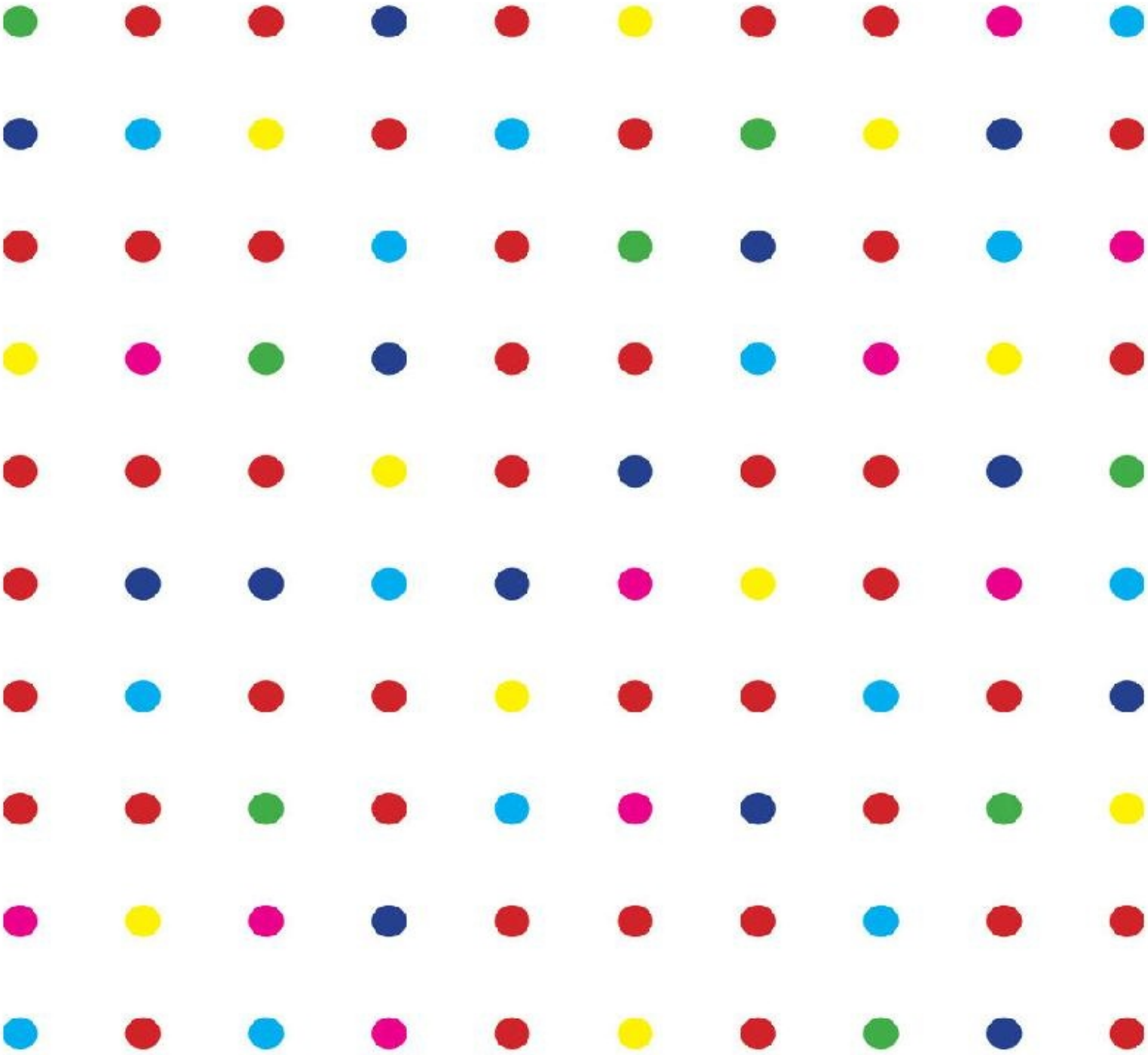

100 Activities for Teaching Research Methods

Catherine Dawson

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Contents

Activity Level Index

Definitions

- Beginner:
  - inexperienced undergraduates (in their first year);
  - students on adult and community education courses who are new to research;
  - trainees on public and private training programmes who are new to research.
- Intermediate:
  - experienced undergraduates (in their second and third year);
  - students on adult and community courses who have some research experience and/or some training in research methods;
  - trainees on public and private training programmes who have previously been involved in a research project and/or undertaken research methods training.
- Advanced:
  - postgraduate students (taught and research);
  - students in centres for doctoral training;
  - students in doctoral training partnerships;
  - research officers and research assistants who have research experience and are advancing their knowledge and understanding through undertaking public or private training courses at advanced level.

Note that some activities presented in this book are suitable for all three levels outlined above. In these cases the complexity of activity, exercise or discussion reflects the level of study.

Activities at beginner level

Activities at intermediate level

Activities at advanced level

Activity Type Index (in alphabetical order)

Brainstorms and brainwaves

Brainstorm with support network

Collaborative dialogue

Focus groups

Games

Group debates

Group exercise followed by group presentation

Group exercise followed by tutor-led discussion

Individual exercise followed by individual presentation

Individual exercise followed by tutor and/or peer feedback

Individual exercise followed by tutor-led discussion

Knowledge exchange

Learning journals, diaries and logs

Micro-conference

Observational exercise and discussion

Role-play

Scenarios for group discussion

Self-guided individual exercises

Social think-tank

Specialist tours, talks and demonstrations

Student-centred resource development

Student worksheets

Support networks

Teaching peers and other groups

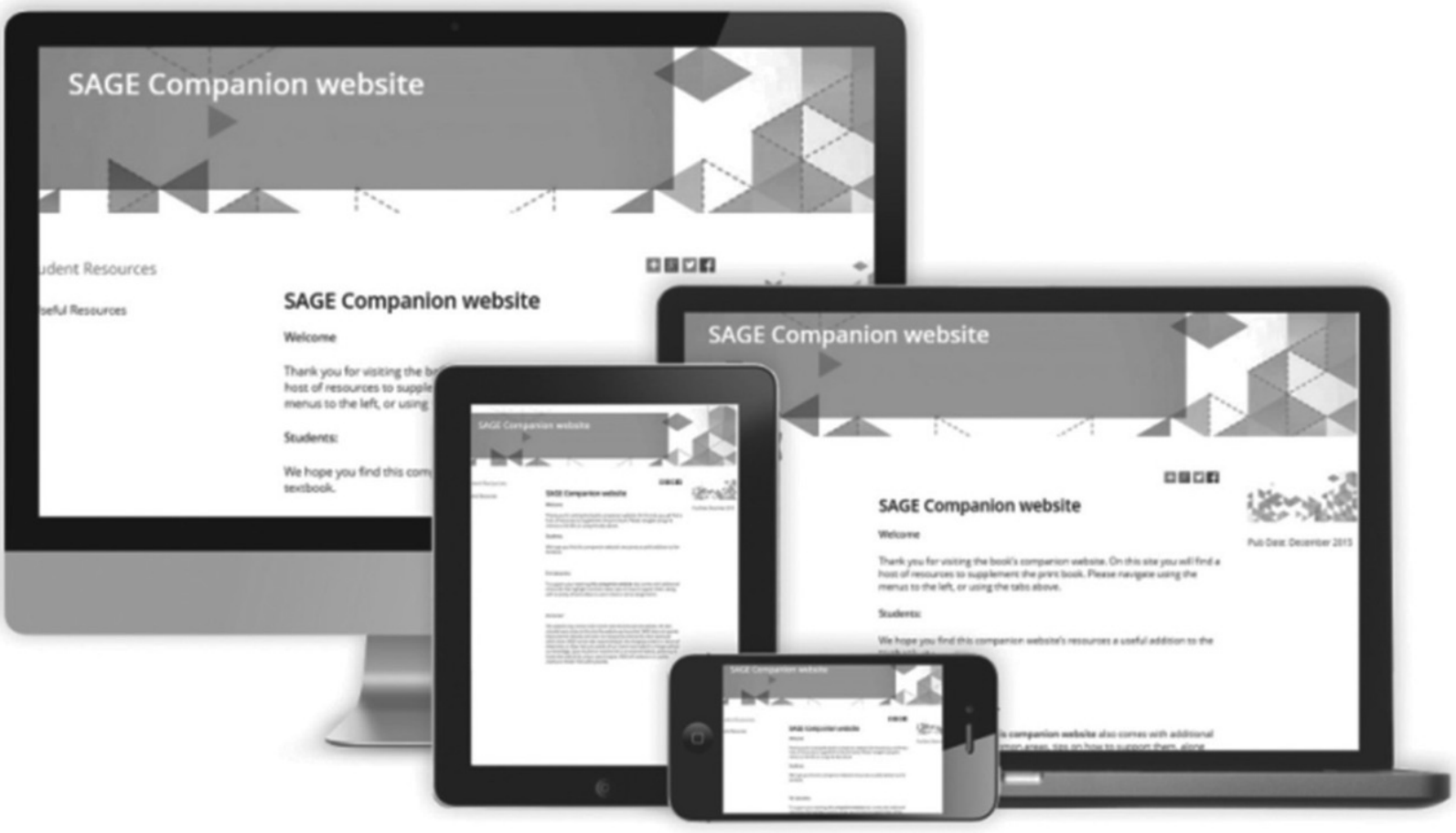
Textbook/PDF development

Tutor-led class discussion

Visual representation and presentation in groups

Websites, apps and podcasts

Companion Website



100 Activities for Teaching Research Methods is supported by online resources that support teaching and aid student study. The resources are available at **https://study.sagepub.com/catherinedawson**

For lecturers: student activity handouts from the book are available for you to download, tailor and share with your students in class or for assignments, which will support their mastery of research methods.

About the Author

Dr Catherine Dawson

studied at university in the UK for an undergraduate degree in Combined Humanities, a master's degree in Social Research and a PhD that looked at the learning choices of adults returning to education. She has worked as a research assistant, research associate and tutor at various UK universities and as a research and training officer in both the public and private sectors. Over the years she has developed and taught research methods courses for undergraduate and postgraduate students and has designed and delivered bespoke research methods training sessions to employees at all levels in the private sector. During her career she has undertaken a wide variety of publicly and privately funded research projects. Catherine currently works as a freelance researcher and writer, concentrating on research methods, study skills and student finance.

Introduction

This book provides 100 practical activities for tutors and instructors who teach research methods. It is a sourcebook of self-guided individual exercises, group exercises, games and role-plays that can be used to complement and expand on existing teaching methods and course materials. The book is not discipline-specific and will, therefore, be of use to tutors who teach in the social sciences, sciences and humanities. It is a pedagogical aid aimed at anyone who teaches research methods: for early-career tutors it will provide ready-made materials that can be used when developing and designing modules, and for more experienced tutors it can be used as a complementary resource to support existing research methods training or to help adapt or develop new modules to further engage students.

The activities are aimed at undergraduates and postgraduates, students on adult education or community education courses and students on private company training programmes. They are aimed at three specific levels of student: beginner, intermediate and advanced. 'Beginner' includes inexperienced undergraduates, usually those in their first year, and students on adult and community courses or private training programmes who do not have research methods experience. 'Intermediate' includes undergraduates with more experience, usually in their second or third year, and students on adult and community courses and private training programmes who have some experience of research methods training or research projects in employment. 'Advanced' includes postgraduate students, students in doctoral training centres, research assistants, research officers and other students/trainees who have research experience. A 'level index' is provided so that tutors can choose the activities that are most suited to the level at which their students are studying. Some activities are suitable for all three levels: the level is reflected in the complexity of discussion/activity and topics covered. This is made clear where it occurs, with instructions given on how to adapt the activity for a specific level, if required.

The activities have been divided into seven sections:

- finding and using sources of information;
- planning a research project;
- conducting research;
- using and analysing data;
- disseminating results;
- acting ethically;
- developing deeper research skills.

This simple structuring enables tutors to skim the contents and find relevant activities quickly. It is intended that the book is used as a flexible 'pick and mix' resource: tutors can skip around within and between the sections to draw together the activities that are useful and relevant to their particular group of students. Although it may seem to be a rather unusual decision, more complex issues such as epistemology and theory generation have been left until the final section of the book. This is because some students struggle with these issues, which can be daunting and off-putting. For some people, these more complex issues only become clear when they have had some instruction in research methods. However, if tutors disagree with this reasoning, the flexible nature of this sourcebook

enables them to present the activities to their students in the order that they deem most appropriate.

Different types of activity are presented in this book. There are self-guided individual exercises, student worksheets, group exercises, group games, role-plays, tutor-led brainstorms and brainwaves, student-centred resource development, support networks, collaborative dialogue, group debates and social think-tanks. An ‘activity type’ index is included so that tutors can choose the type of activity that would most suit their students and subject area. It is also possible for tutors to mix and match type of activity with topic (in cases where an activity is of interest, but the specific topic is not relevant, for example).

Each activity is divided into tutor’s notes and student handouts and includes the following categories:

- purpose;
- type;
- level;
- duration;
- equipment/materials;
- prerequisite activities;
- learning outcome;
- description of the activity;
- key issues;
- useful terms;
- preparatory reading;
- further reading.

These categories provide all the practical and relevant information required for tutors to be able to use each activity effectively in their teaching.

Part 1 Tutor Notes

Section 1 Finding and Using Sources of Information

Activity 1 Distinguishing Between Primary and Secondary Sources

Student handout page 271

Tutor Notes

Purpose: This activity helps students to understand the differences between primary and secondary sources when they are searching for, and using, information for their course and/or their research. A student worksheet helps to introduce the topic and encourages students to think about the differences between the two types of source material.
Type: Student worksheet (during independent study or in class).
Level: Beginner (for students who have limited knowledge of primary and secondary sources).
Duration: Up to 30 minutes.
Equipment/materials: None required.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will be able to distinguish between primary and secondary sources.

The activity

Give your students Handouts 1 and 2. Ask your students to work through the questions on Student Handout 2, using Handout 1 as a guide. This worksheet will help your students to think more about the differences between primary and secondary sources. It can be followed by a tutor-led discussion, if you think it is necessary.

Key issues

This short, simple activity was developed when it became clear that some students enrolling on my research methods courses did not have a basic understanding of the differences between primary and secondary sources. The worksheet was designed as a quick and simple way to get them thinking about the issues involved. However, it is far too basic for some students (such as those with a background in history): discretion should be used when deciding whether or not to use this activity.

Students are sometimes confused about whether a journal paper is a primary or secondary source. You may need to point out that this depends on the type of paper. If a journal paper is purely a report of an original piece of research, carried out by the author(s), it is most likely a primary source. However, a critique, review or analysis of this paper carried out by another researcher is a secondary source. Also, if a journal paper is reporting an analysis of data that has already been collected by another researcher this is a secondary, rather than a primary, source. Some journal papers can be both primary and secondary source material; for example, a researcher might report on their original piece of research (primary source), but might also include a comprehensive literature review (secondary source).

It is important to point out to students that sources that are primary to the originator (the statistician, film-maker, writer, clinician or researcher, for example) become secondary when they are interpreted and analysed by others.

The answers to the questions on the worksheet are as follows:

Source 1: primary
Source 2: secondary
Source 3: primary
Source 4: primary
Source 5: primary
Source 6: secondary
Source 7: primary
Source 8: primary
Source 9: combination
Source 10: secondary
Source 11: secondary
Source 12: primary
Source 13: secondary
Source 14: primary
Source 15: primary

Useful terms

See Student Handout 1 for a definition and examples of ‘primary sources’ and ‘secondary sources’.

Related activities

- Activity 2: Finding and using primary sources
- Activity 6: Using the internet for background research
- Activity 7: Evaluating sources

Preparatory reading

Chapters 2 and 3 of Brundage (2013) provide some useful information about primary and secondary sources, and offer advice about how to find different sources.

If you are teaching research methods in the behaviour sciences, you may find Sections 2.3 and 2.4 of Gravetter and Forzano (2012) useful when teaching about primary and secondary sources.

Further reading

Brundage, A. (2013) *Going to the Sources: A Guide to Historical Research and Writing*, 5th edition. Chichester: John Wiley & Sons. This book is aimed at history tutors and students, but has some interesting material about finding and engaging with sources that is relevant for students studying other social science and humanities subjects.

Gravetter, F. and Forzano, L. (2012) *Research Methods for the Behavioral Sciences*. Belmont, CA: Wadsworth.

Activity 2 Finding and Using Primary Sources

Student handout page 275

Tutor Notes

Purpose: This activity is a student worksheet that helps students to find primary sources and use them effectively (ensuring that relevant information is gathered, recorded, stored and referenced correctly).
Type: Student worksheet.
Level: Beginner.
Duration: Several hours during independent study.
Equipment/materials: Students will need access to the relevant resources and details of the referencing system used at your institution.
Prerequisite activities: If students are new to this topic they may find it useful to work through Activity 1: Distinguishing between primary and secondary sources, although this is not a prerequisite activity.
Learning outcome: By the end of this activity students will know how to identify, locate, use, record and reference primary sources of data.

The activity

Ask your students to work through the activity in the student handout. This directs them to choose three primary source categories from the given list and then identify a specific source within each of the three chosen categories. Once they have done this they should answer the questions posed on the worksheet. This activity helps students to:

- think about the most useful and accessible primary sources for their subject, and consider sources they may not otherwise have considered;
- analyse possible problems with accessing sources and work out strategies to overcome these problems;
- decide what information needs to be gathered to critique, analyse and evaluate the primary source;
- work out what information needs to be gathered so that they can reference or cite the source correctly;
- decide how to store and record the information they have gathered.

Key issues

The following list provides examples of the type of information that students should collect when they are critiquing, reviewing and referencing primary sources:

- author's name, details and credentials;
- date of publication;
- edition or revision (if relevant);
- publisher;
- type of publication (journal article, photograph, manuscript, for example);
- intended audience;
- coverage of topic;
- reasoning, if relevant (for example, whether statistics are valid and reliable and conclusions are backed up by evidence);
- methods;
- style (writing style, type of image or style of recording, for example);
- practical information required to reference the source, such as journal name, volume and number, image medium, photographer's name, date of image, URL and so on.

Referencing software enables students to keep a record of any background information they use for their research. It is important to be organized from the start as this will enable them to find information easily and organize and manage their references as their research progresses. Popular software includes RefME (www.refme.com), CiteULike (www.citeulike.org), EndNote (http://endnote.com) and Zotero (www.zotero.org).

Students in the UK may find Copac (http://copac.ac.uk) useful when searching for primary sources. This service enables students to access 'rare and unique research material' by bringing together the catalogues of over 90 major UK and Irish libraries, including the British Library, the National Library of Scotland, the National Library of Wales and the libraries at the National Trust and the Royal Botanic Gardens Kew. Copac does not hold any of the materials, so students will need to arrange an inter-library loan with their local or university library. Students in the USA can use the Library of Congress (www.loc.gov) to access books, recordings, photographs, maps and manuscripts. See Activity 6: Using the internet for background research for more online catalogues, archives and libraries (worldwide).

Activity 10 requires students to design and test a tool that will enable them to record, store, organize and manage their critiques and reviews of research papers and scientific material. You can use Activity 10 together with this activity to help your students organize their critiques and reviews of primary sources, if you think it would be of benefit.

Useful terms

See Student Handout 1 in Activity 1 for a definition of ‘primary sources’ and ‘secondary sources’. A description of ‘primary sources’ is also contained in the student handout for this activity. See Activity 6: Using the internet for background research for a definition of ‘Boolean logic’ (or Boolean search) in the context of data search techniques.

Related activities

- Activity 1: Distinguishing between primary and secondary sources
- Activity 10: Managing critiques and reviews
- Activity 11: Critiquing quantitative research papers
- Activity 12: Critiquing qualitative research papers

Preparatory reading

Chapter 4 in Stebbins (2006) provides a definition of primary sources and gives practical information about finding such sources.

Barton, K. (2005) ‘Primary sources in history: breaking through the myths’, *Phi Delta Kappan*, 86(10), 745–53. This paper provides some interesting material for tutors who are teaching about the use of primary sources in history.

Further reading

Bahde, A., Smedberg, H. and Taormina, M. (eds) (2014) *Using Primary Sources: Hands-On Instructional Exercises*. Santa Barbara, CA: Libraries Unlimited.

Brundage, A. (2013) *Going to the Sources: A Guide to Historical Research and Writing*, 5th edition, Chichester: John Wiley & Sons.

Stebbins, L. (2006) *Student Guide to Research in the Digital Age: How to Locate and Evaluate Information Sources*. Westport, CT: Libraries Unlimited.

Activity 3 Improving Observation Skills

Tutor Notes

Purpose: This activity helps to raise awareness of the importance of good observation skills when observing other people by asking students to observe a social situation of their choice. It enables students to practise and develop observation skills, and to share their experiences with other students on their course. It also raises ethical issues associated with the observation of others.
Type: Observational exercise and discussion.
Level: Beginner, intermediate and advanced (the level will be reflected in the standard of observation, presentation and discussion).
Duration: Up to 1 hour individual exercise during independent study and one class session for presentations and discussion.
Equipment/materials: None required.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have improved their personal observation skills and developed a greater understanding of ethical issues associated with observation.

The activity

Ask your students to observe a social activity and/or interaction (involving people) that takes place in a familiar environment, something that they encounter almost every day of their lives. When choosing an activity and/or interaction to observe, your students should be mindful and sensitive, paying close attention to ethical issues. For example, observing children or vulnerable people raises a number of important issues and should be avoided by less experienced students (see Activity 88: Conducting research with vulnerable people and Activity 89: Conducting research with children for more information).

Instruct your students to observe from a distance, so that they cannot hear what is being said (if people are talking). They can take written notes if they wish, but they must not use any recording device (such as mobile phones). Ask them to observe carefully and notice what is happening, without judgement, interpretation or analysis.

Tell your students that they will need to return to your next session ready to describe to other students, in as much detail as possible, what they have observed. Remind them that they should only describe what they have seen and should not analyse or interpret their observations. Once every student has described their observations you can move on to a class discussion (see ‘key issues’, below, for useful discussion points).

Key issues

This activity can raise the following issues (depending on level and subject of study):

- understanding the importance of setting aside preconceptions, personal judgement and personal bias when observing (observation can be subject to observer bias);
- observing body language such as eye contact, posture and gesture;
- undertaking unobtrusive or covert observation (making observations while other people are unaware that you are doing so, and the ethical implications attached to this);
- the effect of observing and how this can change the behaviour of those being observed (when they know they are being observed);
- understanding the types of social interaction, symbols and meanings that are being observed;
- understanding the importance of reflecting on what has been observed;
- using other types of observation (participant observation and observing with all the senses rather than purely sight, for example: more information about different types of observation is provided in Activity 45: Using observation techniques);
- observation techniques from different theoretical and methodological perspectives (a realist perspective that suggests there is a real world to observe, experimental research that manipulates and contrives in a systematic way or naturalistic observations and narrative approaches that tell a story, for example);
- understanding the meaning of observations and knowing how to interpret and analyse them (for more advanced students this can include an introduction to theoretical perspectives such as symbolic interactionism, phenomenology and hermeneutics; see Activity 95).

Useful terms

‘Observation’ in research involves careful, selective viewing (and recording) of phenomena. It involves direct access to the phenomenon that is being researched: this can be in the natural world or in a laboratory, for example. In quantitative research, where the goal is to provide quantifiable, reliable and valid data, observation is structured, formal and systematic, following a set procedure or checklist. In qualitative research, observation does not follow a set, predefined procedure and can instead be open, flexible and diverse. However, careful and systematic recording of all observation is required in both qualitative and quantitative research. Activity 45: Using observation techniques considers these issues in more depth.

Related activities

- Activity 36: Undertaking ethnographic work
- Activity 45: Using observation techniques
- Activity 76: Recognizing ethical issues

Preparatory reading

Chapter 5 in Angrosino (2007) provides some interesting material about focusing on observation.

Although Podmore and Luff (2012) write about using observation in early childhood studies, Part III of the book has some useful information for students and researchers from other subject areas.

Jasani, S. and Saks, N. (2013) 'Utilizing visual art to enhance the clinical observation skills of medical students', *Medical Teacher*, 35(7), 1327–31 (electronic). This interesting paper shows that using visual art images, along with a series of guided questions, can train medical students in observation skills.

Further reading

Angrosino, M. (2007) *Doing Ethnographic and Observational Research*. London: Sage.

DeWalt, K. and DeWalt, B. (2011) *Participant Observation: A Guide for Fieldworkers*, 2nd edition. Lanham, MD: AltaMira Press.

Podmore, V. and Luff, P. (2012) *Observation: Origins and Approaches in Early Childhood*. Maidenhead: Open University Press.

Smart, B., Peggs, K. and Burridge, J. (eds) (2013) Observation Methods (4 volumes). London: Sage.

Activity 4 Assessing Prior Experience and Learning

Student handout page 276

Tutor Notes

Purpose: This activity helps students to identify the key skills and knowledge that they need in order to be able to carry out a successful research project. They must think about whether they have developed any of the listed skills/knowledge from personal experiences and previous learning (both formal and informal). From this they go on to think about what else they need to know or learn to be able to move forward with their research, and give specific examples of how this learning/personal development will take place.
Type: Tutor-led brainstorm followed by individual student exercise and discussion (in class).
Level: Beginner, intermediate and advanced. Students will need to be in the early stages of developing their research proposal or ideas for a research project. The level of study will be reflected in the complexity of issues raised.
Duration: Up to 15 minutes for the brainstorm, up to 30 minutes for the individual exercise and up to 15 minutes for the discussion.
Equipment/materials: Interactive whiteboard, flip chart or chalkboard.
Prerequisite activities: None. However, this activity has close connections with Activity 5: Reflecting on your inquiry skills. Therefore, you can use one or other of these activities, or join parts of them together (for example, students undertaking this activity would benefit from using the type of learning journal described in Activity 5).
Learning outcome: By the end of this activity students will have assessed their existing skills and knowledge and identified their personal development requirements in relation to their proposed research.

The activity

Brainstorm with your students the question ‘what skills and knowledge do you need to carry out a successful research project?’ Write their answers on your board/flip chart without judgement, analysis or reflection.

Some students may be unfamiliar with the brainstorming technique. If this is the case, ask them to give any answer they can think of in relation to the question. They are not going to be judged and they should not judge or critique the answers given by other students (even if they do not agree with another’s contribution). Each answer they give will be written on your board: the goal is to come up with a comprehensive list of skills and knowledge that will help students to carry out a successful research project. Brainstorming should generate free-flowing ideas, promote creative thinking, encourage participation and interaction, pool knowledge and illustrate what students already know.

Once you and your students have produced a comprehensive list, ask your students to answer the questions contained in the student handout, on an individual basis. When they have finished answering these questions, discuss their answers in your class to help share ideas and increase understanding.

Key issues

The following list provides examples of issues that have been raised by students over the years (depending on subject, student experience and level of course):

- organization skills;
- time management;
- the ability to meet deadlines/set goals;
- the ability to work under pressure;
- crisis management;
- adaptability and flexibility;
- patience;
- the ability to work independently, using your initiative;
- the ability to stay motivated and interested;
- high levels of enthusiasm;
- the ability to reflect;
- problem-solving skills;
- skills of analysis, evaluation and synthesis;
- the ability to review and critique;
- teamwork skills;
- social/people skills;
- listening skills;
- reading skills;
- communication skills (verbal and written);
- presentation skills;
- editing/proofreading skills;
- interviewing skills;
- questioning skills (written and verbal);
- the ability to empathize/support others;
- the ability to establish rapport;
- IT skills;
- numerical skills;
- data analysis skills;
- knowing how to use datasets and databases;
- experience of using primary and secondary sources;
- the ability to develop aims and objectives;
- knowledge of research methods;
- knowledge of research methodology;
- an understanding of theoretical frameworks;
- an understanding of the relationship between epistemology, theoretical perspective and methodology;
- knowledge of previous related research (and experts in the field);
- budgeting and costing skills;
- the ability to attract funding;
- the ability to choose a good, workable topic;

- the ability to understand complex research methods books;
- the ability to work well with your supervisor.

Useful terms

See ‘useful terms’ in Activity 5: Reflecting on your inquiry skills for a definition of ‘reflective learning’ and ‘learning outcomes’.

Related activities

Activity 5: Reflecting on your inquiry skills

Preparatory reading

Chapter 7 of Kolb (2014) provides some interesting material on learning and development in higher education.

Budworth and Hashemi (2015) provide a useful introduction to reflective learning in Chapter 2 of their book. They also have an interesting chapter on methods of reflective learning (Chapter 6). Although the book focuses on health and safety practitioners, it has relevance to students in other subject areas.

Further reading

Budworth, T. and Hashemi, W. (2015) *Reflective Learning: An Essential Tool for the Self Development of Health and Safety Practitioners*. Abingdon: Routledge.

Kolb, D. (2014) *Experiential Learning: Experience as the Source of Learning and Development*, 2nd edition. Upper Saddle River, NJ: Pearson Education.

Moon, J. (2004) *A Handbook of Reflective and Experiential Learning: Theory and Practice*. Abingdon: Routledge.

Activity 5 Reflecting on Your Inquiry Skills

Student handout page 277

Tutor Notes

Purpose: This activity helps students to think about their previous experiences in relation to the development of their inquiry skills through the use of a personal learning journal. They will be able to reflect on previous experiences, identify where significant learning has taken place and give evidence for that learning.
Type: Learning journal (during independent study).
Level: Beginner and intermediate.
Duration: One to two hours of independent study, with ongoing reflection and journal entries throughout the course (or throughout their research project; see below).
Equipment/materials: Learning journal (paper or digital, according to student preference).
Prerequisite activities: None. However, this activity has close connections with Activity 4: Assessing prior experience and learning. Therefore, you can use one or other of these activities, or join them together.
Learning outcome: By the end of this activity students will have produced a learning journal in which they identify, and provide evidence for, previous and ongoing learning and personal development in relation to inquiry skills.

The activity

This activity has been designed for students on a research methods course. However, it can be adapted for students who are undertaking a research project (if this is the case you will need to change ‘course’ to ‘research project’ in the student handout).

Ask your students to keep a learning journal when your course (or their research project) first begins. This can be paper or digital, according to student preference. This journal is to be kept for the duration of the course/research project and is to include notes, observations, thoughts and other relevant materials.

To begin the journal, ask students to reflect on their inquiry skills. What inquiry skills do they have, how have they developed these skills and what evidence do they have of this learning? Encourage them to think about both formal and informal learning. The student handout provides guidance, if required.

Key issues

The journal is a personal endeavour that will not be seen by tutors or other students. The purpose of keeping a journal is to enhance learning. This is done by reflecting on what is being learned and through the process of writing down these thoughts and reflections. The journal should not be a descriptive account of the course/research project, but should indicate an active process of thought, reflection, recognition, analysis and understanding. Learning journals can help students to:

- develop skills of reflection;
- enhance problem-solving skills;
- improve writing;
- enhance creativity;
- develop critical thinking skills;
- support personal development and self-empowerment;
- support planning and progress with a research project;
- increase active involvement in learning;
- enable students to take control of their own learning.

Students should be encouraged and/or reminded to continue with their journal as their course/project progresses so that they can record ongoing learning and development.

Useful terms

‘Reflective thought’ concerns the ability to gather facts, understand arguments and ideas, address and apply methodological principles, analyse and evaluate information, weigh evidence and produce persuasive arguments and/or conclusions. It includes the ability to question and solve problems by connecting previous knowledge, ideas and experiences with present knowledge, ideas and experiences.

‘Learning outcomes’ reflect the changes that have taken place in an individual as a result of going through a learning process. This might be from experiences in everyday life, at work or in a more formal learning situation, such as employment training courses, apprenticeships or undergraduate courses. Learning outcomes can include subject-based outcomes such as knowledge and comprehension, the ability to apply knowledge in different settings/situations, and processing skills acquired through the use and application of knowledge. Learning outcomes can also include personal outcomes such as interpersonal skills (teamwork and negotiation, for example) and interpersonal qualities (motivation, initiative and critical self-reflection, for example).

Related activities

- Activity 4: Assessing prior experience and learning

Preparatory reading

Chapter 9 of Moon (2006) provides some interesting information about starting to write a learning journal. This is a useful book for tutors who are interested in using learning journals on their course.

Theme 3 in Part 1 of Bassot (2013) provides some interesting material on learning from experience. This is a useful book for tutors who want to know more about reflective writing.

Further reading

Bassot, B. (2013) *The Reflective Journal*. Basingstoke: Palgrave Macmillan.

Moon, J. (2006) *Learning Journals: A Handbook for Reflective Practice*, 2nd edition, Abingdon: Routledge.

Activity 6 Using the Internet for Background Research

Student handout page 279

Tutor Notes

Purpose: This activity increases awareness of the wide variety of sources that are available on the internet for students conducting background research. It lists a variety of online tools and asks students to choose and use three of these tools to find sources relevant to their background research. Although students studying at this level should know their way around the internet, this activity asks them to choose and use sources with which they may be unfamiliar, or that might not be immediately obvious for their research topic, methodology or area of expertise.
Type: Self-guided individual exercise (during independent study).
Level: Intermediate and advanced (for students who are just starting background research for their dissertation, thesis or project).
Duration: Up to 5 hours of independent study.
Equipment/materials: Access to the internet.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have discovered and used a variety of internet tools to find sources for their background research. They will have reviewed and critiqued relevant sources and recorded material correctly so that it can be used or cited at a later date.

The activity

Ask students to undertake the activity contained in the student handout. This lists various internet tools that your students are to use to find specific sources relevant to their research topic and/or methodology (they are to choose three of these tools). If any of these tools are not relevant to your subject, delete as appropriate.

Key issues

The following list provides examples of services that are available on the internet to help students and researchers search for information (this is in addition to the journals and databases that can be accessed by your university/organization subscription, which will be discussed by your subject liaison librarian in Activity 52: Improving data search techniques).

- The Directory of Open Access Journals (www.doaj.org) offers free online access to high-quality academic papers and provides useful quick and advanced search facilities to help students find relevant articles. The aim of the site is to 'increase the visibility and ease of use of open access scientific and scholarly journals, thereby promoting their increased use and impact'.
- The Social Sciences Research Network (www.ssrn.com) is made up of a number of specialized research networks in each of the social sciences. It has been set up to enable the rapid dissemination of social science research on a worldwide basis. Students can visit this site to view abstracts and full papers covering a wide variety of subject areas.
- Google Scholar (http://scholar.google.com) enables students to search scholarly literature such as books, articles, theses and abstracts from academic publishers, professional societies, online repositories, universities and other websites. However, many papers will not be readable without a subscription, so students will need to contact their university library for more information and to access papers.
- Copac (http://copac.ac.uk) enables students to access rare and unique research material by bringing together the catalogues of over 90 major UK and Irish libraries, including the British Library, the National Library of Scotland, the National Library of Wales and the libraries at the National Trust and the Royal Botanic Gardens Kew. Copac does not hold any of the materials, so students will need to arrange an inter-library loan with their local or university library.
- The UK Data Service (http://ukdataservice.ac.uk) is a comprehensive resource funded by the Economic and Social Research Council to support researchers, teachers and policy-makers. Students can access a wide range of secondary data including large-scale government surveys, international macro-data, business micro-data, qualitative studies and census data from 1971 to 2011.
- The British Newspaper Archive at the British Library contains over 10 million searchable pages, from more than 200 newspaper titles from the UK and Ireland. Most of the articles are out-of-copyright material pre-dating 1900, although there is a move to digitize some newspapers from the mid-twentieth century. This is a priced service online, but it is free to search.
- The Library of Congress (www.loc.gov) is a federal cultural institution that serves as the research arm of Congress in the USA. It is described as the largest library in the world, with millions of books, recordings, photographs, maps and manuscripts available in its collections. The library's catalogues can be searched over the internet and there is a useful 'ask a librarian' service for queries.
- WorldCat (www.worldcat.org) is described as the world's largest network of library content and services, enabling searches of library collections around the world. Students and researchers can use this internet service to search for books, music and videos, research materials, visual images and audiobooks. Resources are available in different languages.
- The National Library of Australia (www.nla.gov.au) contains over 10 million items, including books, journals, newspapers, music scores, maps, e-resources, manuscripts, documentary

pictures and oral history and folklore recordings. The catalogue is available online and there is a comprehensive inter-library loan service available.

Useful terms

‘Boolean logic’ (or Boolean search) in the context of data search techniques refers to the logical relationship among search terms. There are three Boolean operators that enable searches to yield valuable results: AND, OR, NOT (NEAR can also be used and is similar to putting quotation marks around a search term). The best searches tend to use a combination of these operators, although, when searching on the internet, simpler searches can take less time than more complex searches. It is important to note that, although most search engines use Boolean logic, they do not always express this concept using the same terms. See Activity 52: Improving data search techniques for more information about using search operators.

Related activities

- Activity 2: Finding and using primary sources
- Activity 7: Evaluating sources
- Activity 50: Using the internet as a tool for research
- Activity 52: Improving data search techniques

Preparatory reading

Ó Dochartaigh (2012) is a useful book to read in its entirety, covering issues such as subject guides, searching keyword search engines and evaluation and citation.

Chapter 4 of Ford (2012) covers the issue of finding high-quality information and provides some interesting and valid points about conducting searches.

Further reading

Ford, N. (2012) *The Essential Guide to Using the Web for Research*. London: Sage.

Ó Dochartaigh, N. (2012) *Internet Research Skills*, 3rd edition. London: Sage.

Activity 7 Evaluating Sources

Tutor Notes

Purpose: This activity is a game that requires students to rank, re-rank and discuss a variety of sources. It is an entertaining way to highlight the importance of effective source evaluation, and it helps students to understand if and how a particular source should be used in their academic work.
Type: Group game (in class).
Level: Beginner.
Duration: One hour for the game and discussion.
Equipment/materials: You will need some white or coloured card on which you can write or print the sources (see below).
Prerequisite activities: None.
Learning outcome: By the end of this activity students will know about different sources that are available, understand that some sources are more valid and reliable than others, and know which sources are appropriate to use in their academic work.

The activity

Write or print each of the sources listed below onto an individual piece of card. Give one card to each of your students (if you have more students than cards, ask some students to observe the game). Ask the students to line themselves up in order of importance, starting at the left with the most valid, reliable and scientifically rigorous source, and working their way to the right so that the most unreliable, biased and flawed source is on the far right.

The time that this takes depends on the experience and characteristics of your group and the influence of personal bias on the decision-making process (see below). Students usually complete this exercise within 10 minutes.

Once the students have aligned themselves to everyone's satisfaction, introduce the changes listed below by swapping the relevant cards. Do this one at a time, asking students to realign themselves each time a new card is introduced. This usually takes up to 15 minutes. When the game has finished, follow with a discussion about the issues that have been raised (see 'key issues', below).

Students with limited mobility can act as observers, or you can assign an 'advisory' role, where advice is offered as students attempt to align themselves. Also, if you have students with a visual impairment, ask students to call out the source on their card at the beginning, after each realignment and at the end of this activity.

Sources (one source per card to be introduced at the start of the game):

Widely cited academic monograph
Peer-reviewed journal paper
Paper in a university repository
Paper in an open access repository
University website
Academic's blog
Academic's YouTube video
Wikipedia article
Channel 4 TV documentary (or an equivalent TV channel in your country)
BBC radio news programme (or an equivalent radio station in your country)
Newspaper article
Political party manifesto
Activist's website
Drug company website
Advertiser's direct email

Changes (write these onto cards, ready to swap later in the game):

Sun newspaper article (or an equivalent tabloid newspaper in your country)
Academic activist's website
Channel 5 TV documentary (or an equivalent TV channel in your country)
Medical school website

Non-peer-reviewed journal paper
Refuted academic monograph

Swap the cards in the following way (one at a time, with the students realigning themselves each time, if deemed necessary):

Newspaper article → *Sun* newspaper article
Activist's website → Academic activist's website
Channel 4 TV documentary → Channel 5 TV documentary
Drug company website → Medical school website
Peer-reviewed journal paper → Non-peer-reviewed journal paper
Widely cited academic monograph → Refuted academic monograph

Key issues

Students may struggle with some of the sources; for example, they may discuss the fact that journal papers and both types of repository paper have equal value (this can raise an interesting discussion about whether the papers have been peer-reviewed and, if so, the value of peer review). Some groups have overcome issues such as this by standing in the same position on the line, one in front of each other. This can change, however, when one of the new sources is introduced. Also, some students may decide that a realignment is not necessary when some of the changes are introduced. This game is not about getting the alignment right or wrong, but is instead about raising the issues surrounding source evaluation. These can include the following:

- All sources, however valid and reliable students believe them to be, must be evaluated, analysed and critiqued carefully. It is important to determine the authority of the author (or originator) in terms of credentials, education, experience and bias. It is also important to determine the validity, quality and reliability of the information that is being presented. All sources should be checked for accuracy and cross-checked, where possible. More information about these issues is given in Activities 11, 12 and 13.
- Peer-reviewed journals have been examined by experts in the field and evaluated on the quality of their research. The 'about' section on a journal homepage will usually show that it is peer-reviewed or refereed. Also, some database/library search facilities enable students to search only for scholarly or peer-reviewed articles. Activity 70: Writing journal papers provides a definition of 'peer review' and gives details of a paper that reviews and critiques the process.
- Students should be aware of their own personal bias (perhaps due to political opinion, for example) when evaluating sources. On occasion, this activity illustrates how personal bias can influence decision-making processes, with some students reaching stalemate about the positioning of certain sources. More information about bias is given in Activity 15: Recognizing research(er) bias.
- Some sources are primary, some sources are secondary. Sources that are primary to the originator (the statistician, film-maker, writer or researcher) become secondary when they are interpreted and analysed by others. However, the assumption should not be made that primary sources are always the most reliable and valid (primary sources such as diaries and memoires are full of personal bias, whereas an academic critique of such material can be accurate and unbiased, for example). See Activities 1 and 2 for more information about primary and secondary sources.
- Certain sources can be useful for research, even if researchers know that they are unreliable, biased or flawed. For example, a researcher looking into funding bias may decide to review a drug company website in an attempt to find out how funding bias can influence the internal research process. However, it is vital that a careful critique takes place and that all biased/flawed sources are acknowledged as such.

Useful terms

Some students ask for a definition of ‘monograph’, which is a detailed written study of a single specialized subject (or a part of the specialized subject). Monographs can be essay or book length.

Also, some students want to know more about ‘repositories’. An open access repository is a place where academic papers (peer-reviewed and non-peer-reviewed), monographs, book chapters and other research output are stored on the internet with unrestricted access. Open access is different from open content. When a journal paper is published through an open access model it is made available on the internet (with unrestricted access) but others cannot modify or change content. The paper is attributed to one author or a group of authors. Open content, on the other hand, enables others to modify, edit and change articles that are freely available. This type of article is not attributed to any particular author.

Related activities

- Activity 1: Distinguishing between primary and secondary sources
- Activity 2: Finding and using primary sources
- Activity 6: Using the internet for background research
- Activity 8: Recognizing statistics, facts, arguments and opinions
- Activity 9: Discovering questionable statistics published online

Preparatory reading

Harris (2011) contains some useful information on evaluating the quality and validity of sources.

Further reading

Stebbins, L. (2015) *Finding Reliable Information Online: Adventures of an Information Sleuth*. Lanham, MD: Rowman & Littlefield.

Harris, R. (2011) *Using Sources Effectively: Strengthening your Writing and Avoiding Plagiarism*, 3rd edition. Glendale, CA: Pyrczak Publishing.

Activity 8 Recognizing Statistics, Facts, Arguments and Opinions

Student handout page 280

Tutor Notes

Purpose: This activity helps students to recognize, and distinguish between, statistics, facts, arguments and opinions by asking them to record, critique and analyse the occurrence of each of these over a week (in books, journals and newspapers, and on social media and television, for example).
Type: Self-guided individual exercise to produce a log (during independent study).
Level: Beginner.
Duration: Several hours of independent study spread over a week.
Equipment/materials: A digital or paper log book or diary.
Prerequisite activities: None, although this activity could be run together with Activity 13: Evaluating science in the media.
Learning outcome: By the end of this activity students will be able to recognize, and distinguish between, statistics, facts, arguments and opinions.

The activity

Give students the student handout at the end of one of your teaching sessions. Ask them to complete the activity over a week (you can discuss the outcome in your next teaching session if necessary and if time is available). The handout asks your students to record, critique and analyse the occurrence of statistics, facts, arguments and opinions over a week. This can be in the media, online or in academic books and journals, for example.

Key issues

When this activity has been undertaken in the past, students who are new to these issues express surprise at how often people in the public eye (in particular, politicians, journalists and celebrities) give misleading or false information that is disguised as, and taken for, fact. These ‘facts’ are then repeated by others and everyone believes them. This activity can be extended by asking students to take one of these particular ‘facts’ and track its use over time, noting how it is used and misused by different people and by different types of media.

Useful terms

See the student handout for a definition of statistics, facts, arguments and opinions.

Related activities

- Activity 7: Evaluating sources
- Activity 9: Discovering questionable statistics published online
- Activity 13: Evaluating science in the media
- Activity 14: Recognizing media and political bias

Preparatory reading

Bad Science (www.badscience.net) is a website containing blogs and articles about bad science, written by Ben Goldacre. The articles were written for the 'Bad Science' column in the *Guardian* newspaper in the UK and highlight the misuse of science and statistics by journalists, politicians and drug companies, for example.

Students and tutors who are interested in these issues will find both Goldacre (2014) and Spiegelhalter and Blastland (2014) accessible, entertaining and interesting.

Further reading

Goldacre, B. (2014) *I Think You'll Find It's a Bit More Complicated Than That*. London: Fourth Estate.

Spiegelhalter, D. and Blastland, M. (2014) *The Norm Chronicles: Stories and Numbers about Danger*. London: Profile Books.

Activity 9 Discovering Questionable Statistics Published Online

Student handout page 282

Tutor Notes

Purpose: This activity helps students to discover and identify questionable statistics that are published online. It asks them to find, in their groups, an example of unreliable statistics reported online to back up a questionable line of thought and/or ideology. From this they produce a checklist that will help them to determine whether the statistics they find online can be relied upon. This activity can be extended to cover statistics published elsewhere, if required.
Type: Small-group exercise (during independent study) followed by a small-group presentation (in class).
Level: Beginner.
Duration: Several hours of group work during independent study and up to 2 hours in the classroom for group presentations and discussion (depending on the number of student groups).
Equipment/materials: Internet access for students and access to relevant presentation software, materials or props.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will be able to discover, identify and critique questionable statistics that have been published online.

The activity

Divide your students into small groups and give them the student handout. They are to work together in their groups (during independent study) to find a website, webpage, blog or other online publication that uses unreliable statistics to back up a questionable line of thought and/or ideology. They will need to describe the way in which the statistics are reported and discuss the flaws in the statistics and/or reporting.

Once they have done this the groups should draw up a checklist that will help them to recognize questionable statistics that are published online. Students will need to present their findings in a 10-minute presentation to the rest of their class. If contact time is limited you can ask students to post their findings on the relevant digital platform (or you can include this information in the student-centred resource that is set up in Activity 54: Making use of statistics).

Key issues

The following points have been identified by students in this activity and are used to develop their checklists:

- Statistics are cited, but their origin is unclear and it is not possible to check on the information provided.
- It is not possible to distinguish between statistics, opinions, arguments and facts. Statistics are presented as facts and opinions are disguised as arguments. More information about these issues is given in Activity 8.
- Advertisers appear to have influenced the statistical content. However, the advertising is not identified clearly and is disguised within the text.
- The prejudices, beliefs or bias of the author are widespread and appear to have influenced the statistics that are reported (statistics have been manipulated to fit the argument).
- A lack of statistical knowledge is displayed.
- Correlation is confused with causation.
- Incorrect statistical rules have been applied.
- The output of statistical software programs has been misread or misinterpreted.
- The statistics presented do not support the conclusions made.
- Unfavourable statistics have been disregarded.
- The statistics are irrelevant to the topic/argument.
- Spelling and grammatical errors indicate that the same poor level of attention has been paid to finding and presenting the statistics.
- Technical jargon and complex formulae (without explanation) are used to confound and confuse. A lack of statistical knowledge by the audience/reader makes this worse.

Useful terms

There are four ways that the term ‘statistics’ is used:

- a subject or discipline and the work carried out within that discipline;
- the methods that are used to collect and process quantitative data;
- the collections of data that are produced from the methods used to collect and process the data;
- specifically calculated figures (such as the mean, mode and median) that are used to characterize the quantitative data that have been collected.

It is the third and fourth definitions that tend to be used in this activity, although occasionally some students may consider the second definition.

‘Personal bias’ is an inclination or preference that influences a person’s judgement, often in a subtle way that can be difficult to detect. Students might detect this within their chosen online report/publication, but they must also be wary of being influenced by personal bias when they undertake their critique. It is useful to undertake this activity as a group exercise because issues of personal bias can, sometimes, be raised and discussed.

Related activities

- Activity 6: Using the internet for background research
- Activity 7: Evaluating sources
- Activity 8: Recognizing statistics, facts, arguments and opinions
- Activity 14: Recognizing media and political bias
- Activity 15: Recognizing research(er) bias
- Activity 54: Making use of statistics

Preparatory reading/listening

Chapter 1 in Rowntree (2000) provides a basic introduction for people who are new to statistics.

Huff (1991) is a book that was first published in 1954 is and still very relevant and useful today.

More or Less is a radio programme that is broadcast on BBC Radio 4 in the UK and produced in association with the Open University. The programme discusses the use and misuse of statistics in everyday life. Podcasts and downloads are available from the BBC website (www.bbc.co.uk/programmes).

Further reading

Huff, D. (1991) *How to Lie with Statistics*. London: Penguin.

Paulos, J. (2014) *Innumeracy: Mathematic Illiteracy and its Consequences*. London: Penguin.

Rowntree, D. (2000) *Statistics Without Tears: An Introduction for Non-Mathematicians*. London: Penguin.

Activity 10 Managing Critiques and Reviews

Student handout page 283

Tutor Notes

Purpose: This activity requires students to design and test a tool that will enable them to record, store, organize and manage their critiques and reviews of research papers and scientific material. It asks them to test their new tool by undertaking a critique and review of two academic papers or research reports.
Type: Self-guided individual exercise (during independent study).
Level: Beginner, intermediate and advanced.
Duration: Several hours during independent study to design their tool and complete the first two entries. The length of time taken will depend on the complexity of their tool and their level of study.
Equipment/materials Software with which to design their tool.
Prerequisite activities: If your students require further guidance about how to critique and review, undertake Activity 11: Critiquing quantitative research papers and Activity 12: Critiquing qualitative research papers. Alternatively, you can use the handouts from these two activities (these provide questions that students should consider when critiquing and reviewing).
Learning outcome: By the end of this activity students will have developed and tested a tool that will help them to record, store, organize and manage their critiques and reviews of research papers and scientific material.

The activity

Give your students the student handout. This asks them to produce a tool that can be used to help them to record, store, organize and manage their critiques and reviews of research papers and scientific material. Suggestions for categories are given in the handout: omit categories marked with an asterisk for students studying at beginner and intermediate level, if appropriate.

Once your students have produced their tool they should critique and review two academic papers of their choice (of relevance to their course, research topic or research methods) and enter details into their tool accordingly. If they find that categories are missing or the design of their tool needs revising, they should make the relevant changes, where appropriate.

Inexperienced students or those who are just beginning their undergraduate course may need to be reminded of the difference between academic papers (presented in peer-reviewed journals, for example) and magazine articles.

Key issues

This is a personal exercise that encourages students to think about the information that should be gathered from academic papers and how this information can be stored. In the past they have produced useful tools using spreadsheets, databases or ready-made online tools that they have adapted, for example.

There are a variety of search engines, curators and apps that help students to find and organize relevant research papers and scientific material (RefMe, CiteULike, Zotero and ReadCube, for example). However, students should be encouraged to go further and develop their own tool that will help them to record specific and detailed information. The student handout contains a list of information that students should think about recording.

Useful terms

See Activity 70: Writing journal papers for a definition of ‘peer review’ and Activity 7 for a discussion about ‘repositories’.

Related activities

- Activity 7: Evaluating sources
- Activity 11: Critiquing quantitative research papers
- Activity 12: Critiquing qualitative research papers

Preparatory reading

Connected Researchers (http://connectedresearchers.com) provides some useful information for researchers who are interested in digital tools to help with their research. It has tools that help to explore literature; find and share data and code; and write, publish and evaluate research [accessed 2 April 2015].

Tutorials about critiquing and reviewing can be found on YouTube (www.youtube.com). These are presented by academics from around the world and cover a number of different subject areas and disciplines, at a variety of levels. The search terms ‘critiquing and reviewing’, ‘writing a critique’ or ‘research critique’ will find many of these videos.

Further reading

Harris, S. (2014) *How to Critique Journal Articles in the Social Sciences*. Thousand Oaks, CA: Sage.

Shon, P. (2012) *How to Read Journal Articles in the Social Sciences: A Very Practical Guide for Students*, London: Sage.

Wallace, M. and Wray, A. (2011) *Critical Reading and Writing for Postgraduates*, 2nd edition. London: Sage.

Activity 11 Critiquing Quantitative Research Papers

Student handout page 284

Tutor Notes

Purpose: This activity helps students to understand how to interpret and critique the published quantitative work of other researchers by asking students to read a scientific paper and answer specific questions. This will enable them to judge the validity and reliability of research reports and papers and assess excellent and poor research practice. It will also help to inform and improve their personal research skills.
Type: Individual exercise (during independent study) followed by tutor-led discussion (in class).
Level: Beginner, intermediate and advanced. The depth of critique and discussion will reflect students' knowledge and understanding of quantitative techniques.
Duration: Several hours during independent study, followed by a class discussion of 40 minutes to 1 hour.
Equipment/materials: A published research paper.
Prerequisite activities: None, although students may find it useful to undertake Activity 10 as it helps them to record, store and manage their critiques. An understanding of quantitative data analysis techniques may be useful for students studying at a higher level (see Activity 57: Analysing quantitative data).
Learning outcome: By the end of this activity students will be able to critique quantitative research papers and recognize potential problems with data interpretation, citation, bias, validity and reliability.

The activity

Give your students a copy of a research paper that is relevant to your subject (some suggestions are given below, if this is more convenient). Ask your students to read the paper and consider the questions in the student handout (Student Handout 1 is for students at beginner level and Student Handout 2 is for students at intermediate and advanced level: delete the questions marked with an asterisk for students at intermediate level). Ask your students to be prepared to discuss their critique in your next teaching session.

Key issues

The following issues can be raised during the discussion (depending on the level and subject of your course):

- Correct interpretation of data. Common mistakes include confusing correlation with causation and ignoring the margin of error.
- Sources and citation. Sources can be used for direct citation (where a quotation is used word for word or where visual data are reproduced without alteration, for example). They can also be used for indirect citation (where the ideas of another person are reworded or summarized, where facts or data are used that are not common knowledge, or where source material is slightly altered but the main argument remains, for example).
- Introduction of bias. This could be during the hypothesis forming stage, the experimentation stage, the data collection and analysis stage or when making conclusions and writing up results. More information about bias can be found in Activity 15: Recognizing research(er) bias and Activity 83: Understanding biased financial relationships.
- Validity and reliability. Validity refers to the accuracy of the measurement, asking whether the tests are measuring what they are supposed to measure. Reliability refers to the way that the research instrument is able to yield the same results in repeated trials. It refers to consistency of measurement and asks whether other researchers would get the same results under the same conditions. Replication of statistically significant results is essential if the scientific community is to accept the hypothesis and establish it as scientific truth. There are different ways to determine validity and reliability and these are discussed in Activity 59: Ensuring validity and reliability in quantitative research.

Useful terms

See Activity 54: Making use of statistics for a definition of ‘descriptive statistics’ and ‘inferential statistics’.

‘Dependence’, in statistics, refers to any statistical relationship between two random variables or two sets of data (they are not independent of each other). ‘Correlation’ is a statistical measure that indicates how two or more variables relate (or fluctuate together). However, correlation does not imply causation: students should be mindful of issues of cause and effect and their misuse in data interpretation.

Related activities

- Activity 10: Managing critiques and reviews
- Activity 12: Critiquing qualitative research papers
- Activity 15: Recognizing research(er) bias
- Activity 54: Making use of statistics
- Activity 59: Ensuring validity and reliability in quantitative research

Suggested papers for critique

Mogey, N., Cowan, J., Paterson, J. and Purcell, M. (2012) 'Students' choices between typing and handwriting in examinations,' *Active Learning in Higher Education*, 13(2), 117–28. (A focus group is conducted in this research, before it moves on to the quantitative research.)

Roosen, K. and Mills, J. (2015) 'Exploring the motives and mental health correlates of intentional food restriction prior to alcohol use in university students', *Journal of Health Psychology*, 20(6), 875–86.

Saygin, M., Ongel, K. and Caliskan, S. (2015) 'Relation between respiratory function tests and life habits of the university students', *Toxicology and Industrial Health*, 31(5), 396–402.

Preparatory reading

Chapters 2–5 in Greenhalgh (2014) provide a good introduction to the subject. Although the focus is on evidence-based medicine, the issues raised in these chapters are relevant to the critique of quantitative papers in other subjects.

Further reading

Greenhalgh, T. (2014) *How to Read a Paper: The Basics of Evidence-Based Medicine*, 5th edition. Chichester: Wiley-Blackwell.

Holosko, M. (2006) *Primer for Critiquing Social Research: A Student Guide*. Belmont, CA: Wadsworth.

Wallace, M. and Wray. A. (2011) *Critical Reading and Writing for Postgraduates*, 2nd edition. London: Sage.

Activity 12 Critiquing Qualitative Research Papers

Student handout page 286

Tutor Notes

Purpose: This activity helps students to critique, review and analyse qualitative research papers by asking them to read an academic paper and answer specific questions. This will help them to recognize whether qualitative research is credible, accurate and trustworthy. It will also highlight issues of citation, bias and interpretation.
Type: Individual exercise (during independent study) followed by tutor-led discussion (in class).
Level: Beginner, intermediate and advanced. The depth of critique and discussion will reflect students' knowledge and understanding of qualitative techniques.
Duration: Several hours during independent study, followed by a class discussion of 40 minutes to 1 hour.
Equipment/materials: A published research paper.
Prerequisite activities: None, although students may find it useful to undertake Activity 10 as this will help them to record, store and manage their critiques. An understanding of qualitative data analysis techniques may be useful for students studying at a higher level (see Activity 61: Analysing qualitative data).
Learning outcome: By the end of this activity students will be able to critique qualitative research papers and recognize potential problems with data interpretation, citation and bias.

The activity

Give your students a copy of a research paper that is related to your subject (some suggestions are given below, if you prefer). Ask your students to read the paper and consider the questions in the student handout (Student Handout 1 is for students at beginner level and Student Handout 2 is for students at intermediate and advanced level: delete the questions marked with an asterisk for students at intermediate level). Ask your students to be prepared to discuss their critique in your next teaching session.

Key issues

The following issues can be raised during the discussion (depending on the level and subject of your course):

- Students need to develop a good understanding of the research process and qualitative methods to be able to critique qualitative research well. The more they read, the more they will understand. Also, their ability to critique will improve with experience.
- Although issues of validity and reliability are not as strictly laid out as they are in quantitative data analysis, it is still important to make sure that qualitative research is credible, accurate and trustworthy (see Activity 64 for information about evaluating qualitative analyses).
- Students should check for correct citation. Sources can be used for direct citation (where a quotation is used word for word, for example). They can also be used for indirect citation (where the ideas of another person are reworded or summarized, where facts or data are used that are not common knowledge, or where source material is slightly altered but the main argument remains, for example).
- Students should check for the introduction of bias into the research process. The extent to which bias is seen to be introduced depends on epistemological and methodological standpoint, and on theoretical perspective. Qualitative researchers tend to recognize, define and discuss the types of bias that could be introduced, believing that it is impossible to eliminate bias completely. Bias can take many forms, including researcher bias (the selection of data that stand out to the researcher), reactivity bias (the influence the researcher has on the participants), selection bias (the sample is not representative of the population) and measurement bias (participants do not answer all the questions or they answer in a way they think they should answer), for example. More information about bias is provided in Activity 15: Recognizing research(er) bias.

Useful terms

See the student handout in Activity 64 for a discussion of terms relevant to the evaluation of qualitative analyses.

Related activities

- Activity 10: Managing critiques and reviews
- Activity 11: Critiquing quantitative research papers
- Activity 15: Recognizing research(er) bias
- Activity 64: Evaluating qualitative analyses
- Activity 65: Drawing conclusions from qualitative data

Suggested papers for critique

Hernandez, L., Leontini, L. and Harley, K. (2013) 'Alcohol, university students, and harm-minimization campaigns: "A fine line between a good night out and a nightmare"', *Contemporary Drug Problems*, 40(2), 157–89.

Singh, J., Schapper, J. and Jack, G. (2014) 'The importance of place for international students' choice of university: A case study at a Malaysian university', *Journal of Studies in International Education*, 18(5), 463–74.

Stenhoff, A., Sadreddini, S., Peters, S. and Wearden, A. (2015) 'Understanding medical students' views of chronic fatigue syndrome: A qualitative study', *Journal of Health Psychology*, 20(2), 198–209.

Preparatory reading

Chong Ho Shon (2015) provides practical and user-friendly advice to help students read and critique research papers.

Further reading

Chong Ho Shon, P. (2015) *How to Read Journal Articles in the Social Sciences*, 2nd edition. London: Sage.

Cutcliffe, J. and Ward, M. (2007) *Critiquing Nursing Research*, 2nd edition. London: Quay Books.

Holosko, M. (2006) *Primer for Critiquing Social Research: A Student Guide*. Belmont, CA: Wadsworth.

Activity 13 Evaluating Science in the Media

Student handout page 288

Tutor Notes

Purpose: This activity helps students to evaluate science in the media by improving their understanding of what is reputable science and what is flawed science, and how these sciences are reported by the media. It will help them to distinguish between the two and will also show how reputable science can be reported badly, and how flawed science can be reported convincingly.
Type: Tutor-led brainstorm followed by an individual student exercise (during independent study) and information sharing (digitally or in class).
Level: Beginner.
Duration: One hour for the brainstorm and class discussion. Up to 3 hours of independent study spread over a week, followed by a further class discussion or sharing of information digitally.
Equipment/materials: Interactive whiteboard, flip chart or chalkboard for the brainstorm. Students will need access to various types of media for a week. They will also need access to the relevant digital platform if they are to share their findings digitally.
Prerequisite activities: None, although this activity can be run together (or combined) with Activity 8: Recognizing statistics, facts, arguments and opinions.
Learning outcome: By the end of this activity students will be able to evaluate when and how reputable and flawed science is reported in the media.

The activity

Draw two columns on your interactive whiteboard, flip chart or chalkboard. Head them ‘Reputable Science?’ and ‘Flawed Science?’ The question marks are used to illustrate that the categories and definitions are open to interpretation and depend on reporting/context (see below). Ask your students to brainstorm what they think is meant by these two headings. Write down all their answers without judgement or criticism. The brainstorm should be concluded when the students cannot think of anything else to add.

Once you have completed the brainstorm discuss the issues raised, revising, modifying and clarifying the brainstorm list, if required. Print off (or ask students to copy) the revised list so that they have a record to keep.

For the next part of the activity, give your students the student handout. This asks them to monitor various forms of media over the next week, taking note of when and how both reputable and flawed science are reported. After the week is complete, you can discuss your students’ findings in your next teaching session, if class time permits, or you can ask students to post and share their findings with their peers, using the relevant digital platform.

Key issues

The following issues have been raised from this activity in the past:

Reputable science

- The research is carried out by experienced researchers.
- The researchers are qualified.
- There is a named author/researcher.
- The research has been peer-reviewed.
- There is no hidden agenda.
- The methods are clear to see.
- The statistics are reliable.
- The information makes sense.
- Statements are backed up by evidence.
- Arguments are based on fact.
- References are included.
- Limitations are acknowledged.
- The funding body is acknowledged.

Flawed science

- The research is carried out by inexperienced researchers.
- The authorship is unclear.
- There is a political agenda.
- The arguments are based on conjecture.
- The report includes conspiracies.
- The claims are too good to be true.
- The claims are sensationalist.
- The claims are headline grabbing.
- The information doesn't make sense.
- It is obviously selling something.
- There is no discussion of methods.
- The conclusions are too simplistic.
- The science is attacking other science without justification.
- It is not clear who the funding body is.
- The funding body has a vested interest.

Media reporting of science

- It is not always clear whether science is reputable or flawed when it is reported by the media. Crucial information that helps us to judge the reliability of science is often not reported (perhaps because it is seen to be uninspiring or too complex for the lay person, for example). It is important to have the original scientific publication cited so that the information can be analysed

and evaluated.

- Reputable science can be reported badly and flawed science can be reported well. For example, a highly regarded piece of research, carefully reported in a peer-reviewed journal, can be turned into a ‘headline-grabbing claim’ or a ‘sensationalist claim’ by the media (see the list above). Similarly, a flawed piece of research can be reported well, with the media presenting statistics as valid and reliable even though there is no evidence to back this up.
- The media can misrepresent science. They may be reporting a reputable study, but pick up on only one part of that study and gives a misleading account or misleading facts.
- Scientific information can be interpreted many times before it reaches the public domain. The report that the public hears may be not be based on the original source: errors and misrepresentation can be incorporated (and exaggerated) each time the science is interpreted.
- The media focus on science that is controversial, in particular where there is controversy between scientific ideas and non-scientific viewpoints. Non-controversial science is less likely to be reported.

Useful terms

‘Media bias’ is selectivity in what stories, science and perspectives are covered in the media. Stories are chosen because they are sensationalist or controversial, or science is reported by emphasizing views that are not backed up by evidence, for example (see Activity 14: Recognizing media and political bias).

Related activities

- Activity 8: Recognizing statistics, facts, arguments and opinions
- Activity 9: Discovering questionable statistics published online
- Activity 14: Recognizing media and political bias
- Activity 15: Recognizing research(er) bias

Preparatory reading

John Bohannon, an investigative journalist with a PhD, wanted to find out how easy it is to turn bad science into big headlines. He achieved his aim with a study that suggested chocolate helps people to lose weight, which was reported by traditional and social media around the world. He describes how the research was ‘bad science’, and how it was reported, in his blog: http://io9.com/i-fooled-millions-into-thinking-chocolate-helps-weight-1707251800 [accessed 24 June 2015].

Further reading

Conway, E. and Oreskes, N. (2012) *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. New York: Bloomsbury Press.

Goldacre, B. (2014) *I Think You'll Find It's a Bit More Complicated Than That*. London: Fourth Estate.

Hammersley, M. (2013) *Media Bias in Reporting Social Research? The Case of Reviewing Ethnic Inequalities in Education*. Abingdon: Routledge.

Retzbach, A. and Maier, M. (2015) 'Communicating scientific uncertainty: Media effects on public engagement with science', *Communication Research*, 42(3), 429–56.

Activity 14 Recognizing Media and Political Bias

Student handout page 289

Tutor Notes

Purpose: This activity is an entertaining way to raise awareness of the types of media bias and political bias that can influence the topic, design, methods, conclusions and reporting of a research study. It helps students to recognize how and when political and media bias occur.
Type: Small-group discussion (in class) followed by a class brainwave (this is a variation on the brainstorm technique; see below).
Level: Beginner and intermediate.
Duration: Twenty minutes for the small-group discussion, followed by up to 20 minutes for the brainwave, with a concluding discussion if time is available.
Equipment/materials: None required.
Prerequisite activities: None, although this activity is connected closely to Activity 13: Evaluating science in the media, so you can choose which activity would work best with your students, or combine the two.
Learning outcome: By the end of this activity students will understand and recognize the effect of media and political bias on the topic, design, methods, conclusions and reporting of a research study.

The activity

Divide your students into small groups. The number and size of the groups will depend on the size of your class. Ideally, you need five or six groups with three or more students in each. Give each group a copy of the student handout. This defines media and political bias and asks your students to come up with a list of examples of these, in particular in relation to how such bias influences the topic, design, methods and conclusions of a research study and the reporting of research findings.

When the groups have come up with a list the brainwave can begin. This is a variation on the brainstorming method. It enables students to share their information in an entertaining way, while listening to others, thinking quickly and memorizing what has come before. Each answer is given quickly, without judgement or criticism from other members of the class.

Using this technique, you instruct one member of the first group to stand up and give an example of how political and/or media bias can influence research. Then a member of the second group stands up and gives a different example, then a member of the third group and so on. The groups do not have to make their contribution in any particular order: you can point randomly at the groups to keep your students on their toes.

This continues until a member from each group has spoken and given an example. The brainwave can continue, starting again at the first group (with a different member speaking, if appropriate) until all ideas are exhausted and/or ideas are beginning to be repeated. Use your judgement about whether ideas are being repeated: as you will see from the list below, some ideas are similar, but are described in a slightly different way. You can choose to let these stand because they encourage students to think about the issues from slightly different perspectives. Also, note that this is an interesting activity to carry out with students from other countries as they may have quite different views on press freedom and government censorship.

If you have time you can conclude with a discussion on the issues that have been raised during the brainwave.

Key issues

The following issues have been raised in this activity over the years:

- Left-wing media report research with a left-wing slant (right-wing media report research with a right-wing slant).
- The media will only report research that backs up their political stance.
- The media are pushing a specific viewpoint so will only use research that backs this up.
- The media are not reporting the research objectively.
- The media will not consult an academic who is an expert in the field if this person goes against their views.
- Tabloid newspapers report research from which they can generate a sensationalist headline.
- Tabloid newspapers generate a sensationalist headline, even if they have to manipulate the results of the research.
- Newspapers only report research that will sell papers.
- Newspapers only report research that will sell advertising.
- Only part of the research is reported (the full research findings are not reported).
- The media misreport research findings.
- Second-hand reports of research studies are given, which can be wrong.
- The media fail to consult the original source.
- Inexperienced reporters don't know how to analyse and critique academic research.
- Media companies employ inexperienced researchers and reporters.
- Media outlets commission biased researchers to carry out a study.
- Social media are used to present political bias as fact and truth.
- Social media present a 'human angle' and are seen as more trustworthy but they are full of personal bias.
- Research that backs up a political agenda is placed in a prominent position.
- Researchers allow their political opinion to influence their research.
- Researchers want to persuade others that their political view is correct and conduct some research accordingly.
- Politicians only quote research that backs up their political beliefs (politicians ignore research that doesn't back up their political beliefs).
- Politicians quote dubious results/research findings.
- Politicians and the media don't disclose their source of information.
- Politicians and the media make up statistics because no one questions them.
- Politicians ignore sources such as academics, medicine, science and non-governmental organizations.
- Politicians denigrate researchers and their methods, if they go against their policy.
- Politicians sack researchers as advisers, if findings go against government policy.
- Governments commission research on a 'hot' (popular) topic.
- Governments only pay for research that will back up their policies.
- Government advisers try to influence the research methods or research they have funded.
- Researchers have to design research projects that will attract government funding.
- Only topics that have impact (as defined by government) attract funding.
- Government research funding comes with strings attached.

- The media and politicians report research in a sexist and/or racist way, reflecting their own attitudes, rather than what has been found by the researchers.
- Politicians influence the media and what is reported.
- Media in some countries are closed down for reporting research that doesn't follow the government line.
- Governments censor the media and the research that they report.
- Newspapers are not allowed to publish any study that criticizes the government.

Useful terms

‘Bias by omission’ is a term used to describe a media story or a politician’s speech that leaves out one side of the story or fails to report certain findings.

‘Placement bias’ or ‘bias by placement’ describes the tendency to place in a prominent position stories/research findings that back up a specific agenda.

‘Mainstream bias’ refers to the tendency to report what every other media outlet is reporting. This can happen with a research study where one headline-grabbing conclusion is reported (and misreported) constantly.

‘Bias by story selection’ describes the tendency for the media only to use stories/research findings that back up a particular argument, policy or political stance.

‘Bias by selection of sources’ describes the tendency only to use sources that back up a particular argument or policy and leave out sources that present an opposing view.

‘Bias in treatment’ or ‘treatment bias’ refers to the tendency to treat others differently due to issues such as age, gender, nationality and religion, for example. This bias can be prominent when the media pick up a research study that discusses difference, and then misreports the results, based on their own bias, for example.

‘Bias in behaviours’ or ‘bias-motivated behaviour’ refers to the way that personal bias influences the behaviour of a person, a politician or the media, for example. It can include stereotyping, insulting, calling people names or posting negative comments on social media (for example, where feminist historians have been denigrated or belittled for their research into the lives of women).

Related activities

- Activity 15: Recognizing research(er) bias
- Activity 83: Understanding biased financial relationships
- Activity 84: Recognizing and managing the funding effect

Preparatory reading

The Conversation is ‘an independent source of news and views, sourced from the academic and research community and delivered direct to the public’. It was launched in Australia in March 2011 and in the UK in May 2013. See the interesting conversation about BBC bias at http://theconversation.com/uk/topics/bbc-bias [accessed 2 April 2015].

Chapter 1 of Street (2011) has some interesting information about political bias in the media.

Further reading

Hammersley, M. (2013) *Media Bias in Reporting Social Research? The Case of Reviewing Ethnic Inequalities in Education*. Abingdon: Routledge.

Manning, P. (2001) *News and News Sources: A Critical Introduction*. London: Sage.

Street, J. (2011) *Mass Media, Politics and Democracy*, 2nd edition. Basingstoke: Palgrave Macmillan.

Activity 15 Recognizing Research(er) Bias

Student handout page 290

Tutor Notes

Purpose: This activity is an entertaining way to raise awareness of the ways in which research(er) bias can influence research practice and research projects. It asks students, in groups, to create, prepare and present a summary of a research project in which some type of bias has been introduced (this will need to be detected by their peers, so groups need to make this bias obscure, hidden, subtle or difficult to detect).
Type: Small-group exercise (during independent study) followed by a group game (in class).
Level: Intermediate and advanced.
Duration: Several hours of group work during independent study and up to 15 minutes for each group presentation and questions in class, followed by a tutor-led discussion.
Equipment/materials: None required.
Prerequisite activities: Although there are no specific prerequisite activities, this activity works best with students who have some knowledge or experience of research methods. Therefore, Activities 18, 19, 20, 22, 23 and 25 would all be of use.
Learning outcome: By the end of this activity students will be able to recognize research(er) bias in the work of others and reduce research(er) bias in their own work.

The activity

Divide your class into small groups (the number of groups and the number of students within each group will depend on your class size, but try to have at least four groups to ensure that the activity is effective). Give each group the student handout at the end of a teaching session and ask them to prepare the activity, in their group, in readiness for your next teaching session. The activity requires each group of students to choose a topic for a research project and develop a short summary of the project. They must present this summary to the rest of their class in the next teaching session.

However, each group must purposely incorporate research(er) bias into their summary. The ‘game’ element of this task is that other students must try to discover the type of bias that has been incorporated, so the groups of students must make the bias as obscure, hidden or subtle as possible. After each presentation, students can ask questions to try to find out more about the type(s) of bias incorporated.

At the end of the session the group that has hidden their bias the most effectively is the winner (if appropriate, a small prize can be awarded to the winning group). In some cases the bias is not detected at all, so the group is asked to disclose this once they have been questioned by other students and no bias has been found. Also, on rare occasions, students recognize an unintended form of bias that is present in a group’s research summary. When this occurs it provides a graphic example of how bias can be introduced into the research process without the researcher(s) being aware.

This session works well at the end of a module or before a break because it can be entertaining and good fun for students and tutors. A small prize can be provided and students themselves asked to vote for the winning group. If time permits, a further discussion can be held about the types of bias that have been raised during the game and strategies that can be adopted to overcome, reduce or eliminate this bias.

Key issues

After having completed this activity, it is important to reiterate the point made on the student handout: the extent to which bias is seen to be introduced into the research process depends on epistemological and methodological standpoint and theoretical perspective. For example, researchers approaching their work from an objective standpoint will follow set rules and procedures to get rid of bias in the research process (eliminate bias). On the other hand, a researcher approaching from a subjective standpoint will recognize, define and discuss the types of bias that could be introduced (acknowledge bias), as they tend to believe that it is impossible to eliminate bias completely.

The following types of bias have been raised during this activity (the prominence and/or inclusion of these depends on the subject of study, epistemological and methodological standpoint and theoretical perspective):

- The topic has been chosen because the researcher has a particular viewpoint they wish to get across and the research summary reflects this (rather easy to spot, but some students then hide other types of bias within this that are not so easily spotted, using deflection and distraction techniques).
- Personal bias is displayed in the topic, hypothesis, research question, assumptions and/or method of investigation (for example, heterosexual bias, race bias, gender bias and class bias).
- The study fails to identify problems with validity and reliability and/or fails to report researcher cautions about potential problems (design bias). See Activity 59 for more information about issues of validity and reliability in quantitative research.
- The wrong people are chosen for the research (population definition bias). Potential participants are excluded or included (by mistake or to skew results purposely, for example).
- Potential participants within the sampling frame are excluded (sampling frame bias). There is a difference between the population defined by the researcher and the actual population that is being studied through the chosen sampling method. This can occur, for example, where a simple random sampling technique is to be used but all potential participants do not have an equal and known chance of being chosen (see Activity 22: Knowing about probability samples).
- Students have targeted the most obvious, most desirable or most easily accessible sample (sampling bias). This is a popular bias introduced by students in this activity. However, it important to discuss issues of snowball sampling and convenience sampling, for example, to illustrate that this type of sampling does have its place, as long as bias is acknowledged. See Activity 23: Knowing about non-probability (purposive) samples for more information.
- Students select particular cases for their research (selection bias), perhaps to back up a particular line of thought or prove a hypothesis, for example.
- Students have introduced a flaw in the data collection procedures (procedural bias). For example, questionnaires are to be administered in too short a time interval, employees are to be interviewed in front of their boss, or participants are paid to produce results.
- The study fails to control for the effects of data collection and measurement (measurement bias). For example, researchers have not accounted for participants giving socially desirable answers or being influenced by prestige bias (see Activity 38: Constructing questions).
- Data are interpreted incorrectly or inappropriate conclusions are drawn (data analysis bias). Although students are only presenting a summary, some introduce bias by suggesting that inappropriate statistical techniques will be used or that they have not developed a suitable data

analysis strategy, for example.

- The results will be reported in a particular, biased way (reporting or reporter bias). Students might suggest that the reporting of their results will be delayed or supressed or their paper will be published only on a website that has a particular political agenda, for example.

Useful terms

See the student handout for a definition of ‘bias’ and ‘research(er) bias’, and key issues above for descriptions of specific types of bias.

Related activities

- Activity 8: Recognizing statistics, facts, arguments and opinions
- Activity 9: Discovering questionable statistics published online
- Activity 14: Recognizing media and political bias
- Activity 83: Understanding biased financial relationships
- Activity 84: Recognizing and managing the funding effect

Preparatory reading

Chapter 6 of Hammersley (2000), titled ‘Bias in Social Research’, provides an interesting read.

Further reading

D’Angelo, J. (2012) *Ethics in Science*. Boca Raton, FL: CRC Press.

Hammersley, M. (2000) *Taking Sides in Social Research: Essays on Partisanship and Bias*. London: Routledge.

Wells, F. and Farthing, M. (eds) (2008) *Fraud and Misconduct in Biomedical Research*, 4th edition. London: Royal Society of Medicine Press.

Section 2 Planning a Research Project

Activity 16 Choosing a Research Topic

Student handout page 291

Tutor Notes

Purpose: This activity helps students to choose a suitable topic for their research and encourages them to focus on and clarify their topic by asking them to sum up their research in one sentence. They are encouraged to adapt and modify their one-sentence summary after having received peer and tutor feedback. This activity is useful for students who are struggling to think of a topic as it suggests creative and alternative ways to develop ideas. It is also useful for those who have already chosen a topic because it enables them to receive constructive feedback from their peers and tutor.
Type: Self-guided individual exercise (during independent study) followed by peer and tutor feedback (face-to-face or digitally).
Level: Beginner and intermediate (this exercise is of particular use for students who need to choose a topic for their dissertation).
Duration: Up to 3 hours of independent study, followed by up to 1 hour of class discussion or several hours of digital discussion.
Equipment/materials: Tutors and students will need an account with the relevant digital platform if you choose this option.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have chosen a suitable research topic and produced, tested and refined a one-sentence summary of their research.

The activity

Give the student handout to your students. This asks them to choose a research topic and prepare a one-sentence summary of their research. They will need to present this summary to the rest of the group and be prepared to receive peer and tutor feedback. This can be done in a one-hour teaching session or as an electronic exercise, using the relevant digital platform. (Twitter has been used for this activity in the past: asking students to sum up their research in a 140-character message helps them to narrow down their topic and be as clear and concise as possible. It also encourages students to be succinct with their feedback when they comment on the sentences of their peers.) If you choose to carry out this activity digitally, give deadlines for summaries to be posted and for feedback to be given.

Key issues

This activity is useful because it helps students to choose a topic and focus in on what exactly they want from their research. It helps them to narrow down their topic and ensure that it is a workable project. Also, students are able to see and offer feedback on the summaries of their fellow students, which helps to raise awareness of the wide variety of topics that will be covered and improve understanding about what works well and what has not been done so well. It will help them to adapt, modify and refine their own topic/sentence in light of what others say about their summary, and in light of what they say about the summaries of others.

On occasions students struggle to come up with a topic, even if they have tried some of the methods listed on the student handout. In this case you may need to offer some personal advice (face-to-face or digitally) to stimulate thought.

Useful terms

See the student handout for a description of the different methods and techniques that can be used to stimulate thought.

Related activities

- Activity 17: Producing aims and objectives
- Activity 18: Developing a research question
- Activity 19: Designing a research project
- Activity 20: Choosing research methods
- Activity 21: Using multiple or mixed approaches

Preparatory reading

Appendix 4 of Denscombe (2012) and Chapter 8 of Cottrell (2014) contain useful material about choosing a research topic.

Further reading

Cottrell, S. (2014) *Dissertations and Project Reports: A Step by Step Guide*. Basingstoke: Palgrave Macmillan.

Denscombe, M. (2012) *Research Proposals: A Practical Guide*. Maidenhead: Open University Press.

Activity 17 Producing Aims and Objectives

Student handout page 292

Tutor Notes

Purpose: This practical activity requires students to produce aims and objectives for their research (comprehensive guidance is provided in the student handout). A fellow student reviews the aims and objectives, offering advice for changes and improvement, where necessary. They are then modified accordingly.
Type: Self-guided individual exercise followed by peer review (during independent study).
Level: Intermediate and advanced.
Duration: This activity requires several hours of independent study, followed by peer review and modification of aims and objectives, where necessary. The actual time taken depends on level of study, type of research, the amount of preliminary work that has already been undertaken and the ease with which aims and objectives can be developed.
Equipment/materials: None required.
Prerequisite activities: Students will need to have chosen a research topic so, if they are struggling with this, Activity 16: Choosing a research topic would be useful.
Learning outcome: By the end of this activity students will have produced clear, concise and unambiguous aims and objectives for their research project.

The activity

Ask your students to divide themselves into pairs. Give them the student handout. Ask them to develop their aims and objectives for their research, giving clear guidance about how to do this. Once they have produced their aims and objectives, they should swap them with their partner for peer review. The aims and objectives should be modified and improved accordingly.

Key issues

It can take some students a considerable amount of time to develop good aims and objectives for their project. A meeting with their fellow student can help to ease the block, and some students who are struggling find it helpful to review their fellow student's aims and objectives before they have completed their own. This activity is flexible and will enable peer engagement and encouragement, if required. It is also important not to put a time limit on producing aims and objectives, if possible, as this can make the process more difficult and stressful for some students.

Another option, if students are really struggling, is to direct them to sites such as ResearchGate (www.researchgate.net). Here students can post their proposed aims and objectives and receive feedback from the scientific community. Alternatively, they can review existing posts to find out how other researchers and students overcame the problems they faced.

Useful terms

The ‘aim’ is a simple and broad statement of intent, and the ‘objectives’ are the means by which the researcher intends to achieve the aim. See the student handout for a more detailed definition of each term.

Related activities

- Activity 16: Choosing a research topic
- Activity 18: Developing a research question
- Activity 19: Designing a research project
- Activity 20: Choosing research methods
- Activity 30: Producing a research proposal

Preparatory reading

Chapter 3 in Thomas and Hodges (2010) provides some practical and useful information about producing aims and objectives for a research project in the social and health sciences, covering issues such as how to write good aims and objectives and avoiding common errors.

Part 4 of Williams (2013) includes information about producing aims and objectives and ensuring that methods match aims when planning a dissertation.

Further reading

Thomas, D. and Hodges, I. (2010) *Designing and Managing Your Research Project: Core Skills for Social and Health Researchers*. London: Sage.

Williams, K. (2013) *Planning Your Dissertation*. Basingstoke: Palgrave Macmillan.

Activity 18 Developing a Research Question

Student handout page 294

Tutor Notes

Purpose: This activity asks students to develop a clear, concise and workable research question (comprehensive guidance is given in the student handout). They will need to present their research question to other members of their class and receive tutor and peer feedback (face-to-face or digitally). This activity is useful for students who are struggling to develop a workable research question, and for students who have developed a question that may need to be improved, adapted or refined.
Type: Self-guided individual exercise (during independent study) followed by peer and tutor feedback (face-to-face or digitally).
Level: Intermediate and advanced.
Duration: Several hours of independent study, over a period of time, followed by up to 1 hour of class discussion or periodic digital discussion. Up to 2 hours of tutor time to set up the digital resource and monitor posts, if this option is chosen.
Equipment/materials: Tutors and students will need an account with the relevant digital platform, if this option is chosen.
Prerequisite activities: Activity 16: Choosing a research topic will be useful for students who have not yet chosen a topic.
Learning outcome: By the end of this activity students will have developed and refined a well-formulated, workable, credible and defendable research question.

The activity

Give the student handout to your students. This asks them to develop a research question (guidance is provided), present it to the rest of the class and be prepared to receive peer and tutor feedback. Ask your students to present their research question in a one-hour teaching session or electronically, using the relevant digital platform. The choice depends on the teaching time that you have available and on your personal preference. If you choose the digital option, give deadlines for research questions to be posted and for feedback to be given. Once students have received peer and tutor feedback they should modify and refine their research question accordingly.

It can take a long time for some students to develop the right research question. Therefore, it is useful to give out the student handout several weeks before the peer and tutor feedback activity takes place so that students can begin to think about, and start to develop, their research question as the course progresses. The way in which you tackle this timing issue will depend on the structure, type and level of the course you are teaching.

Key issues

Developing the right research question is crucial to the success of a research project. Students must take time to ensure that their research question is appropriate, workable, specific and defendable. They should also try to produce an innovative question that will lead to interesting and significant research. For some students this process cannot be rushed: this should be pointed out to students, who can become frustrated when they find it difficult to develop an appropriate research question in a short period of time.

In most cases research questions, once developed and deemed suitable, will remain the same throughout the research project, helping to guide students through the research and writing process. However, some qualitative methodologies may require the research question to adapt and grow as the research progresses. This may be because the underlying premise cannot be supported or emerging data suggest that the initial question is no longer central to the context studied, for example. If students need to change their research question they must reanalyse their data in light of the new question, taking great care not to develop a new question that merely fits with an emerging hypothesis.

Useful terms

See the student handout for a definition of ‘research question’.

Related activities

- Activity 16: Choosing a research topic
- Activity 17: Producing aims and objectives
- Activity 19: Designing a research project
- Activity 20: Choosing research methods
- Activity 21: Using multiple or mixed approaches
- Activity 26: Justifying your research topic
- Activity 27: Defending methodology

Preparatory reading

White (2009) in its entirety is a useful introductory text for this activity.

Further reading

Alvesson, M. and Sandberg, J. (2013) *Constructing Research Questions: Doing Interesting Research*. London: Sage.

White, P. (2009) *Developing Research Questions: A Guide for Social Scientists*. London: Palgrave Macmillan.

Activity 19 Designing a Research Project

Tutor Notes

Purpose: This activity asks small groups of students to invent an exercise that will help other students to design a research project. It helps students think about what is involved in designing a research project in a creative and entertaining way.
Type: Small-group exercise (during independent study) followed by small-group presentation (in class or digitally).
Level: Beginner, intermediate and advanced. The type and standard of exercise designed by students will reflect the level and subject of study.
Duration: Several hours of independent study in groups, followed by a 10-minute presentation for each group in class (or digitally). If time permits, and if you feel it is appropriate, further time can be spent trialling the exercise that was voted the winner.
Equipment/materials: Students can choose relevant equipment and materials, and these should be made available for their use.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will understand what is involved in designing a research project, and will be able to relate this understanding to their own research project.

The activity

Divide your students into groups. Ask them to invent an exercise (during independent study) that will help other students to design a research project. Encourage them to be as creative as possible. Ask each group to make a short presentation about their exercise to the rest of the class (up to 10 minutes) in the next teaching session.

Once all presentations have been given, ask students to vote on the best exercise and, if time permits (and if feasible; see exercises listed below) try out the winning exercise. If you are short of contact hours, you can carry out this activity digitally, asking students to post a short video presentation on the relevant digital platform and then asking for electronic votes.

Key issues

This activity encourages students to think about the best way to help others learn about how to design a research project. In doing this they should, themselves, learn about the design issues involved. This activity has been carried out at various levels and has proved to be very useful (and entertaining) for students. The following are a few examples of the types of exercise that have been invented by students. Some are straightforward and conventional, whereas others are creative and unusual (you will notice that some of these could be trialled in class, whereas others are not so practical).

Example 1

Ask each student to roll a dice in turn. If they roll a three they must say three things that are important when designing a research project, if they roll a four they must say four things, and so on. The tutor should write down each point so that at the end of the exercise there is a list of all the things that are important when designing a research project. (This exercise was voted the best in that particular group and trialled in class. Students enjoyed the exercise and found that it increased their understanding and provided a useful list to reference when they came to design their own research project.)

Example 2

Give examples of poorly designed research projects and ask students to comment on why they are poorly designed. Ask students to redesign the projects. In this presentation the students gave examples of poorly designed projects and then asked other students to point out why they were poorly designed, thus trialling part of their exercise during their 10-minute presentation.

Example 3

Write down, at the top of a piece of paper, an issue that you think is important when designing a research project. Fold over the paper and pass to the next student. Keep on doing this for 20 minutes. Use a new piece of paper if the first runs out. The list can be read out at the end of the exercise with a discussion to follow. If points are repeated this could show the type of design issues that are most important, or most easily recognized. (Another group suggested a similar exercise but had a more modern take in that it utilized a Twitter feed, rather than a piece of paper.)

Example 4

Lead a class brainstorm, starting with the question ‘what issues are important when designing a research project?’ Once this has taken place the brainstorm facilitator should highlight and discuss the important issues. This brainstorming technique has been suggested several times: one group held their own brainstorm during independent study and presented their list during their presentation.

Example 5

Design a research project on a topic of your choice. You must make sure that you include information under the following headings: title, background information/research, aims and objectives, methodology, research methods, timetable, budget and resources, impact, dissemination, references and bibliography. Post your project design on the relevant digital platform for comment and review from other students and tutors. Expand this into a research proposal when you have received feedback.

Example 6

Give students a list of all the things that can go wrong when a researcher designs a research project. Ask students to decide what they would do differently, or how they would overcome the problem, in each case.

Example 7

Using visual images (drawings, photographs or symbols, for example) create a collage of what to include in your research design. Test tubes could indicate experiments, question marks could indicate a questionnaire and books could indicate a literature review, for example. Arrange the images in a sequence that will help you to design your research project.

Useful terms

The ‘research design’ is a detailed outline of how an investigation will take place. It is the framework that has been created to answer the research question. It defines the type of study and the methods that will be used.

A ‘research proposal’ is a document that formalizes the research design by providing a written description of the proposed programme of research. See Activity 30: Producing a research proposal for more information.

Related activities

- Activity 16: Choosing a research topic
- Activity 17: Producing aims and objectives
- Activity 18: Developing a research question
- Activity 20: Choosing research methods
- Activity 30: Producing a research proposal

Preparatory reading

A Higher Education Academy funded project carried out by staff and students at Leeds Metropolitan University in the UK (now Leeds Beckett University) aimed to develop games-based learning tools to be used in the sociology undergraduate curriculum. The research shows how effective games can be in enhancing the undergraduate research methods learning experience. For more information, visit http://eprints.leedsbeckett.ac.uk/1328/1/ECGBL%202014%20.pdf [accessed 7 July 2015].

Further reading

Bell, J. (2010) *Doing your Research Project*, 5th edition. Maidenhead: Open University Press.

Walliman, N. (2011) *Your Research Project: Designing and Planning your Work*, 3rd edition. London: Sage.

Activity 20 Choosing Research Methods

Student handout page 296

Tutor Notes

Purpose: This activity encourages students to think about the most appropriate methods for collecting, sampling, recording, storing and analysing data. It asks students, in their groups, to consider examples of different research projects and answer questions about each project. This will raise awareness of the variety of methods that are available.
Type: Small-group exercise (in class) followed by a tutor-led discussion.
Level: Intermediate.
Duration: Up to 30 minutes for the group exercise, followed by up to 30 minutes for the tutor-led discussion.
Equipment/materials: None required.
Prerequisite activities: Students will need some knowledge of sampling techniques, so Activities 22, 23, 24 and 25 would be useful. Some knowledge of data analysis methods would also be useful (see Activities 57 and 61).
Learning outcome: By the end of this activity students will have a greater knowledge and understanding of a variety of research methods. They will understand how these can be used for different types of research and will be able to relate this understanding to their own research project.

The activity

Divide your students into small groups and ask them to work through the student handout in their group. This gives examples of different types of research and asks students to choose the most appropriate methods for each. A selection of subject areas has been included: delete the examples that are the least suitable for your subject so that you have a total of five examples for students to work through. Once the groups have completed the exercise, discuss the results in a tutor-led discussion.

Key issues

There are no specific answers to this exercise: students can choose methods that they feel are most appropriate to the research project. During the discussion you will need to discuss whether the most appropriate methods have been chosen and highlight other methods that have not been raised by the groups of students. The tips provided in the student handout can be used as a basis for discussion, if you wish.

Useful terms

‘Research methods’ are the tools that researchers use to gather and analyse their data and can include sampling techniques, questionnaires, interviews, focus groups, case studies, experiments, trials, qualitative data analysis techniques and quantitative data analysis techniques.

‘Research methodology’ is a guideline system or framework that is used for solving a problem. It includes practices, procedures and rules used by those involved in inquiry and covers issues such as the constraints, dilemmas and ethical choices within research. Methodology also includes the theoretical analysis of these systems or frameworks, a critique of other frameworks and a careful analysis of the interrelationship between epistemological standpoint, theoretical perspective and methodology (see Activity 90: Knowing about epistemology and ontology and Activity 94: Locating epistemological and methodological standpoint).

Related activities

- Activity 19: Designing a research project
- Activity 21: Using multiple or mixed approaches
- Activity 22: Knowing about probability samples
- Activity 23: Knowing about non-probability (purposive) samples

Preparatory reading

Part II of Robson (2011) provides some interesting and useful information about planning research and choosing research methods.

Further reading

Bryman, A. (2012) *Social Research Methods*, 4th edition. Oxford: Oxford University Press.

Remler, D. and Van Ryzin, G. (2015) *Research Methods in Practice: Strategies for Description and Causation*, 2nd edition, Thousand Oaks, CA: Sage.

Robson, C. (2011) *Real World Research*, 3rd edition, Chichester: John Wiley and Sons.

Activity 21 Using Multiple or Mixed Approaches

Tutor Notes

Purpose: This is a ‘methods mash-up’, an activity that helps students to think about the different methods that can be used, how these relate to methodological standpoint and how there can be some flexibility and fluidity in this relationship.
Type: Group game.
Level: Intermediate and advanced.
Duration: One hour (or one teaching session).
Equipment/materials: You will need several pieces of card (two different colours) on which you can write or print the methodologies and methods listed below.
Prerequisite activities: None, although students will need some understanding of research methods and methodology (see Activity 20: Choosing research methods and Activity 92: Understanding methodology).
Learning outcome: By the end of this activity students will know more about multiple or mixed approaches and have a deeper understanding of how these approaches relate to their own research.

The activity

Write or print each of the methodologies listed below on separate cards (using card of the same colour). Make sure that your writing/font is big enough so that it can be read at a distance. Using a different colour of card, write or print each of the methods listed below on a separate card. If you do not have different colours of card, use a different colour of pen/ink instead.

Methodology	Method
experimental research	structured interview
survey research	unstructured interview
discourse theory	focus group
phenomenological research	closed-ended questionnaire
ethnography	open-ended questionnaire
heuristic inquiry	life history
deconstruction	case study
	observation
	controlled experiment
	simple random sample
	randomized double blind trial
	snowball sample
	semiotics
	literary analysis
	content analysis

Distribute one card to each student (you may need to add more methodologies/methods to the list, or delete some, depending on the number of students in your group). Also, you can choose and change the list items depending on your subject and level of study.

Ask the methodology students to stand in a row at the front of the room, holding up their cards. Then ask the methods students to join the methodology student that they feel is most appropriate for their method, again holding up their cards. Some students will find this a very straightforward task,

whereas others will find it more difficult due to the method that they have been allocated. Also, students can find that one methodology student is paired with more than one method student, whereas another methodology has no students. If students are unsure about their pairing, encourage them to discuss it among themselves.

Once the methods students have paired with a methodology student and everyone is happy, ask the methods students to think again, and pair themselves with a different methodology student that they think is appropriate. Make it clear that students do not have to move, if it is not appropriate. This ‘mash-up’ can continue until the students feel that they cannot change again without repetition. Finish the activity with a class discussion on the issues that have been raised.

If you have students in your group who have mobility restrictions, allocate a methodology card so that they do not need to change positions. Also, if you have students with a visual impairment, students can call out their method or methodology. This can be done each time changes are made.

Key issues

The following issues have been raised when this activity has taken place in the past:

- Some methodologies lend themselves more readily to mixed approaches than others.
- Although some methods seem to be specific to a particular methodology, it is possible to use certain methods within a less obvious methodology.
- Mixed method approaches enable both qualitative and quantitative data to be collected and analysed in the same study. This can help to overcome the weaknesses found in both qualitative and quantitative research.
- Mixed method approaches enable researchers to gain a better understanding than that gained through using a single approach.
- Mixed methods can be viewed as a methodology if a study is designed and conducted using this approach. If this is the case, students must pay close attention to theoretical perspectives and philosophical assumptions when developing their methodological framework.
- If students choose to use a multiple or mixed approach, they must take into account the understanding of their audience: granting bodies, examiners and stakeholders may approach the work with their own biases and methodological/method preferences. Students will need to become very familiar with their mixed approach and persuade others that this approach is the best and most appropriate for their research (see Activity 27: Defending methodology).

Useful terms

‘Mixed method’ approaches can also be called ‘multi-method’ approaches, ‘multiple methods’ or ‘triangulation’. This is an approach that involves integrating qualitative and quantitative research and data (concurrently or sequentially) to gain a deeper insight, greater understanding and/or generate new knowledge.

See Activity 20 for a definition of ‘research methods’ and ‘research methodology’ and Activity 92 for a definition of the methodologies listed above.

Related activities

- Activity 20: Choosing research methods
- Activity 27: Defending methodology
- Activity 91: Asking epistemological questions
- Activity 92: Understanding methodology
- Activity 93: Asking methodological questions
- Activity 94: Locating epistemological and methodological standpoint
- Activity 95: Understanding theoretical perspective

Preparatory reading

Chapters 1 and 2 of Creswell (2015) provide useful and interesting information on mixed method approaches.

Further reading

Creswell, J. (2015) *A Concise Introduction to Mixed Methods Research*. Thousand Oaks, CA: Sage.

Plano Clark, V. and Ivankova, N. (2016) *Mixed Methods Research: A Guide to the Field*. Thousand Oaks, CA: Sage.

Teddlie, C. and Tashakkori, A. (2009) *Foundations of Mixed Methods Research: Integrating Qualitative and Quantitative Approaches in the Social and Behavioral Sciences*. Thousand Oaks, CA: Sage.

Activity 22 Knowing about Probability Samples

Student handout page 298

Tutor Notes

Purpose: This activity, with the use of five real-world examples, helps students to recognize the different types of probability sampling methods that are available, identify possible strengths and weaknesses and think about how these different methods are used in research. This will help them to think about the most appropriate sampling methods for their own research project.
Type: Student worksheet.
Level: Intermediate.
Duration: Several hours of independent study (the actual time taken will depend on how much students know about sampling methods and how much background reading they will need to undertake to complete this activity).
Equipment/materials: Students will need access to the appropriate literature.
Prerequisite activities: None, although this activity can be run together with Activity 23: Knowing about non-probability (purposive) samples.
Learning outcome: By the end of this activity students will be able to recognize, analyse and apply probability sampling methods.

The activity

Ask your students to work through the examples given in the student handout. They should do this during independent study because most students will need to undertake background reading to answer the questions (unless they are very familiar with sampling methods). If teaching time permits, you can discuss their answers in your next teaching session.

Key issues

Example 1

This is a simple random sample that gives each member of the population an equal and known chance of being chosen. Using this procedure, a number is assigned to each element/individual in the study population. Random numbers are then generated (for example, using a calculator, online random number generator, spreadsheet, or a printed table of random numbers) to select the required sample. This method requires an accurate list of the study population and is ideal for generating statistics.

An advantage is that each selection is independent of other selections and has an equal and independent chance of being selected. Problems can arise if it is difficult or impossible to identify every member of the population, or if members of the population are geographically widely dispersed (costly and time-consuming). Also, care must be taken when generating random numbers as some methods are open to bias, human error or software/hardware malfunction, for example.

Example 2

This is a cluster sample. This technique is used when it is impossible or impractical to compile an exhaustive list of all elements within the study population. Instead, the elements are grouped into subpopulations (already existing or created by the researcher) and then elements from each subpopulation are chosen using a simple random sample (used in this example) or a systematic random sample (described below).

A problem with this method is an overrepresented or underrepresented cluster in terms of certain characteristics. This can skew the results of the study. The technique is less precise than other types of probability sampling, but if a larger sample size is available (due to the practicality of travel, for example) this could offset the loss in precision.

Example 3

This is a systematic random sample (or quasi-random sample or interval random sample). This is a statistical method involving the selection of elements from an ordered study population. A starting point is chosen at random, with each subsequent selection made at regular intervals.

An advantage to this method is its simplicity; if carried out carefully, the population will be evenly sampled. However, a problem with this method is that it depends on how the list has been organized (alphabetically, for example). The researcher must ensure that a pattern, or periodic trait, is not hidden in the list as this will have an influence on randomness. Also, it is only the first selection of where to start the list that is a probability selection: there may be some units/elements that have a zero chance of being selected.

Example 4

This is a stratified random sample, which is a method of sampling that involves the division of a study population into smaller groups known as ‘strata’. These groups can differ in behaviour or the attribute under study. Once the different groups have been identified, members can be selected using a simple random sample or a systematic random sample, for example.

Advantages include convenience and cost, and stratified samples tend to be more representative than other probability samples, ensuring that elements from each stratum are represented. Also, different sampling techniques can be used within the strata (mixed methods approaches can overcome problems inherent in certain methods). Problems can arise in the identification of appropriate strata (timely and costly) and in analysing results. Misrepresentation of elements into the chosen strata can increase variability.

Example 5

This is a disproportionate stratified sample. With this type of sampling the sample size of each stratum does not have to be in proportion to the population size of the stratum. When disproportionate allocation is used, the data that have been gathered must be weighted, and this can lower precision. Other strengths and weakness of this method are similar to those described in Example 4.

Useful terms

See the student handout for a definition of ‘probability samples’ and key issues, above, for a definition of each of the sampling techniques described in the student handout.

Related activities

Activity 23: Knowing about non-probability (purposive) samples
Activity 24: Choosing sample size
Activity 25: Avoiding sampling problems

Preparatory reading

Blair and Blair (2015) provide a comprehensive and accessible guide to sampling techniques which is useful for students who do not have statistical training.

Further reading

Blair, E. and Blair, J. (2015) *Applied Survey Sampling*. Thousand Oaks, CA: Sage.

Lohr, S. (2010) *Sampling: Design and Analysis*, 2nd edition. Boston: Cengage Learning.

Thompson, S. (2012) *Sampling*, 3rd edition. Hoboken, NJ: John Wiley & Sons.

Valliant, R., Dever, J. and Kreuter, F. (2013) *Practical Tools for Designing and Weighting Survey Samples*. New York: Springer.

Activity 23 Knowing about Non-Probability (Purposive) Sampling

Student handout page 300

Tutor Notes

Purpose: This activity, with the use of five real-world examples, helps students to recognize the different types of non-probability (or purposive) sampling methods that are available, identify possible strengths and weaknesses and think about how these different methods are used in research. This will help them to think about the most appropriate sampling methods for their own research project.
Type: Student worksheet.
Level: Intermediate.
Duration: Several hours of independent study (the actual time taken will depend on how much students know about sampling methods and how much background reading they will need to undertake to complete the activity).
Equipment/materials: Students will need access to the appropriate literature.
Prerequisite activities: None, although this activity can be run together with Activity 22: Knowing about probability samples.
Learning outcome: By the end of this activity students will be able to recognize, analyse and apply non-probability (or purposive) sampling methods.

The activity

Ask your students to work through the examples given in the student handout. They should do this during independent study because most students will need to undertake background reading to answer the questions (unless they are very familiar with sampling methods). If teaching time permits, you can discuss their answers in your next teaching session.

Key issues

Example 1

This is quota sampling. Using this technique, the sample is selected by the interviewer/researcher according to a quota-system based on factors such as age, sex and social class. It is a popular method for market researchers. In quota sampling the goal is to represent the major characteristics of the population by sampling a proportional amount of each. Convenience or judgement sampling is used to select the required number of subjects from each category (see below).

Quota sampling is popular because it is cheap and easy to administer, but it is criticized for its theoretical weakness (sampling errors cannot be estimated, a representative number of respondents within each category might not be obtained and strict control of fieldwork is difficult, for example). The proportion in each category must be accurate and care must be taken not to introduce researcher bias (choosing specific people within each category based on their appearance, for example).

Example 2

This is snowball sampling. It takes advantage of existing social networks, relying on referrals from initial subjects to generate additional, new subjects (for example, one interviewee will give the researcher details of another person to be interviewed, and so on). This method is used when the study population is small and when description or understanding, rather than generalization, is the goal.

Snowball sampling is useful when it is difficult to find or recruit subjects, perhaps because they are involved in illegal activity or they belong to some type of underground or hidden group, for example. It can make it easier for the researcher to establish contact and be trusted, because they have been introduced by another member of the group. However, this method is subject to bias because friends recommend friends and selection involves deliberate choice. Great care must be taken when choosing the initial contact. Researchers using this method tend to acknowledge bias.

Example 3

This is theoretical sampling. Using this method, the emerging theory helps the researcher to choose the sample as the research progresses. Within this sampling procedure the researcher might choose to sample extreme cases that help to explain an emerging theme, or might choose homogeneous samples where people who are alike in some relevant detail (or have similar characteristics) are selected, for example.

This method is flexible, creative and cost-effective. However, it is open to sampling bias and the researcher must be aware of this, acknowledging bias as the research progresses. This method can create huge volumes of data that are difficult to analyse: experience and patience can help the project to move forward.

Example 4

This is convenience sampling, where subjects are chosen on the basis of convenience (this method can also be termed haphazard or accidental sampling). Researchers use this method because it is inexpensive, informal and practical, having few rules governing how it is used.

Convenience sampling is criticized for introducing various types of bias, including sampling, selection and researcher bias (see Activity 15: Recognizing research(er) bias). However, researchers using this method tend to acknowledge and report bias. Convenience sampling can also lead to overrepresentation or underrepresentation of particular groups within the sample. The ease with which this method can be used makes it a popular choice for some researchers.

Example 5

This is judgement sampling (sometimes referred to as judgemental or authoritative sampling). It can be seen as an extension of the convenience sampling method described above. Subjects are chosen because they are seen to be relevant or of interest to the research topic, based on the knowledge and expertise of the researcher.

This method is simple, convenient and cost-effective. However, it has a low level of reliability and a high level of bias. Also, it can be difficult to judge the level of knowledge and expertise of the person choosing the sample. Careful documentation and reporting is required to explain credentials, describe methods and acknowledge bias.

Useful terms

See the student handout for a definition of non-probability sampling and key issues, above, for a definition of the different types of non-probability sampling techniques.

Related activities

- Activity 15: Recognizing research(er) bias
- Activity 22: Knowing about probability samples
- Activity 24: Choosing sample size
- Activity 25: Avoiding sampling problems

Preparatory reading

Emmel (2013) provides an interesting discussion on the history, use and misuse of different sampling methods in qualitative research.

Further reading

Daniel, J. (2012) *Sampling Essentials: Practical Guidelines for Making Sampling Choices*. Thousand Oaks, CA: Sage.

Emmel, N. (2013) *Sampling and Choosing Cases in Qualitative Research: A Realist Approach*. London: Sage.

Henry, G. (1990) *Practical Sampling*. Newbury Park, CA: Sage.

Activity 24 Choosing Sample Size

Student handout page 302

Tutor Notes

Purpose: This activity requires students to build a digital resource of tools and/or methods that will help them to determine sample size. It will help to raise awareness of the different types of sampling size tools and methods that are available and relevant to their research, highlight their strengths and weaknesses and provide advice for other students who might be thinking about using a particular tool or method.
Type: Student-centred resource development.
Level: Intermediate and advanced.
Duration: Up to 3 hours of independent study.
Equipment/materials: Students will need access to their chosen sample size tool or method and access to the relevant digital platform.
Prerequisite activities: Students might find this activity easier and more relevant if they have undertaken Activities 22 and 23 as these help to raise awareness of the different types of sampling methods that are used in quantitative and qualitative research.
Learning outcome: By the end of this activity students will have developed a digital resource of sample size tools and methods that can be used to help them work out the sample size for their research.

The activity

Give the student handout to your students. This asks them to find a useful tool or method that helps students and researchers to determine an appropriate sample size for their research. They must then post and share this with other students on the relevant digital platform. When they do this they need to highlight the strengths and weaknesses of the tool or method, and offer advice for students who may be thinking about using it. Choices depend on subject, level of study, previous experience and student preferences (for qualitative or quantitative research and for certain types of technology, for example).

When undertaking this activity it is useful to give a deadline by which all ideas should be posted. It is also useful to monitor the posts and make your own comments as the resource is developed. This is because, on occasions, students can recommend an inappropriate tool (a badly designed online sample size calculator, for example).

Key issues

This activity asks students to find suitable tools and methods for determining sample size that they can share with fellow students. In doing this, students are required to think more about the issues that are involved in determining sample size, and undertake a critique of the chosen tools/methods. It encourages them to explore alternative tools and methods that they may not have thought about previously and think about their strengths and weaknesses. The end result is a useful digital resource that students can reference when required.

Confidence levels and confidence intervals (see ‘useful terms’, below) are two measures that affect the accuracy of data: these two measures help researchers to work out sample size and will be required if students choose to use certain types of online sample size calculator, for example. This activity encourages students to understand more about what is meant by these terms, and some students will provide information and advice to other students about using these measures. If they do not, it is useful for you to post further information to aid understanding.

Useful terms

‘Sample size’ refers to the number of individuals or groups that are required to respond to achieve the required level of accuracy (note that in this definition sample size refers to the final number of responses collected, rather than the number of individuals selected to provide responses). When sample sizes are calculated, the potential response rate will need to be taken into consideration, although response rates cannot be predicted (see Activity 49: Improving response rates).

The ‘confidence interval’ (also called the margin of error) is used to describe the amount of uncertainty associated with a sample estimate of a population parameter (this is a measurable characteristic of a population, such as a mean or standard deviation). It provides a range of values that is likely to contain the population parameter that is of interest. An example of this is the plus or minus figure that tends to be reported in public opinion poll results. It shows the possible deviation between the opinions of those in the poll and the opinions of the entire population.

The ‘confidence level’ is expressed in percentage terms and is a measure of the reliability of a result, illustrating how sure, or certain, researchers can be about the conclusions from their analysis. For example, researchers can show that a 95% confidence level means that they are 95% certain about their conclusions (this tends to be the standard percentage used in quantitative research).

Related activities

- Activity 22: Knowing about probability samples
- Activity 23: Knowing about non-probability (purposive) samples
- Activity 25: Avoiding sampling problems

Preparatory reading

Chapter 8 in Emmel (2013) covers the issues of sample size in qualitative research, and Dattalo (2008) provides some interesting information about sample size in quantitative research.

Further reading

Dattalo, P. (2008) *Determining Sample Size: Balancing Power, Precision, and Practicality*. New York: Oxford University Press.

Emmel, N. (2013) *Sampling and Choosing Cases in Qualitative Research: A Realist Approach*. London: Sage.

Julious, S. (2010) *Sample Sizes for Clinical Trials*. Boca Raton, FL: Chapman & Hall.

Activity 25 Avoiding Sampling Problems

Student handout page 303

Tutor Notes

Purpose: This activity, with the use of five real-world examples, helps students to recognize problems with sampling methods and enables them to think about ways that these problems can be rectified and/or overcome. It can be used as an introductory exercise in class for students new to sampling techniques, or it can be used as a longer exercise during independent study to help students gain a deeper understanding of the issues involved.
Type: Student worksheet.
Level: Intermediate.
Duration: Up to 1 hour in class or several hours during independent study, depending on which option is chosen.
Equipment/materials: None required, although students will need access to the relevant literature, if the independent study option is chosen.
Prerequisite activities: If you are using this as an introductory exercise, no prerequisite activities are required. If you are using this to help students gain a deeper understanding of sampling techniques, Activities 22, 23 and 24 will help to aid understanding.
Learning outcome: By the end of this activity students will be able to recognize and overcome sampling problems.

The activity

Give your students the student handout and ask them to work through the worksheet. This can be done in two ways:

- You can use the worksheet as an introduction to a discussion about sampling methods. Give the worksheet to students in your class and ask them to work through each example, giving a brief answer to each question. After 30 minutes, lead a class discussion about the issues that the worksheet has raised.
- The worksheet can be given to students to work through during independent study. They should be encouraged to review the relevant literature to gain a deeper understanding of problems that can occur with the various types of sampling method. They should be encouraged to answer the questions as fully as possible. You can use this activity together with Activities 22 and 23 if you wish to expand the coverage of this topic.

Key issues

Example 1

The margin of error would be enormous on such a small random sample, which would make predictions and generalizations meaningless. The accuracy and completeness of the sampling frame are unclear: it is not stated how the sampling frame was created and whether it is possible to include all manufacturing companies in the UK. There is no definition of ‘manufacturing company’ and, therefore, it is unclear what type and size of organization is included in the sampling frame.

These issues suggest that, in this case, it would be very difficult to choose an accurate random sample and, even if it were accurate, a random sample of 30 would be far too small. The student needs to rethink his methodology and decide whether he wants to make generalizations and predictions and, if so, whether the sampling frame enables him to generate an accurate (and much larger) sample. Time, budget and resources would have to be taken into account, and care would have to be taken in choosing a reliable and effective online random number generator.

It might be better for the student to dismiss the idea of a random sample and the need to make generalizations, instead using some type of non-probability sample to select a small number of executives who can be interviewed in depth. Although he could not make generalizations, he could describe their experiences.

Example 2

This research relies on a self-selecting sample. Self-selection bias will be present because the participants have the ability to choose whether or not to take part and this will be based on issues such as time available, interest in the topic, motivation levels, apathy, workload, indifference and so on. Also, some students might not know about the research (depending on the method the student uses to inform others about the questionnaire).

This is an extremely ambitious (and misguided) project. The stated outcomes (to generalize to all medical students and to devise gaming training) are disparate and difficult to achieve, given the stated method. Also, the student has already made the assumption that gaming is beneficial, before he has tested this hypothesis. The student needs to rethink his stated outcomes and his methods. It is possible to survey the whole population of his medical school (i.e. carry out a census), but he needs to do this in a way that avoids problems with self-selection bias if participants are able to choose, independently, whether or not to take part in his census. If he is to test his hypothesis he should do this before making statements about the next stage of his work.

Example 3

This student seems to be unaware of the importance of sampling. The initial choice of her university town and home town are based on convenience for ease of travel and to make it easier to contact schools through her personal contacts. The choices are also based on a weak hypothesis (levels of

bad behaviour might be influenced by school location). Within each school the teachers decide which school pupils should be interviewed, which can lead to selection bias. The teachers define 'bad behaviour' and make their choices accordingly: disruptive or uncooperative children could be omitted (teachers may not want the school to get a bad reputation, for example), children who are absent on the day of interview are not included, 'favourites' are chosen, and so on.

This sample is too small for the student to draw conclusions about whether school location has an influence on behaviour. She needs to rethink her methodology and methods. She could increase her sample size using an accurate cluster sampling procedure, for example, or she could change the focus of her research to delve into the experiences of individual pupils.

Example 4

If this student is interested in finding out about alcohol consumption levels by gender and subject, it appears that he wants to make generalizations about consumption levels, although this is not explicitly stated. If so, he has chosen an inappropriate sampling method. Quota sampling is a purposive (or non-probability) method. Students do not have a specifiable chance of being selected: only those that are there at the right time on the right day have a chance of being selected. Also, quota sampling uses convenience or judgement sampling to choose respondents: care would have to be taken to avoid selection bias.

If this student wants to make generalizations, but still sample by gender and subject, he should choose a probability sampling method, such as a stratified random sample. However, gaining access to student details for his sampling frame could be problematic.

His choice of subject areas seems rather arbitrary: an explanation needs to be given for this choice or care taken to make it more representative of subjects available at his university.

Example 5

The specific focus of this research is not clear, which is problematic for an analysis of the chosen sampling methods. If the researcher is interested in describing the experiences and behaviour of people using drugs at music festivals, then a snowballing technique is a useful and valid way to contact people. However, care would have to be taken when choosing the initial contacts, and sampling and selection bias would need to be acknowledged and reduced, where possible. The student would have to be skilled in establishing rapport and gaining trust for this method to work effectively (see Activity 41: Establishing rapport).

It is not clear why the three festivals have been chosen. This could have a big influence on the results of the research. For example, some music festivals have a strict no-drugs policy that is reinforced rigorously by police officers searching cars and festival-goers as they enter the site. Others have a much more relaxed policy and do not have police officers on site. These different policies could have an influence on the level and type of drug taking, as could the type of festival: a family-friendly folk festival would attract very different festival-goers than an adult-only electronic music festival, for example. The researcher needs to think about, and justify, her choice of festivals.

Useful terms

A ‘sampling frame’ is a list, source or device from which the sample is drawn. It includes all the items within the population that can be sampled (this could include individuals, organizations and households, for example).

The ‘margin of error’ is a measure of the accuracy of results: the larger the margin of the error, the less accurate the results. It is a way of quantifying uncertainty about a survey result. The margin of error is qualified by a probability statement called a confidence level (see Activity 24: Choosing sample size).

See Activity 22 for a definition of ‘probability samples’ and Activity 23 for a definition of ‘non-probability (purposive) samples’. Definitions of ‘sampling bias’ and ‘selection bias’ are given in Activity 15: Recognizing research(er) bias.

Related activities

- Activity 15: Recognizing research(er) bias
- Activity 22: Knowing about probability samples
- Activity 23: Knowing about non-probability (purposive) samples
- Activity 24: Choosing sample size
- Activity 59: Ensuring validity and reliability in quantitative research

Preparatory reading

Daniel (2012) provides some useful introductory material on choosing sampling methods and sizes.

Further reading

Blair, E. and Blair, J. (2015) *Applied Survey Sampling*. Thousand Oaks, CA: Sage.

Daniel, J. (2012) *Sampling Essentials: Practical Guidelines for Making Sampling Choices*. Thousand Oaks, CA: Sage.

Emmel, N. (2013) *Sampling and Choosing Cases in Qualitative Research: A Realist Approach*. London: Sage.

Thompson, S. (2012) *Sampling*, 3rd edition. Hoboken, NJ: John Wiley & Sons.

Activity 26 Justifying your Research Topic

Student handout page 305

Tutor Notes

Purpose: This activity asks students to produce a justification for their research topic, which they must present (and defend) to the rest of the group. This can be done as a short oral presentation in class or, if contact time is limited, can be posted on the relevant digital platform for peer review, feedback and defence.
Type: Self-guided individual exercise followed by individual presentation (in class or digitally).
Level: Intermediate and advanced.
Duration: Several hours for independent study and a presentation of up to 10 minutes for each student (if this option is chosen). The actual time required for independent study will depend on the type and amount of work that has already been undertaken.
Equipment/materials: Students will need access to appropriate presentation software/hardware or access to the relevant digital platform, depending on which option is chosen.
Prerequisite activities: Activity 16 will be useful for students who are struggling to choose a suitable topic.
Learning outcome: By the end of this activity students will have produced, presented and defended a justification for their research topic.

The activity

Give the student handout to your students. This asks them to produce a justification for their research topic and present (and defend) their justification to their fellow students in an oral presentation lasting up to 10 minutes. Questions are provided to help them to produce their topic justification. Students should be prepared to answer questions from other students in defence of their justification, and should prepare questions that they can ask of other students. If contact time is limited you can ask students to post, and defend, their justification digitally.

Key issues

This activity is useful for a variety of reasons:

- A topic justification will help students to decide whether their proposed project is viable, workable, exciting, important and worth their time and effort. It will also help them to think about whether the topic provides enough scope to work at the right intellectual level.
- It will encourage students to think about how they decided on the topic and determine whether this is a valid, reliable and justifiable reason for undertaking the research.
- The justification should establish that the research is important and that it will add to new knowledge. Some students, however, spend too much time concentrating on filling a gap in the literature, and neglect to illustrate how or why their research is important. This activity should help them to think more about these issues.
- If you are working with PhD students, this is a useful activity to undertake as it:
    - ensures that their topic is viable, workable and at the right level for doctoral study;
    - provides valuable information for students to include in their thesis;
    - helps them to practise defending their topic, which is good preparation for their viva/oral examination.

Useful terms

A ‘topic justification’ introduces the topic (the primary subject area and the context or properties of the subject) and indicates why the research is important and significant. This includes potential benefits, impact and adding to new knowledge, for example.

Related activities

- Activity 16: Choosing a research topic
- Activity 17: Producing aims and objectives
- Activity 18: Developing a research question
- Activity 27: Defending methodology
- Activity 73: Writing an impact statement

Preparatory reading

Part II of Bastow et al. (2014) provides some interesting material on economic and societal impact by looking at the demand for social science research from the private and public sectors.

Chapters 7, 8 and 9 in Booth et al. (2008) cover the topics of making good arguments, making claims and assembling reasons and evidence, respectively.

Further reading

Bastow, S., Dunleavy, P. and Tinkler, J. (2014) *The Impact of the Social Sciences: How Academics and Their Research Make a Difference*. London: Sage.

Booth, W., Colomb, G. and Williams, J. (2008) *The Craft of Research*, 3rd edition. Chicago: University of Chicago Press.

Activity 27 Defending Methodology

Student handout page 306

Tutor Notes

Purpose: This activity asks students to produce a defence of their methodology, which they must present to the rest of the group. It helps students to understand, analyse, critique and defend their chosen methodology, while increasing exposure to different methodologies that have been chosen by other members of the group.
Type: Self-guided individual exercise (during independent study) followed by individual presentations (in class).
Level: Intermediate and advanced (students will need to have thought about, and decided on, their preferred research methodology).
Duration: Several hours of individual study, followed by a 10-minute presentation by each member of the group (with time for questions and answers after each presentation).
Equipment/materials: Students will need access to appropriate presentation software/hardware and appropriate literature.
Prerequisite activities: This activity could be run together with Activity 92, as this helps students to understand more about methodology.
Learning outcome: By the end of this activity students will have analysed, critiqued and defended their chosen research methodology.

The activity

Give your students the student handout. This asks them to produce a defence of their chosen research methodology and present it to the rest of the group in a verbal presentation lasting up to 10 minutes (for some students you may need to ensure that they understand the difference between methodology and methods; see ‘useful terms’ in Activity 20).

At the end of each presentation other students can ask questions. Therefore, students should be encouraged to think about what they might be asked and prepare some suitable answers. They should also think about what questions they would like to ask other students. This is a useful way for students to produce a detailed defence of their chosen methodology, while also raising awareness of other methodologies that they might not have considered.

Key issues

Methodological defence is an extremely important part of the research process, especially for researchers who choose a more innovative, less well-known methodology. Once students have chosen a suitable methodology they must be able to defend their choice. For students studying at advanced level this will help them to ensure that their methodological choice fits with their theoretical perspective and epistemological standpoint and that their methodology is the most suitable framework for their chosen topic and research question.

If students are applying for funding for their research they must pay close attention to methodology. Grant proposals can fail if the methodology is flawed (the methodology is not suited to the research question, for example) and if methodological detail is lacking.

Useful terms

See Activity 20 for a definition of ‘research methodology’ and ‘research methods’ and Activity 92 for a description of the most popular methodologies chosen by students. Methodology is influenced by epistemological standpoint: Activity 90 provides a definition of ‘epistemology’ and Activity 91 provides more information about asking epistemological questions. Some students studying at intermediate level may find these issues overwhelming: you will need to use your judgement about the depth and scope of discussion in this activity (questions 5 and 6 can be deleted from the student handout if you feel they are too advanced for your students).

Related activities

- Activity 18: Developing a research question
- Activity 21: Using multiple or mixed approaches
- Activity 90: Knowing about epistemology and ontology
- Activity 92: Understanding methodology
- Activity 94: Locating epistemological and methodological standpoint

Preparatory reading

Chapter 2 of Clough and Nutbrown (2012) asks ‘what is methodology?’ and provides a useful introduction for students new to methodology.

Further reading

Clough, P. and Nutbrown, C. (2012) *A Student's Guide to Methodology*, 3rd edition. London: Sage.

Della Porta, D. and Keating, M. (2008) *Approaches and Methodologies in the Social Sciences: A Pluralist Perspective*. Cambridge: Cambridge University Press.

Activity 28 Costing a Research Project

Student handout page 307

Tutor Notes

Purpose: This activity is for students who need to cost their research project. It will help to raise awareness of the costing methods, approaches and procedures adopted by their institution and/or funding body, and help them to categorize costs, recognize allowable and unallowable costs, work within caps and limitations, and seek expert help.
Type: Small-group exercise (in class) followed by a tutor-led discussion.
Level: Advanced (this activity is for students and researchers who need to cost their research project accurately, for a grant application or to satisfy internal procedures, for example).
Duration: Forty minutes for the small-group exercise, followed by 20 minutes for the tutor-led discussion.
Equipment/materials: Access to information about the costing method adopted by your institution or funding body (a website or downloadable documentation, for example).
Prerequisite activities: Students will find it useful to undertake Activity 29: Producing and justifying your budget, although this is not a prerequisite activity.
Learning outcome: By the end of this activity students will know how to categorize costs, recognize allowable and unallowable costs, work within caps and limitations, and know where to seek expert help when working out their costs.

The activity

Divide your students into small groups. Direct your students to the costing method adopted by your institution. Examples are the Transparent Approach to Costing (TRAC) and Full Economic Costing for Research (fEC) used in higher education in the UK, and the National Institutes of Health (NIH) Modular Grant Applications system for medical research in the USA (see ‘useful terms’, below). Researchers in small or private organizations should be directed to the costing methods that are adopted by the relevant funding body. Information about costing methods can be found on institution websites or obtained from university research offices, for example.

Ask students to work through the student handout in their groups. Once they have completed this task, lead a class discussion to clarify the issues raised and to explain some of the more complex costing procedures.

Key issues

The following issues can be raised in this activity:

- In general, costs are categorized into direct costs (staff salaries, equipment and materials, for example) and indirect costs (library facilities and estates, for example). However, using the fEC method in the UK, costs are now categorized into directly incurred costs, directly allocated costs and indirect costs:
  - Directly incurred costs are items or services incurred or purchased specifically for a project, such as consumables, travel and subsistence, research assistants, dedicated technicians, support staff and equipment purchases.
  - Directly allocated costs are the costs of services on a project, where the services are shared by other activities and projects, such as major research facilities, estates, investigators' time and laboratory technicians.
  - Indirect costs are not directly related to any one research project or activity, but a necessary part of the costs of undertaking the project or activity, such as staff and non-staff costs in central service departments, academic support time or estates costs that relate to central services (in the USA indirect costs are now known as facilities and administration costs).
- When working out costs, researchers should take care to ensure that costs appear in only one of the three categories described above (there must be no double counting). Direct costs are favourable as there is more scope for transferring money from one budget heading to another (indirect costs cannot be transferred).
- Within each costing method there are allowable and unallowable costs. Some funding bodies are very specific about what will and will not be funded (having to adhere to a specific costing method), whereas others are more flexible.
- Caps and limitations can include salary caps and stipends, limits on equipment purchase and a limit on the amount of funding for large-scale surveys, for example. Students must pay close attention to caps and limitations: if they are ignored (or misunderstood) it can lead to rejection of the grant application.
- The following departments and/or people can help students to cost their projects:
  - the university research office;
  - the estates management department;
  - the human resources department;
  - the communications/marketing office;
  - the university printing and binding service;
  - supervisors or mentors;
  - doctoral training centre staff;
  - departmental administration office;
  - experienced collaborators (it can be useful for students or early-career researchers to work with more experienced colleagues on grant applications);
  - funding body research liaison staff.

Useful terms

TRAC is the standard method used for costing in higher education in the UK. It has been used since 2000 for costing the main activities of higher education institutions: teaching, research and other core activities. Universities are required to submit an annual TRAC return to the relevant funding council. Although non-university organizations in the UK are not expected to use the TRAC method, funding organizations will want proof that costing methods are robust.

Full Economic Costing is an extension of the TRAC method. It was introduced in 2005 by the UK government (the abbreviation fEC is used rather than FEC because the latter is recognized as referring to 'further education colleges'). It is a method used by higher education institutions across the UK to calculate the cost of research projects, and takes account of all direct costs and associated indirect and estates costs.

The Modular Grant Applications method was introduced in 1998 by the US NIH. The method was designed to help researchers concentrate on their research rather than the minutiae of budget development, and to reduce the time spent between receipt of application and grant award. Specific modules or increments are established in which direct costs must be requested, with a maximum stated level for requested budgets. This system is used for research project grants, small grants, academic research enhancement awards grants, exploratory/developmental research grants and clinical trial planning grant programmes.

Related activities

- Activity 29: Producing and justifying your budget
- Activity 30: Producing a research proposal
- Activity 31: Obtaining funding
- Activity 83: Understanding biased financial relationships
- Activity 84: Recognizing and managing the funding effect

Preparatory reading

Research Councils UK (www.rcuk.ac.uk) has some useful documents available for download from their website. For example, the document 'Full Economic Costing: Updated Guidance Notes for Peer Reviewers' is useful as it explains very clearly how fEC should be considered throughout the peer-review process [accessed 23 June 2015].

The Higher Education Funding Council for England (www.hefce.ac.uk) provides some useful information about research funding and costing for research in the UK. This includes information about the UK Research Partnership Investment Fund (set up in 2012 to support investment in higher education research facilities), mainstream quality-related research funding (distributed on the basis of research quality) and capacity funding (supporting research capacity development in science, engineering and technology) [accessed 23 June 2015].

Jisc (www.jisc.ac.uk/guides) provides some useful guides about how ICT costs can be reduced in education and research, which can help researchers to demonstrate value for money in their grant applications [accessed 23 June 2015].

Modular budget guidelines and sample modular budgets are available from the NIH website: http://grants.nih.gov/grants/funding/modular [accessed 23 June 2015].

Further reading

Jansen, R.C. (2013) *Funding Your Career in Science: From Research Idea to Personal Grant*. Cambridge: Cambridge University Press.

Payne, M.A. (2011) *Grant Writing Demystified*. New York: McGraw-Hill.

Sternberg, R. (ed.) (2014) *Writing Successful Grant Proposals from the Top Down and Bottom Up*. Thousand Oaks, CA: Sage.

Activity 29 Producing and Justifying your Budget

Student handout page 308

Tutor Notes

Purpose: This activity is for students and researchers who need to produce and justify a budget for their research. It provides advice, guidance and tips on how to do this. Once their budget justification (or budget narrative) has been produced, it is submitted for tutor feedback and modified accordingly.
Type: Self-guided individual exercise (during independent study) followed by tutor feedback.
Level: Advanced (doctoral students, postdocs, early-career researchers or research officers, for example).
Duration: This activity can take several weeks to complete, depending on the complexity of the budget.
Equipment/materials: Researchers will need access to the relevant budget and costing methods adopted by their institution and/or chosen funding body.
Prerequisite activities: Activity 28: Costing a research project.
Learning outcome: By the end of this activity students will have produced and justified their budget in the required format.

The activity

Give the student handout to your students. This asks them to produce and justify their budget and provides advice, guidance and tips on how to do this. Once they have produced their budget and justification, they can submit it to you for feedback, and then make alterations accordingly.

Key issues

When checking whether students have highlighted, explained and provided a rationale for their costs, ensure that they have addressed the following (you can also check that they have addressed the issues covered in the student handout):

- Who is to be employed on the project? What is their experience, how will they contribute to the success of the project and does this justify the proposed costs?
- If using standard job titles and salary levels, does the required work differ in any way from the work required on other projects by staff with the same job titles and salaries?
- Are the proposed charges related accurately to the project? Does the proposed charge differ from other projects? If so, how does it differ from the standard level expected on all research projects? What is the explanation for this difference?
- How, exactly, will supplies and equipment be used on the project? How are they relevant to the research design and methods?
- Have the availability and status of similar equipment and the anticipated extent of use been highlighted? If collaboration is involved, has all equipment owned by all parties been included?
- What are the reasons for choosing a particular model or service contract, in relation to alternatives?
- If upgrades to existing equipment are required, why is this so and why does this provide the best value for money?
- If it is only possible to provide estimates for certain costs, has it been demonstrated that estimates are sound (based on previous experience, careful research or detailed knowledge, for example)?
- Are all costs realistic, reasonable, justifiable, allowable and allocable (necessary for the success of the project)?

Useful terms

See ‘useful terms’ in Activity 28 for definitions of ‘Transparent Approach to Costing’, ‘Full Economic Costing for Research’ and the ‘Modular Grant Applications’ method.

Related activities

- Activity 28: Costing a research project
- Activity 30: Producing a research proposal
- Activity 31: Obtaining funding

Preparatory reading

HEFCE (www.hefce.ac.uk) provides some useful information about obtaining value for money in research. You can also access the Financial Memorandum between higher education institutions and HEFCE and the HEFCE Audit Code of Practice on this website, both of which provide useful background reading [accessed 2 July 2015].

Part 2 of Dawson (2015) expands on the information provided in this activity and covers all aspects of costing research projects and producing budgets.

Further reading

Dawson, C. (2015) *How to Finance your Research Project: A Practical Guide to Costing Research Projects and Obtaining Funding*. London: Robinson.

Jansen, R.C. (2013) *Funding Your Career in Science: From Research Idea to Personal Grant*. Cambridge: Cambridge University Press.

Payne, M.A. (2011) *Grant Writing Demystified*. New York: McGraw-Hill.

Activity 30 Producing a Research Proposal

Student handout page 310

Tutor Notes

Purpose: This activity requires students to produce a research proposal that is subjected to peer review and then modified and refined accordingly.
Type: Self-guided individual exercise followed by peer review (during independent study).
Level: Advanced.
Duration: This activity involves several weeks of independent study, followed by peer review and modification of proposals. The actual time taken depends on type of research, subject and the amount of preliminary work that has already been undertaken.
Equipment/materials: None required.
Prerequisite activities: Although there are no specific prerequisite activities, this activity is aimed at advanced students who have experience of research methods and/or know how to approach their proposed research. The activities listed in 'related activities' below are all relevant and would be useful for students to undertake before carrying out this activity.
Learning outcome: By the end of this activity students will have produced, modified and refined their research proposal.

The activity

Ask your students to produce a research proposal following the guidelines provided in the student handout. Once they have done this, they will swap their proposal with a peer so that they can review each other's proposals, using the guidance given in the handout. Students should then modify and refine their proposal, according to the results of the peer review. You can ask students to choose a partner to review their work, or you can select the pairs of students (this is useful if you think that certain students would work well together, because of their chosen topic or methodology, for example).

Key issues

Students must ensure that their proposal is pitched at the right intellectual level for their audience and for its purpose. They will also need to make sure that they follow the structure and style required by your department/university (if relevant).

A research proposal at advanced level should demonstrate that the student:

- knows about, and can critically analyse, current thinking in their discipline;
- will create and interpret new knowledge (through research and advanced scholarship) and advance knowledge in their discipline;
- has the ability to design and implement a project that will enable them to generate new knowledge;
- is able to carry out research that is unique and/or offers new insight or development, with useful policy and practice implications (if relevant) and demonstrable impact;
- has the background understanding and required knowledge of relevant research techniques (including an evaluation and critique of methodology and methods);
- is able to produce a detailed and workable timetable (and include resources and budget, if relevant) with all eventualities covered;
- can critique, justify and modify their project in light of problems that can arise;
- will be able to publish their work after it has satisfied peer review.

Useful terms

A ‘research proposal’ is a document (written by the student or researcher) that provides a detailed description of the intended research project. It also provides a justification for the research, illustrating why it is important, valid and worthwhile. See the student handout for a description of the components that make up a research proposal.

Related activities

- Activity 16: Choosing a research topic
- Activity 17: Producing aims and objectives
- Activity 18: Developing a research question
- Activity 19: Designing a research project
- Activity 20: Choosing research methods
- Activity 21: Using multiple or mixed approaches
- Activity 26: Justifying your research topic
- Activity 27: Defending methodology

Preparatory reading

All three books listed below provide useful preparatory reading for this activity.

Further reading

Denicolo, P. and Becker, L. (2012) *Developing Research Proposals*. London: Sage.

Denscombe, M. (2012) *Research Proposals: A Practical Guide*. Maidenhead: Open University Press.

Punch, K. (2006) *Developing Effective Research Proposals*, 2nd edition. London: Sage.

Activity 31 Obtaining Funding

Tutor Notes

Purpose: This activity encourages students to identify, and share with others, relevant sources of funding for their research project.
Type: Student-centred resource development.
Level: Advanced. This activity is for students and researchers who need to obtain funding for their research.
Duration: This activity can take place over several weeks, depending on the course. Students will need to monitor, find and post information, which can take a few minutes each week.
Equipment/materials: Access to the relevant digital platform.
Prerequisite activities: There are no prerequisite activities, although students who need to obtain funding for their research will find the following two activities useful: Activity 28: Costing a research project and Activity 29: Producing and justifying your budget.
Learning outcome: By the end of this activity students will have developed a useful resource that they can access to find a potential funding organization.

The activity

Create a list of headings, under which your students can search for, and post, specific sources of funding. This can include, for example, funding databases (online), funding directories (printed), internal departments, professional bodies, government/state/federal funding, overseas funding, private funding, charitable funding, industrial funding, sponsorship and crowd-funding platforms. Create your list to reflect the subject and/or topic of research of your students.

Post your list on the relevant digital platform and ask your students to post, under the relevant heading, specific sources that they have found. You may find it useful to give a deadline by which all sources should be posted. Your students can then use the list of specific sources to search for their own funding.

Key issues

Searching for funding can be a long and laborious process for some students and researchers. This activity helps to ease the search process by pooling ideas and providing a list of funding sources that are of direct relevance to your students.

Introduce this activity early on so that students have plenty of time to post their ideas and search for funding. You can also enter some suggestions under each topic, to get the list started, for example:

- Funding databases (online): Research Professional (UK), www.researchprofessional.com; Euraxess Funding Search (UK), http://euraxessfunds.britishcouncil.org
- Funding directories (printed):
  - Palgrave Macmillan (2014) *The Grants Register 2015: The Complete Guide to Postgraduate Funding Worldwide*, 33rd edition. Basingstoke: Palgrave Macmillan.
  - Lillya, D. and Zagnojute, G. (2016) *The Guide to Educational Grants 2016/17*, 14th edition, London: The Directory of Social Change.
- Government funding: Arts and Humanities Research Council, www.ahrc.ac.uk; The Higher Education Academy, www.heacademy.ac.uk
- Charitable funding: Joseph Rowntree Foundation, www.jrf.org.uk/funding; Nuffield Foundation, www.nuffieldfoundation.org
- Sponsorship: Scholarship Search, www.scholarship-search.org.uk; Scholarship Portal, www.scholarshipportal.eu
- Crowd-funding platforms: Geek Funder, http://geekfunder.com; Rocket Hub, www.rockethub.com

Useful terms

Public funding for science and research in the UK is said to operate under the ‘Haldane principle’. The original idea of this was that the decision about what to spend research funds on should rest with the researcher, rather than with politicians. However, there have been several revisions to this idea since its inception. Today, the UK government ‘identifies strategic priorities, and the scientific community selects projects within relevant fields on the basis of scientific merit, as assessed by peer review’. A statement of the principle, published by the UK government, can be viewed at www.publications.parliament.uk/pa/cm200809/cmselect/cmdius/168/16807.htm.

See ‘useful terms’ in Activity 28 for definitions of ‘Transparent Approach to Costing’, ‘Full Economic Costing for Research’ and the ‘Modular Grant Applications’ method.

Related activities

- Activity 28: Costing a research project
- Activity 29: Producing and justifying your budget
- Activity 30: Producing a research proposal

Preparatory reading

Both books listed below provide useful information about finding funding for a research project. If you are from the UK, useful information about Research Council funding can be obtained from Research Councils UK: www.rcuk.ac.uk/funding.

Vidal, S., Laureano, R. and Trindadeb, M. (2015) 'Assessing the impact of grant managers on the success of grant applications', *Perspectives: Policy and Practice in Higher Education*, 19(3), 84–91. The findings from this study indicate that researchers are significantly more likely to be successful in their grant application if grant administrators are involved in the editing and writing of research proposals. This is useful advice for students who are hoping to obtain funding.

Further reading

Aldridge, J. and Derrington, A. (2012) *The Research Funding Toolkit: How to Plan and Write Successful Grant Applications*. London: Sage.

Dawson, C. (2015) *How to Finance Your Research Project: A Practical Guide to Costing Research Projects and Obtaining Funding*. London: Robinson.

Activity 32 Working Collaboratively with Others

Tutor Notes

Purpose: This activity is an entertaining way to help students understand how difficult it can be to fit into an existing research team or student group. This could be when researchers working at an advanced level need to collaborate with other research teams, or when students at beginner or intermediate level need to work with other students on a particular project, for example. It highlights the importance of making new members feel welcome and part of the team, and illustrates the importance of providing an adequate induction when working collaboratively with an existing research team or student group.
Type: Group game (in class).
Level: Beginner, intermediate and advanced.
Duration: Twenty minutes for the game, followed by 20–40 minutes for a tutor-led discussion.
Equipment/materials: Three soft balls, about the size of a tennis ball (they must be soft so that injury is avoided). You will also need a space big enough to take up to 18 students standing in a circle, with about half a metre between each student. This activity can be undertaken outside, if it is not too windy.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will understand (and know how to overcome) the difficulties that can be encountered when new group members join existing research teams or student groups.

The activity

Ask for two student volunteers. When they have been chosen, ask them to leave the room and tell them that you will invite them back in 5 minutes or so. Then choose 10–16 students (depending on the size of your group). If you have students left over, they are to observe the exercise. If you have students with a disability that affects coordination or sight you may need to assign an observer or advisory role.

Ask your students to stand in a circle, leaving about half a metre between each other. Give one ball to one student. Instruct the students to throw the ball around the group so that everyone gets the ball once (students must pay attention so that the same person does not receive the ball twice: stop and start again if this happens). All they have to do is remember who throws the ball to them and who they throw the ball to. Tell them to stop once everyone has received the ball once. Ask them to repeat this exercise, throwing the ball to the same person again. Ask them to keep on going until the ball flows smoothly around the circle.

Once you are happy that this is working well, ask the students to stop. Give another student another ball and then ask the exercise to begin again, this time with two balls. Again, students should ensure that they receive the ball from the same person and throw the ball to the same person (following the same pattern that was established with the first ball). Let students practise for a minute or two, until both balls flow smoothly around the circle.

Once you are happy that this is working well, stop the exercise and introduce the third ball, giving it to another student. Ask the students to begin again (following the same pattern) and practise for a few minutes until all three balls are flowing smoothly around the circle.

This exercise is quite easy to do because students are only remembering who the ball comes from and who it goes to, but it looks very complicated and impressive when three balls are traversing the circle. Every now and again the balls might crash together – if this happens ask the students to stop throwing and then restart the exercise.

When the balls are flowing smoothly, instruct the students to keep throwing the balls, even when the two volunteers join the circle. Invite the volunteers back into the room and ask them to join the circle (the volunteers can decide whether to join the circle together in one place, or to space themselves out around the circle). The volunteers do not know that the pattern has been rehearsed and tend to stand expectantly waiting for the ball to be thrown to them.

If the balls crash together, stop and start the exercise again. Continue for 2–3 minutes, perhaps until you see the realization dawn on the volunteers that they are never going to be given the balls. Once this happens, ask the volunteers to try to get a ball and then throw it to someone else (some volunteers may try to get a ball before you ask them to do so: this is not a problem, as the same issues can be raised). If they succeed in getting and throwing a ball you will find that the routine tends to break down and confusion reigns as students work out how to continue. Some groups will discuss how to start again, whereas others will not. Stop the exercise when you feel it is appropriate.

Key issues

The following questions can be asked during the discussion:

1. What did the volunteers feel when they joined the circle? This could be isolation, confusion, a sense of not being part of the group, not understanding the rules of the game.
2. How did other members of the group feel about not enabling the volunteers to join in with the game? This can range from ‘not a lot’ because they were concentrating too much, to ‘we felt mean’ because they were not telling the volunteers how the game was played.
3. What could members of the group have done to enable the volunteers to better fit in? Students tend to suggest that the group stops throwing the balls and starts the exercise again, with the new members starting from the beginning so that they understand the rules of the game and can join in with everyone else. Some students will point out that they needed someone in charge, a manager or leader, to make these decisions.
4. What happened when the volunteers tried to force themselves into the game without understanding the rules? This could include confusion, the collapse of the game, not knowing how to continue (especially without instructions), a sense of annoyance that the game had been stopped or a feeling that the best thing to do would have been to stop the game and start again, explaining the rules to the new members.
5. How did the volunteers feel when they tried to catch a ball (this will depend on how successful they were and if and how the game collapsed as a result). Students can feel ‘guilty’ that the game had broken down or ‘pleased’ that the game had stopped so that the rules could be explained to them, for example.
6. What could have been done to integrate the new members? Again, most students will suggest that the game is stopped, that the rules are explained and that the game starts gain, incorporating the new members. Some may suggest that this should have been made clear from the start.

This game illustrates that collaboration works best if all members of the team understand their roles and functions within the project/group and understand the existing rules and regulations (both formal and informal) that guide the work. These need to be made clear from the outset during a comprehensive induction process. It is also important to foster social, cultural and organizational understanding if the project is to cross international, social and organizational boundaries (at advanced researcher level, for example). Technical understanding is crucial for all those involved in technical aspects of the project.

The game also illustrates that effective communication is vital to the success of a collaboration project. It is important to encourage personal, informal exchange among group members and collaborators. As a project progresses, collaborators and group members tend to develop a better understanding of the research problem and learn to develop a common vocabulary with which to communicate.

Another point that can be illustrated in this game is that all collaborators and group members should understand their commitments from the start of the project. If everyone understands what is expected from the outset there will be no misunderstandings as the project progresses. The most successful collaboration projects are those that have developed a real sense of partnership between all members. This partnership often continues once a project has finished, leading to future collaboration projects.

Useful terms

‘Induction’ in this context refers to the orientation and training of an employee or new group member into an organizational or group culture. It should demonstrate how the new member is interconnected with, and interdependent on, everyone else in the organization or research project.

Related activities

- Activity 86: Collaborating and cooperating ethically

Preparatory reading

The National Institute for Health Research has a useful website for researchers in the UK studying at advanced level who are thinking about collaborating with industry: www.nihr.ac.uk/industry. Some interesting case studies are given on this site [accessed 15 July 2015].

The Academy of Medical Sciences is keen to 'encourage permeability' between universities, industry and the National Health Service in the UK. More information about initiatives that have been set up to achieve this can be obtained from the Academy of Medical Sciences website: http://acmedsci.ac.uk [accessed 15 July 2015].

A new agreement reached by Research Councils UK and the US National Science Foundation (the Lead Agency Agreement) came into effect in 2013. This agreement removes some of the barriers facing international collaboration and simplifies the collaboration process for UK and US researchers, enabling researchers to apply for collaborative funding with minimal extra paperwork. More information about this agreement can be obtained from the websites of Research Councils UK (www.rcuk.ac.uk) and the National Science Foundation (www.nsf.gov).

Further reading

Bozeman, B. and Boardman, C. (2014) *Research Collaboration and Team Science: A State-of-the Art Review and Agenda*. New York: Springer.

Levin, P. (2005) *Successful Teamwork! For Undergraduates and Taught Postgraduates Working on Group Projects*. Maidenhead: Open University Press.

O'Rourke, M., Crowley, S., Eigenbrode, S.D. and Wulfhorst, J.D. (eds) (2013) *Enhancing Communication and Collaboration in Interdisciplinary Research*. Thousand Oaks, CA: Sage.

Section 3 Conducting Research

Activity 33 Understanding the Process of Science

Tutor Notes

Purpose: This activity requires students to think about the process of science in a visual and creative way. This will encourage them to go beyond the simple linear depiction of the scientific method and enable them to think more deeply about science and how research is conducted.
Type: Small-group exercise to produce a visual representation, followed by small-group presentation (in class).
Level: Beginner and intermediate (the level will be reflected in the complexity of visual representation and group presentation).
Duration: Twenty minutes for the group exercise, followed by a five-minute presentation from each group.
Equipment/materials: Large sheets of paper (such as flip chart paper). Coloured pens can help creativity. Students can use diagramming software if they wish. However, the 'retro' technique of coloured pens and paper seems to work well for students in this activity.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have developed a deeper understanding of the process of science.

The activity

Divide your class into small groups. Ask each group to develop a visual representation that illustrates and/or explains the process of science (see ‘useful terms’, below). Once they have done this, ask each group to share and explain their visual representation with the rest of the class. Some students (in particular, those from certain science backgrounds) will need encouragement to go beyond a simple, linear depiction of the scientific method.

Students have come up with a wide variety of visual representations in this activity. Some of them have been cyclical, with arrows illustrating that the process moves backwards and forwards between actions such as exploration, discovery, testing, verification, scientific community review, scientific community feedback, participant review, and public and social benefits. Some students have drawn flow charts with arrows indicating that steps can be repeated and dead ends reached and/or bypassed. Other depictions have included mind maps, with ‘science’ as the central word from which a wide variety of words and images branch out; radial trees, with ‘observation’ at the centre; top-down, triangular depictions, with the researcher at the top; and concept maps, with phrases and/or words linking concepts and helping to explain the scientific process.

Key issues

This activity can raise the following issues:

- The popular linear depiction of the scientific method illustrates the logical steps through which science moves: make an observation → ask a question → form a hypothesis → conduct the experiment → collect data → draw conclusions → develop theory. However, this is a very simplistic description. In reality, science moves through a series of stages, often repeating itself, developing and expanding on previous research and moving through different sequences to explain emerging ideas and significant findings. It can involve more than one researcher, working at different stages and following different sequences.
- Science can be approached deductively (putting forward a hypothesis for testing) and inductively (through observation of a phenomenon or behaviour). In this activity both types can be mentioned, although some students may need to be encouraged to think about one or other type in more depth. Conclusions and/or interpretations can be generated using deductive and inductive methods, and the method that is used depends on epistemological and methodological standpoint. Some researchers use a combination of both methods in their research project, if their methodological framework allows for this. More information about these issues is provided in Activity 99: Generating theory inductively and deductively.
- The process of science can be creative, dynamic, exciting and unpredictable. Conclusions can be reached, modified, revised and changed. Science is evolving constantly: it is ongoing and can raise more questions than it answers.
- The process of science has an influence on society and culture (new discoveries and developments, and the benefits they bring) and is influenced by society and culture (the type of research conducted, the subjects covered and the methods used, for example).

Useful terms

The ‘process of science’ refers to the practices and procedures used by scientists/researchers to uncover knowledge, interpret meanings of new discoveries, validate new knowledge (and understanding) and develop scientific theory.

Related activities

- Activity 34: Knowing about real-world scientific research
- Activity 35: Avoiding mistakes in experiments
- Activity 99: Generating theory inductively and deductively

Preparatory reading

Gauch (2012) is useful for providing a deeper understanding of the general principles of the scientific method and is interesting because it explores science's interrelationships with disciplines in the humanities.

Draw Science (http://blog.drawscience.org) is a blog where 'science meets art'. Infographics are published, based on research papers, to grab attention, aid understanding and disseminate research outcomes more widely [accessed 18 November 2015].

Further reading

Chalmers, A. (2013) *What Is This Thing Called Science?* 4th edition. Maidenhead: Open University Press.

Gauch Jr, H.G. (2012) *Scientific Method in Brief*. Cambridge: Cambridge University Press.

Valiela, I. (2009) *Doing Science: Design, Analysis, and Communication of Scientific Research*, 2nd edition. New York: Oxford University Press.

Activity 34 Knowing about Real-World Scientific Research

Student handout page 312

Tutor Notes

Purpose: This activity is a role-play that helps students to think about scientific research in the real world. It enables them to understand more about the work undertaken by scientists, the experiments they conduct, how science is reported, how it is funded and the value, importance and impact of scientific research.
Type: Role-play.
Level: Beginner and intermediate.
Duration: Several hours of preparation time in groups (during independent study), followed by up to 20 minutes of role-play for each group (four groups in total).
Equipment/materials: Students should be given access to relevant presentation software/hardware and props, if they need it.
Prerequisite activities: None, although students may find it useful to work through Activity 33: Understanding the process of science.
Learning outcome: By the end of this activity students will understand more about the role, importance, value and impact of scientific research in the real world. They will have an increased awareness of the work that scientists undertake, know more about how science is funded and understand how science is communicated to specialists and the wider public.

The activity

Divide your students into four groups. Assign one of the roles given in Student Handout 1 to each group. Ask them to prepare their role for the next teaching session. Encourage them to use any presentation software/hardware, props, or anything else useful to emphasize their point during the role-play, and to make their presentation entertaining.

In your next teaching session each role-play is to last up to 20 minutes. Introduce each role-play by explaining the role of the group making the presentation, and by giving the audience the relevant role from Student Handout 2. The groups should make their presentation and the rest of the students should engage in the role-play using the roles assigned to them, asking questions where appropriate. The roles are as follows:

- Group 1. The students in this group are to play the role of researchers working for a pharmaceutical company. The rest of the students are to play the role of school pupils who are thinking about what they would like to do for their future careers.
- Group 2. The students in this group are members of the editorial board of a scientific journal. The rest of the students are to play the role of postgraduate students who need to submit journal articles.
- Group 3. The students in this group are researchers working together on a project for which they need to obtain funding. The rest of the students are to play the role of members of a funding body that will decide whether or not the research should be funded.
- Group 4. The students in this group are university recruitment staff, looking to find suitable staff for research positions within the science department. The rest of the students are to play the role of potential applicants.

Key issues

This activity can raise the following issues:

- a detailed discussion of the process of science (see Activity 33);
- the qualifications required for students to become scientists;
- the characteristics and attributes required by scientists;
- the potential differences between publicly and privately funded research;
- the unpredictable, exciting and thrilling nature of scientific discovery;
- issues surrounding ‘reputable’ and ‘flawed’ science (see Activity 13);
- how to write a scientific paper, what sections should be included and how to get it published (see Activity 70);
- how to attract more women into science;
- how to persuade others of the importance of science;
- the different ways that science is funded and how to succeed in obtaining funding (see Activity 31).

Useful terms

See Activity 35 for a definition of the ‘scientific method’ and Activity 33 for a definition of ‘the process of science’.

Related activities

Activity 33: Understanding the process of science
Activity 35: Avoiding mistakes in experiments

Preparatory reading

Johnson (2013) provides a useful guide to the different types of science career that are available.

Further reading

Gauch Jr, H.G. (2012) *Scientific Method in Brief*. Cambridge: Cambridge University Press.

Gray, D. (2014) *Doing Research in the Real World*, 3rd edition. London: Sage.

Johnson, T. (2013) *Working in Science: A Practical Guide to Science Careers for Graduates*. Bath: Trotman Education.

Activity 35 Avoiding Mistakes in Experiments

Student handout page 314

Tutor Notes

Purpose: This activity asks students to identify mistakes that can occur in experiments and encourages them to think about the best solution to overcoming or avoiding each of these mistakes.
Type: Game.
Level: Beginner and intermediate.
Duration: Twenty minutes for the group discussion, followed by up to 40 minutes for the game and tutor-led discussion.
Equipment/materials: None required.
Prerequisite activities: None, although some students might find it useful to have worked through Activity 33: Understanding the process of science.
Learning outcome: By the end of this activity students will be able to identify, overcome and avoid mistakes in experiments.

The activity

Divide your students into two groups and give each group a copy of the student handout. This asks them to discuss, in their group, the mistakes that can occur when undertaking experiments and to find solutions to overcome or avoid the mistakes that they identify.

After 20 minutes of discussion the game can begin. Ask one group to suggest a mistake and then ask the other group to suggest a solution. Continue to alternate between groups, taking it in turns to come up with mistakes and solutions.

If you are happy to make this into a competition, the groups should compete with each other, one offering a mistake, the other offering a solution, until one group wins. This could be when no new mistakes are forthcoming or when a group is unable to offer a solution, for example. Alternatively, you can hold a vote on the best solutions that have been identified, if you wish. Turning this activity into a competition can increase motivation and enthusiasm, but you should use your judgement on this as it depends on your student cohort.

If you have time you can finish this game with a tutor-led discussion on the issues that have been raised.

Key issues

Below are some examples of the types of mistakes and solutions that have been identified in this activity:

- Mistake: the experiment is unfocused. Solution: produce a title that describes the nature of the experiment in a clear and concise way.
- Mistake: a mismatch between test and purpose. Solution: develop a statement of purpose, which describes clearly what you intend to do in your experiment.
- Mistake: incorrect procedures are used. Solution: take time to choose appropriate methods and ensure that they fit the stated purpose.
- Mistake: researcher bias is introduced. Solution: understand what is meant by researcher bias. Be aware of the problems that can occur as this will help you to avoid or reduce problems with bias.
- Mistake: the hypothesis is presumed to be right, without being tested thoroughly. Solution: never presume that the hypothesis is right, even if it seems obvious or common sense. Test thoroughly with an open mind, as unexpected results can occur.
- Mistake: ignoring data that do not support your hypothesis. Solution: remain observant and report all results, whether or not they support your hypothesis.
- Mistake: data are manipulated to support the hypothesis. Solution: if this is deliberate, find and observe a scientific code of conduct and maintain high ethical standards. If this is by mistake, gain more experience and knowledge; read around the subject and seek advice from experts.
- Mistake: failure to spot important errors. Solution: improve observation skills and keep comprehensive notes about everything you observe. Don’t get distracted. Ensure that you observe with an open mind and don’t be ruled by expectation.
- Mistake: data are interpreted incorrectly. Solution: become more experienced in data analysis techniques. Attend a course, read around the subject or speak to your tutor.
- Mistake: deliberate falsification of results due to a desire to succeed. Solution: maintain high moral and ethical standards. Find out about, and adhere to, a code of conduct for research integrity.

Useful terms

‘Experimental research’ is commonly referred to as the ‘scientific method’. It is a method of investigation based on prediction, experiment and observation. This type of research seeks to add to knowledge through diligent inquiry that involves systematic and controlled testing to understand causal processes. Issues of reliability and validity are extremely important, with rules and procedures laid down to help researchers avoid mistakes and maintain accuracy and integrity.

See Activity 15 for a definition of ‘research(er) bias’ (or experimenter bias).

Related activities

- Activity 15: Recognizing research(er) bias
- Activity 33: Understanding the process of science
- Activity 34: Knowing about real-world scientific research
- Activity 59: Ensuring validity and reliability in quantitative research
- Activity 97: Recognizing problems with reasoning

Preparatory reading

Dorothy Bishop, professor of development neuropsychology at the University of Oxford, has written an interesting opinion piece for *Times Higher Education* on the pressures faced by researchers to falsify results and undertake 'questionable' research practice. The article can be found at www.timeshighereducation.co.uk/content/when-only-the-best-research-results-will-do [accessed 24 June 2015].

Viceisza (2012) is recommended for economics researchers and/or those interested in research in developing countries. It presents an innovative rewriting and reuse of experimental methods for policy-making. The discussion on strengths and weaknesses is pertinent to this activity.

Further reading

Carey, S. (2011) *A Beginner's Guide to Scientific Method*, 4th international edition. Boston: Wadsworth.

Chang, M. (2014) *Principles of Scientific Methods*. Boca Raton, FL: Taylor & Francis Group.

Viceisza, A. (2012) *Treating the Field as a Lab: A Basic Guide to Conducting Economics Experiments for Policymaking*. Washington, DC: International Food Policy Research Institute.

Activity 36 Undertaking Ethnographic Work

Tutor Notes

Purpose: This activity asks students to describe, in a visual and creative way, two components of ethnographic research (planning an ethnographic study and undertaking an ethnographic study). It encourages them to find out more about ethnographic research and produce inventive and entertaining representations to present to their peers.
Type: Small-group exercise to produce two visual representations (during independent study) followed by small-group presentations (in class).
Level: Beginner, intermediate and advanced (the level will be reflected in the complexity of visual representation and group presentation).
Duration: Several hours of independent study in their groups, followed by a presentation of up to 10 minutes in class for each group.
Equipment/materials: Students can choose their equipment and materials, and these should be made available for their use (see below). They will also need access to the relevant ethnographic literature.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will know what is involved in planning and undertaking ethnographic research.

The activity

Divide your students into small groups. Ask them to produce two visual representations of ethnographic research. The first is to be a visual representation of ‘planning for an ethnographic study’ and the second is to be a visual representation of ‘undertaking an ethnographic study’.

They are to do this during independent study, so they will need to work together with their group members to find out what is involved in planning and undertaking ethnographic research, and produce suitable visual representations that they can present to their fellow students in the next teaching session. Allow up to 10 minutes for each presentation, followed by a tutor-led discussion covering the issues raised. If contact time is limited you can ask your students to post their visual representations on the relevant digital platform for peer review and comment.

Students can use any suitable equipment or materials. This could include presentation software, graphics software, flip chart paper and coloured pens, overhead projector and transparencies, laptop and interactive whiteboard, posters and collages, video-recording equipment, or any other relevant materials and equipment.

Key issues

Students tend to be very creative with this activity, producing a variety of visual representations. These have included collages of artwork and photographs, practical flow charts, mind maps showing thought processes, concept maps highlighting themes and concepts, and short video clips representing different aspects of ethnographic research. One group even performed a mime, with a student holding explanation cards by the side of each mimed action.

This activity can raise the following issues (the more complex issues tend to be raised by those studying at advanced level).

- Planning for an ethnographic study:
  - Begin with a problem (from personal observation, background reading or personal experience/knowledge, for example).
  - Work out your theoretical perspective.
  - Become familiar with your methodology and how this is related to theoretical perspective.
  - Develop a research question.
  - Produce aims and objectives.
  - Develop an open mind.
  - Recognize and acknowledge biases and preconceived notions.
  - Develop quality controls to reduce the influence of bias (mixed methods and triangulation, for example).
  - Choose data collection methods.
  - Think about sampling procedures and sample size, although it may be difficult to determine these at the beginning of a study and they can change as the study progresses.
  - Choose recording methods.
  - Choose data analysis methods.
  - Decide on a specific writing style.
  - Produce a timetable.
  - Work out a budget.
  - Decide on the resources required.
  - Collect together relevant materials and equipment.
- Undertaking an ethnographic study:
  - Make introductions.
  - Gain access.
  - Undertake fieldwork.
  - Remain open to new methods and new sources of data as the research progresses.
  - Set aside assumptions.
  - Consider multiple perspectives and realities.
  - Hear what people say.
  - Observe what people do.
  - Analyse data as research progresses.
  - Use existing theory to help aid understanding.
  - Identify themes and concepts.
  - Decide which paths to take.
  - Remain culturally sensitive.

- Use inductive processes to develop theory.
- Tell the story from the participant’s point of view.
- Share findings with participants.
- Disseminate findings in a variety of ways.

Useful terms

‘Ethnography’ is the investigation, and systematic recording, of human cultures and human societies. Within ethnography there are different traditions, such as reflexive or critical ethnography (involving an ideological critique and questioning the status quo of power relations) and naturalistic ethnography (founded on positivism and based on the legacy of colonialism).

The focus in ethnography is to describe and interpret cultural behaviour and phenomena. All behaviour is observed and recorded through fieldwork, with a careful distinction made between scientific perceptions of reality and perceptions of the people being investigated (the researcher observes, records and analyses while ensuring that people speak in their own voices). The world is observed from the point of view of the subject rather than the ethnographer, and stories are told in the voices of local people as they go about their daily lives. Causal explanations are avoided.

Related activities

- Activity 5: Reflecting on your inquiry skills
- Activity 37: Conducting interviews
- Activity 41: Establishing rapport
- Activity 42: Listening to interviewees
- Activity 44: Recording techniques
- Activity 45: Using observation techniques
- Activity 46: Using visual methods

Preparatory reading

Atkinson (2015) provides an interesting insight into ethnographic fieldwork in sociology and anthropology and is useful for anyone considering this type of research.

Further reading

Atkinson, P. (2015) *For Ethnography*. London: Sage.

Fetterman, D. (2010) *Ethnography: Step-by-Step*, 3rd edition. Thousand Oaks, CA: Sage.

Hammersley, M. and Atkinson, P. (2007) *Ethnography: Principles in Practice*, 3rd edition. Abingdon: Routledge.

Activity 37 Conducting Interviews

Tutor Notes

Purpose: This activity asks students to develop an idea for an app that will help them to conduct interviews for their research project. They must pitch their idea to their classmates in a short presentation. It provides an entertaining and creative way for students to learn about the practical issues involved in conducting interviews.
Type: Small-group exercise during independent study, followed by small-group presentations in class (or digitally, if contact time is limited).
Level: Beginner, intermediate and advanced (the depth and breadth of presentation and discussion will reflect the level).
Duration: Several hours of independent study, followed by one teaching session for group presentations and class discussion.
Equipment/materials: Students can choose their presentation equipment and materials, and these should be made available for their use.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have a clear understanding of the practical issues involved in conducting interviews for their research.

The activity

Divide your students into small groups. Ask each group to develop an idea for an app that will help them to conduct interviews for their research project. They only need to develop the idea for the app: it is not necessary to actually design the app.

Your students will need to pitch their idea to their classmates in the next teaching session (if teaching time is limited, ask your students to pitch their idea on the relevant digital platform instead). You can ask your students to do this in the style of *Dragons' Den* or *The Apprentice* (if this appeals to your students), with the class voting on the best pitch and/or the most useful app. Follow the presentations with a tutor-led discussion on the issues that have been raised, if time permits.

Key issues

The ideas that are presented depend on the subject and level of the course that you are teaching. Examples include:

- a calendar to store the time and date of interview;
- alerts for when an interview is due;
- reminder of what to take to an interview;
- a map with the location of the interview and the best way to get to the interview, including public transport and car parking;
- a 'question designer' that helps you to develop good, workable questions and avoid asking leading, ambiguous or double-barrelled questions;
- a voice recorder to record the interview, for life history interviews or for unstructured interviews, for example;
- a list of questions, with boxes to tick using the touchscreen, if undertaking a structured interview;
- an alert that highlights the important issues that are being raised and that need to be followed up (if the researcher is using a theoretical sampling technique, for example);
- an initial, quick and simple analysis of the data that can be followed up quickly, if necessary;
- an 'interview summary' facility that enables researchers to record the salient points;
- a 'contact summary' that enables the researcher to record information about who the participant was, when the interview took place and the issues that should be followed up in subsequent interviews, for example;
- a feature that stores photos of participants, if they agree;
- information, advice or alerts about data protection issues, which could include warnings of when laws have been breached and what the researcher should do to ensure that it does not happen again;
- a feature that highlights ethical issues, such as anonymity, confidentiality and data protection.

Although some of the features described above may not be possible, given technological limitations, this activity is useful because it encourages students to think about, and raise, practical issues involved in conducting interviews.

Useful terms

‘Unstructured interviews’ provide the freedom for participants to tell their life stories as they wish, with the researcher helping to keep the narrative moving forward. The emphasis is on finding meanings and acquiring a deep understanding of people’s life experiences. As such, this type of interview may require considerable personal disclosure from the interviewee. Life story interviews (covering the whole life story of the interviewee, told in their own words) and oral history interviews (recording bibliographic accounts of people’s lives) are two types of unstructured interview.

‘Semi-structured interviews’ are used to ask standard questions of each participant but also allow for additional questions and probing for detail, if required. The assumption is that experiential knowledge can be transmitted from the participant to the researcher, and that there may be additional experiences/themes that have not been predetermined by the researcher. Data can be quantified, compared and contrasted with data from other interviews (see Activity 63: Coding and categorizing qualitative data).

‘Structured interviews’ are used in survey research to ask the same set of standardized questions to all respondents in the same order. The questions are grouped into predetermined categories that will help to answer the research question, or confirm/disconfirm the hypothesis. As with semi-structured interviews, the assumption is that the respondent has experiential knowledge that can be transmitted to the interviewer. Interview data can be analysed and, if correct procedures have been followed, generalizations can be made to the target population.

Related activities

- Activity 38: Constructing questions
- Activity 39: Producing an interview schedule
- Activity 41: Establishing rapport
- Activity 42: Listening to interviewees
- Activity 44: Recording techniques

Preparatory reading

The UK Data Service (www.ukdataservice.ac.uk) is ‘a comprehensive resource funded by the ESRC to support researchers, teachers and policy-makers who depend on high-quality social and economic data’. The website contains detailed information about a variety of interview methods [accessed 4 December 2015].

Further reading

Brinkmann, S. and Kvale, S. (2015) *InterViews: Learning the Craft of Qualitative Research Interviewing*, 3rd edition. Thousand Oaks, CA: Sage.

Gubrium, J. and Holstein, J. (eds) (2003) *Postmodern Interviewing*. Thousand Oaks, CA: Sage.

Kvale, S. (2007) *Doing Interviews*. London: Sage.

Seidman, I. (2013) *Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences*, 4th edition. New York: Teachers College Press.

Activity 38 Constructing Questions

Student handout page 315

Tutor Notes

Purpose: This activity has been designed to help students recognize badly worded and poorly constructed questions, when used in questionnaires and interview schedules. Students are asked to work through 10 examples, identify the problems and suggest solutions. This will improve their ability to construct questions for their own interviews and/or questionnaires.
Type: Student worksheet (during independent study or in class).
Level: Beginner and intermediate.
Duration: Thirty minutes to 1 hour.
Equipment/materials: None required.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will be able to recognize and improve badly worded and poorly constructed questions, when used in interviews and/or questionnaires.

The activity

Ask your students to work through the worksheet presented in the student handout.

Key issues

Question 1

This question is double-barrelled, leading and ambiguous. The word ‘wrong’ is emotive and suggests that there is something not normal about young people, and the term ‘of today’ is unspecific and open to misinterpretation. The question appears to ask respondents to distance themselves and comment from the moral high ground. It also asks them to make comments on an issue about which they may have little opinion. The researcher needs to think about what, exactly, they are trying to find out with this question, and reword it accordingly. Filter questions can be used to find out whether respondents have an opinion on this issue; the question should be split so that only one question is asked; emotive words should be omitted; and specific dates/time-frames should be used.

Question 2

The problem with this question is in the categories supplied for the answer. Everybody has a different idea about the definition of ‘sometimes’ and ‘frequently’. Specific time-frames need to be given and they should follow a logical order: in this example the order is not logical. This question could also contain prestige bias (people feel that they should go swimming because it is good for them, or feel that the researcher expects them to say that they go swimming; see below). The researcher needs to illustrate that there are no expectations for a respondent to go swimming.

Question 3

In this question it is assumed that the respondent thinks something can be done about global warming and that they are able to comment on the issue. This question leads the respondent into having an opinion about something on which they might not otherwise have an opinion. Filter questions should be used to determine whether the respondent has an opinion on this issue. ‘Global warming’ is a contested issue and an emotive term that should be avoided by the researcher.

Question 4

This question is leading and presents the issue of prestige bias. The term ‘medical professional’ suggests that these people know what they are talking about: this type of ‘prestige marker’ can lead people into agreeing with the professional and answering ‘strongly agree’. This question could be reworded, omitting the reference to medical professionals. Filter questions can also be used to help overcome this problem, and researchers should continue to emphasize the importance of accuracy to respondents. This question could also benefit from a ‘don’t know’ category as some respondents may feel that they do not know enough about the topic to give an informed answer.

Question 5

This question is asked in the negative, which can be very difficult for some people to answer (if they say they agree, they are agreeing with not doing something, which can be very confusing). Negatives, and especially double negatives, should be avoided in all questions (double negatives can be reworded as positives). 'Do you agree' should be reworded as it leads respondents into answering in a particular way. This question should include a 'no opinion' or 'don't know' category.

Question 6

How many parents would like to admit that their son has stolen anything (presuming that this question is asked to parents, otherwise a filter question will be required)? This is a private issue that can cause embarrassment, anger or frustration. The respondent might be fearful of being perceived as a bad parent and this could lead them into giving a false answer. The question is very direct and could be viewed as insensitive. If it is to be used in a questionnaire, it needs to be reworded, perhaps with the addition of several categories about the type of stealing (this question is very general, so would benefit from being narrowed down). It also needs a filter question. The researcher would have to create a permissive atmosphere and guarantee (and adhere to) anonymity. This question, when reworded and divided, could, however, work in an interview situation where good rapport and trust has been established, if it is asked in a sensitive, non-judgemental way.

Question 7

This is an extremely leading question that uses an emotive and leading word: 'blackmail'. It assumes that the government is being blackmailed, it assumes that the media are left-wing and blackmailing the government, and it assumes that the respondent agrees with this and can make a comment on this assumption. If this type of question were to be asked it is obvious that the researcher has their own political agenda and that the results of the research cannot be taken seriously.

Question 8

It is not clear what is meant by the 'average family', which makes it very difficult for a respondent to answer the question and even harder for a researcher to analyse the answers given. Also, this question is leading the respondent into agreeing that families throw food away each week. It is unclear what useful information could be gained from this question: is it asking for respondents to describe what is thrown away in weight, or by type of food, or something else? The researcher needs to think about what they are actually trying to find out with this question. Indeed, they might need to decide whether a question is the best way to address this topic. Perhaps it might be better to ask some families to keep a diary (over a specified period of time) with details of what food they throw away, when, and how much it weighs, for example.

Question 9

This question is too vague and can be answered in many different ways. For example, are gross or net earnings required (before or after deductions)? Should weekly, monthly or annual earnings be reported? Does the answer require household earnings or personal earnings? The question needs to be rewritten with very specific instructions about what is required. Also, some people do not want to

disclose their earnings, so this will need to be taken into account when the question is rewritten.

Question 10

This question assumes that the respondent understands what is meant by ethnicity and will respond in the way that is intended by the researcher. Again, people can answer this question in different ways: a person's background, life experiences, culture and nationality can influence the way that this question is answered. The researcher should ensure that the respondents have enough information or expertise to answer the question. This problem can be overcome by providing a specific frame of reference. For example, UK researchers could use the categories that are used in the UK Census (the 1991 Census was the first one to include a question on ethnicity, after various field trials had taken place).

Useful terms

‘Prestige bias’ is the term that has been coined to describe how certain factors or markers can influence a person into answering a question in a certain way. This could be because respondents do not want to appear foolish or lacking in knowledge, or it could be because they want to align their responses with professionals or celebrities, for example.

Related activities

- Activity 37: Conducting interviews
- Activity 39: Producing an interview schedule
- Activity 41: Establishing rapport
- Activity 47: Designing questionnaires
- Activity 48: Administering questionnaires

Preparatory reading

Some useful resources can be found towards the end of Cox and Cox (2008). These aid understanding of issues relating to question construction and possible flaws.

Further reading

Bradburn, N. (2004) *Asking Questions: The Definitive Guide to Questionnaire Design*. San Francisco: Jossey-Bass.

Cox, J. and Cox, K. (2008) *Your Opinion Please: How to Build the Best Questionnaire in the Field of Education*. Thousand Oaks, CA: Corwin Press.

Ekinci, Y. (2015) *Designing Research Questionnaires for Business and Management Students*. London: Sage.

Gillham, B. (2007) *Developing a Questionnaire*, 2nd edition. London: Continuum.

Activity 39 Producing an Interview Schedule

Student handout page 318

Tutor Notes

Purpose: This activity helps students to produce and test an interview schedule for one-to-one interviews or for group interviews. It should be undertaken with students who have already decided that they want to conduct interviews for their research.
Type: Self-guided individual exercise (during independent study).
Level: Intermediate.
Duration: Several hours of independent study (the actual time taken will depend on personal experience and knowledge, and the type of interview that the student intends to undertake).
Equipment/materials: Access to interview methods literature and resources.
Prerequisite activities: Students will find it easier to undertake this activity if they have already worked through Activity 38: Constructing questions. This activity helps students to recognize badly worded and poorly constructed questions for questionnaires and interview schedules.
Learning outcome: By the end of this activity students will have produced and tested an interview schedule for their research.

The activity

Give your students the student handout. This asks them to produce and test an interview schedule for their research. Advice about how to do this is given, along with information about how the design of the interview schedule is influenced by the type of interview.

Key issues

This activity is best undertaken with students who have already decided that they are to use some form of interviewing in their research. It has little relevance for students who are not using interviews. Students will need to know what type of interview they are going to use before they can construct their interview schedule. Therefore, it is useful to introduce this activity after a lecture, teaching session or background reading on the different types of interview that are used in research.

Useful terms

See ‘useful terms’ in Activity 37 for a definition of ‘structured’, ‘semi-structured’ and ‘unstructured’ interviews and Activity 40 for a definition of ‘focus groups’. The student handout gives a definition of ‘interview schedule’.

Related activities

- Activity 37: Conducting interviews
- Activity 38: Constructing questions
- Activity 40: Running a focus group
- Activity 41: Establishing rapport
- Activity 42: Listening to interviewees
- Activity 43: Understanding group dynamics
- Activity 44: Recording techniques

Preparatory reading

King and Horrocks (2010) provide a useful introduction to the different types of interview that can be used in qualitative research.

Further reading

Kamberelis, G. and Dimitriadis, G. (2013) *Focus Groups: From Structured Interviews to Collective Conversations*. Abingdon: Routledge.

King, N. and Horrocks, C. (2010) *Interviews in Qualitative Research*. London: Sage.

Rubin, H. and Rubin, I. (2012) *Qualitative Interviewing*, 3rd edition. Thousand Oaks, CA: Sage.

Seidman, I. (2013) *Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences*, 4th edition. New York: Teachers College Press.

Activity 40 Running a Focus Group

Student handout page 320

Tutor Notes

Purpose: This activity gives a demonstration of a focus group. It illustrates how focus groups can be used for gathering data and highlights the role of the moderator, showing how they can control or overcome digressions, dominant speakers, breakaway conversations and disruptions. It also illustrates how to record a focus group.
Type: Focus group (in class), followed by a class discussion.
Level: Beginner, intermediate and advanced (the level will be reflected in the complexity of discussion).
Duration: Thirty to 40 minutes for the focus group, followed by 20 to 30 minutes for the discussion.
Equipment/materials: A room that is suitable for a focus group. Audio-recording equipment (of good quality and poor quality; see below).
Prerequisite activities: None.
Learning outcome: By the end of this activity students will understand how focus groups are used to gather data, understand the role of the moderator and know how to record a focus group.

The activity

This is a practical activity that requires you to run a focus group with your students. The topic can be of your choosing: in the past this activity has been carried out towards the end of the course, so that students can discuss their experiences on the course so far. You will be the moderator so it is advisable only to attempt this activity if you have some experience of running focus groups. When this activity was first trialled, roles were assigned to all students, including the role of moderator. However, the activity failed because the moderator had no experience and did not know how to run the group or control or overcome the problems that had been introduced. If you do not have experience of running a focus group, you can find a suitable focus group demonstration online to show to your students and use as a basis for discussion.

The ideal number of participants for a focus group is 9–11. If you have many more students you can ask that some observe the focus group. It is possible to run a focus group with as few as five students, but any fewer than that number will not provide a good demonstration of the focus group method.

Choose a suitable venue if possible and arrange the furniture appropriately. Try to ensure that there will be no disturbances or distractions. If this is not possible, discuss these issues at the end of the focus group, asking students to comment on how they were disturbed and/or distracted and what they would do to ensure that this did not happen in their own focus groups.

When your students arrive, take four of them aside. Assign one of the roles listed in the student handout to each student (these should be printed and divided, with one role given to each student so that they can refer to their role as the discussion progresses). Ask the students not to reveal their role to others in the group.

Run the focus group with your students for 30–40 minutes (the time will depend on how much students want to say and the time that you have available for your class: you can discuss ideal lengths later with your students). Record the discussion so that you can demonstrate recording techniques.

Key issues

The following points will help to provide a useful and interesting demonstration of the focus group method and give examples of issues that can be covered during the class discussion:

1. Focus group: introduce yourself, explain why you are holding the discussion and tell participants what will happen to the results. Discussion: highlight the importance of a good introduction. Describe how you would negotiate a length of time for the focus group if you were not constrained by class time.
2. Focus group: discuss recording techniques and describe how data from the focus group will be used, stored and protected. Discussion: play back some of the recording so that you can demonstrate the importance of using a good recorder (if appropriate, you can also use a poor-quality recorder to demonstrate how bad a recording can be and the associated difficulties with transcription and analysis). Demonstrate via the recording how, in most cases, participants tend to speak quietly at the beginning but more loudly as the discussion progresses and they become more confident. Discuss issues of data protection, storage and security.
3. Focus group: assure participants about anonymity and confidentiality, asking that they respect this and don't pass on what has been said in the group to third parties. Discussion: highlight the importance of anonymity, confidentiality and data protection (see Activities 66, 76 and 79).
4. Focus group: demonstrate how to negotiate a code of behaviour with your participants (students tend to raise issues such as dominance, aggression, abuse, not listening, and interrupting). Ask the participants to respect each other. Only one person should speak at a time, they should not interrupt each other, no one person should dominate and all opinions should be seen as valid, even if others might not agree with them. Discussion: ask students how they felt about this code being broken by some of the students in the group. Also, ask the role-playing students how they felt about breaking this code and not respecting other members of the group.
5. Focus group: begin with general, easy questions to help your students relax. Demonstrate how silences can be used positively. Show how you use your interview schedule and probe for detail. Discussion: ask if students noticed the type, structure and order of questions (see Activity 39: Producing an interview schedule). Did they notice how silences were used constructively? Did they notice how participants were probed for more information?
6. Focus group: control and/or overcome the problems that are introduced by the role-playing students (do not make eye contact with the dominant student, gently steer the digressions back to the topic, ask students to rejoin the discussion if they are having a breakaway conversation, for example). Discussion: ask if students noticed the roles that their peers had been asked to play and/or if they noticed the tactics used by the moderator to control or overcome the problems. If students were unable or unwilling to play their role, ask why (some students do not want to break the negotiated code of behaviour, for example).
7. Focus group: wind down, thank the participants for taking part and demonstrate how to leave a contact name and number. Discussion: conclude the discussion with important issues that have not been covered, which are of relevance to your group and their level of study. This could include information about finding and recruiting participants or issues such as the interrelationship between the focus group method, methodological standpoint and theoretical perspective, for example.

Useful terms

A ‘focus group’ is a collection of interacting individuals, with common characteristics or interests, holding a discussion that is introduced and led by a ‘moderator’. This person ensures that the discussion stays on topic and controls breakaway conversations, dominance and disruption. The aim of a focus group is not to reach a consensus, but to gain a greater understanding of attitudes, opinions, beliefs, behaviour and perceptions (with the focus on interaction as part of the research data).

Focus groups can be used as a research method by researchers approaching their work from different epistemological and methodological standpoints, although care must be taken to ensure compatibility of method with underlying standpoint. They can be used in an exploratory way to help inform a questionnaire, or they can be used towards the end of a project to help explain emerging themes, for example. In some projects, researchers use focus groups as the only data collection method. Participants are chosen from the study population, using a variety of sampling techniques (depending on methodology).

Related activities

- Activity 37: Conducting interviews
- Activity 38: Constructing questions
- Activity 39: Producing an interview schedule
- Activity 41: Establishing rapport
- Activity 42: Listening to interviewees
- Activity 43: Understanding group dynamics
- Activity 44: Recording techniques

Preparatory work

There are a wide variety of focus group demonstrations available online (the search term ‘focus group demonstration’ finds some good groups).

Further reading

Barbour, R. (2007) *Doing Focus Groups*. London: Sage.

Kruegar, R. and Casey, M. (2015) *Focus Groups: A Practical Guide for Applied Research*, 5th edition. Thousand Oaks, CA: Sage.

Liamputtong, P. (2011) *Focus Group Methodology: Principle and Practice*. London: Sage.

Activity 41 Establishing Rapport

Student handout page 321

Tutor Notes

Purpose: This activity helps students to think about how they can establish rapport with research participants. It presents five real-world scenarios that have been encountered by researchers and asks students to discuss what they would do in each situation to overcome the problems and establish rapport.
Type: Small-group exercise (in class) to discuss scenarios followed by a tutor-led discussion. If contact time is limited this activity can be given to students to complete on an individual basis during independent study (see below).
Level: Beginner and intermediate.
Duration: Up to 40 minutes for the small-group exercise and up to 20 minutes for the tutor-led discussion.
Equipment/materials: None required.
Prerequisite activities: None, although students may find Activity 42: Listening to interviewees an interesting activity to run together with this activity.
Learning outcome: By the end of this activity students will know how to establish rapport with research participants.

The activity

Divide your students into small groups and give them the student handout. This presents five real-world scenarios that have been faced by researchers and asks students to think about how they would overcome the given problems and establish rapport.

Once the groups have discussed each scenario, you can lead a class discussion on the issues raised. If you do not have enough contact hours to undertake this activity in class it can be completed as a self-guided individual exercise during independent study. Students can then post, share and discuss their ideas using the relevant digital platform, if appropriate.

Key issues

This activity can raise the following issues about establishing rapport:

- Preparation is important. Know who you are going to see, where, when and how. Know what you need to take with you and arrive in good time so that you can overcome any problems.
- Dress appropriately.
- Be courteous and polite.
- Try to be empathetic and friendly. Try to put yourself in the position of the participant/interviewee.
- Do not rush straight into the interview, if times allows. Accept a drink if offered and try to gain trust: look around the room and use pictures, photos or items as a basis for conversation.
- Be respectful of time and get to the point if interviewees have made it clear that time is short.
- Make good eye contact. Listen carefully and show that you are listening.
- Watch body language, gauge how people are feeling and try to rectify problems with reassurance or gentle persuasion, if required.
- Provide assurances about confidentiality, anonymity and data protection. Make it clear that information is only to be used for research purposes.
- Offer the participants something in return for their help, something that is of value to them.
- Researchers should be honest as this will help them to gain trust (some students feel that deception can be used, if necessary, whereas others feel that it should never be used; see below).

Although this activity is primarily about establishing rapport with participants, it can raise important ethical and moral issues. For example, in Scenario 1 of the student handout a group of students suggested that the researcher ‘lies’ and pretends to agree with the extreme views of the interviewee so that the researcher can establish rapport and gain more information. They went on to suggest that the researcher could almost ‘flirt’ with the interviewee, again ensuring that the interview went well. Other students felt that this was unacceptable and totally inappropriate: students should never lie or flirt in an interview situation.

This activity can also raise issues about legality, acceptable practice and the type of research that is being conducted. For example, in Scenario 2 some students suggested that it would be acceptable to smoke cannabis with the interviewee because it would help them to establish trust and a common bond (and help the researcher to relax after the trauma of the lift). Others pointed out that this is an illegal activity (in the UK) and, therefore, should not be undertaken. It could also affect the researcher’s ability to conduct the interview properly. Some students felt that smoking cannabis with participants would be fine if they had prolonged contact and were a ‘participant observer’, but that it would not be acceptable in the given scenario, where a one-off interview is to take place.

Useful terms

‘Rapport’ refers to a harmonious relationship in which trust and empathy can be established so that all parties can communicate well with each other. For researchers who have prolonged contact with participants, rapport can also involve the development of friendship, collaboration and reciprocity.

Related activities

- Activity 42: Listening to interviewees
- Activity 43: Understanding group dynamics
- Activity 76: Recognizing ethical issues

Preparatory reading

Bucerius, S. (2013) 'Becoming a "trusted outsider": Gender, ethnicity, and inequality in ethnographic research', *Journal of Contemporary Ethnography*, 42(6), 690–721. This article provides some interesting material on the issues involved in establishing rapport between a female researcher and male group members, and on the advantages of being a 'trusted outsider' rather than an 'insider'.

Further reading

Mazzei, J. and Brien, E. (2009) ‘You got it, so when do you flaunt it? Building rapport, intersectionality, and the strategic deployment of gender in the field’, *Journal of Contemporary Ethnography*, 38(3), 358–83.

Pitts. M. and Miller-Day, M. (2007) ‘Upward turning points and positive rapport-development across time in researcher–participant relationships’, *Qualitative Research*, 7(2), 177–201.

Activity 42 Listening to Interviewees

Student handout page 323

Tutor Notes

Purpose: This activity is a fun way to highlight the importance of listening well when interviewing participants for a research project. It requires pairs of students to role-play an interview, while being observed by their peers.
Type: Role-play as a small-group activity (in class), followed by a tutor-led discussion.
Level: Beginner and intermediate.
Duration: Up to 20 minutes for the role-play, followed by a tutor-led discussion of up to 40 minutes.
Equipment/materials: None required.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will be able to recognize non-listening clues and know how to listen well within an interview setting.

The activity

Divide your students into groups of at least four (the actual number depends on class size, although it is recommended that no one group is larger than eight students). Ask two students in each group to volunteer to undertake the role-play, one as the interviewer and one as the interviewee. The rest of the students are to observe, and listen to, the role-play.

Give the interviewers the student handout and ask them to follow the instructions. These instruct the interviewers to ask 10 questions, but not listen to the answers. Once all the questions have been asked the role-play is completed.

Ask students to discuss the following questions (this can be within their group or as a whole class, if it is not too big). Remember that the observers and the interviewee do not know that the interviewer was asked not to listen.

- Did the observers notice anything unusual in this interview situation? If so, what did they notice?
- Did the interviewees notice anything unusual in this interview situation? If so, what did they notice?
- Can the observers and the interviewee guess what the interviewer was asked to do?

Once these questions have been discussed, ask the interviewer to reveal their role as a ‘non-listener’. Whether this has been observed will depend on how well the role has been played and the observation skills of those observing. Also, adopting a non-listening role can be very difficult for some people: if it has not been observed ask the interviewers whether they encountered any difficulties with adopting this role and, if so, the nature of the difficulty.

Ask students to draw up a list of all the non-listening clues that they observed. Once this list has been completed, discuss how students can improve their own listening skills when interviewing people for their research.

Key issues

Good listening skills are essential if students intend to interview participants for their research project. This can be in a one-to-one setting for a structured, unstructured or semi-structured interview, or during a focus group, for example.

The following clues suggest that an interviewer is not listening to what the interviewee is saying (they also indicate bad research practice):

- no eye contact;
- fidgeting, fiddling and/or doodling;
- not acknowledging what has been said with nods and smiles, for example;
- interrupting what is being said;
- speaking at the same time as the interviewee;
- finishing the sentence for the interviewee;
- turning away or becoming distracted when the interviewee is in mid-sentence;
- responding to external stimuli, such as noises outside the room;
- checking phones, laptops or tablets;
- saying something that has no relevance to what the interviewee has said;
- asking a question that has already been answered.

The following points will help students to improve their listening skills in an interview situation:

- Venue. This should be accessible (both mentally and physically for interviewees), comfortable and free from noisy distractions and interruptions. All phones should be switched off.
- Seating. Interviewer and interviewee should sit close enough so that they can hear each other, but the interviewer should take care not to invade the interviewee's space. Sitting opposite each other can be a little threatening and side-by-side can cause discomfort; at an angle is best.
- Eye-contact, smiling and nodding. These are all important for helping to establish rapport and indicate that the interviewer is listening. This encourages the interviewee to say more (see Activity 41: Establishing rapport).
- Concentration. It is important to concentrate on what is being said and not get distracted when the interviewee is speaking. For example, students should not fiddle with a pen, play with their laptop, look out the window or respond to outside stimuli, such as text messages or sounds outside the room. If students show that they are listening properly it will encourage the interviewee to give more information. Also, students should ensure that they are not distracted by any audio devices that they are using as this will influence their ability to listen properly (see Activity 44: Recording techniques).
- Active listening. When the interviewee is speaking, students should take note of the words they are using and the ideas they are expressing. It is important to distinguish between opinions, prejudice and fact. Students should listen carefully, ask for clarification and probe for more information. They can only do this if they remain alert and listen to everything that is being said. Students should ensure that they continue listening until the interviewee has finished speaking. They should not jump to conclusions about what an interviewee is going to say.
- Questioning. Open questions that start with words such as 'what', 'why' and 'how' are important as interviewees cannot answer these with a simple 'yes' or 'no' and will have to elaborate on

what they are saying.

- Repetition. A useful technique is to repeat the last few words that someone has said, turning them into a question. This demonstrates that the interviewer is listening to everything that is being said and it encourages the interviewee to say more.
- Summarizing and concluding. Another useful technique is to summarize what the interviewee has said as a way of finding out whether everything has been heard correctly and understood. It can also encourage the interviewee to give more information and clarify his or her position. This is a useful technique when concluding an interview.

Useful terms

‘Active listening’ involves one person listening carefully to the words of another and understanding, evaluating and interpreting what they hear. To listen actively, students need to be able to concentrate on what the speaker is saying and free their mind from distractions. Even if they do not agree with what is being said, they need to continue to listen rather than become distracted with the development of their own thoughts and arguments. This is of particular importance when interviewing participants for a research project.

Related activities

- Activity 37: Conducting interviews
- Activity 38: Constructing questions
- Activity 39: Producing an interview schedule
- Activity 40: Running a focus group
- Activity 41: Establishing rapport
- Activity 44: Recording techniques

Preparatory reading

Chapter 7 in Brinkmann and Kvale (2015) provides some useful advice about conducting interviews.

Chapters 6 and 7 in Seidman (2013) provide some insightful information about listening well and talking less, establishing rapport and exploring laughter.

Further reading

Brinkmann, S. and Kvale, S. (2015) *InterViews: Learning the Craft of Qualitative Research Interviewing*, 3rd edition. Thousand Oaks, CA: Sage.

Gillham, B. (2005) *Research Interviewing: The Range of Techniques*. Maidenhead: Open University Press.

Seidman, I. (2013) *Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences*, 4th edition. New York: Teachers College Press.

Activity 43 Understanding Group Dynamics

Student handout page 324

Tutor Notes

Purpose: This activity helps students to recognize the presence, type and influence of group dynamics in three types of study: during action research, in focus group research and in ethnographic research. It presents three real-world scenarios and provides questions on each for students to work through in their groups.
Type: Small-group exercise in class to discuss scenarios. If contact time is limited this activity can be run as an individual exercise during independent study.
Level: Beginner and intermediate.
Duration: Up to 30 minutes for the small-group exercise, followed by up to 30 minutes for the tutor-led discussion.
Equipment/materials: None required.
Prerequisite activities: None, although if students are interested in conducting focus groups for their research they might find Activity 40: Running a focus group useful.
Learning outcome: By the end of this activity students will be able to recognize the presence, type and influence of group dynamics when conducting research.

The activity

Divide your students into groups and give them the student handout. This asks them to work through three real-world scenarios, in their groups, answering the questions given after each scenario. Once they have done this, you can hold a tutor-led discussion to discuss the issues raised. If contact time is limited you can run this activity as an individual exercise during independent study.

Key issues

Scenario 1

In this scenario two teenagers have formed a coalition or alliance that is having a negative influence on the functioning of the group. They may be trying to influence other group members and disrupt the work of the group. They are using both verbal and non-verbal communication methods: speech, gestures, looks, leaving the room, etc. All of these are important for the researcher to observe and record as they help to explain group dynamics and group processes. The researcher could choose to record this behaviour using audio-recording equipment, video-recording equipment and/or by observing and taking detailed notes, for example.

This situation could be caused by an argument between certain group members (perhaps between the dominant disrupter and the dominant enthusiast). The dominant disrupter seems to require an ally, perhaps to legitimize his actions or to help him feel more confident in his actions. Various group members could be trying to assert themselves, which could lead to a difference in opinions that has a negative influence on the functioning of the group.

The researcher could try finding out what has happened, by speaking to the teenagers on an individual basis, but should take care to gather the thoughts and opinions of all group members. The researcher should not take sides, nor be perceived to be taking sides. In an action research project data from individual interviews, along with data about how group dynamics change over time (and as a result of intervention), are useful in the analysis.

Scenario 2

In this scenario the supervisor is displaying leadership tendencies that could be influencing the stated opinions of others in the group. This woman is their supervisor in their day-to-day work, so group members may not want to be seen to disagree with her. Or, because the supervisor has chosen the focus group participants, she might have chosen people who agree with her or who are compliant.

This scenario suggests that the group dynamic issues encountered are as a result of poor recruitment and selection. Correct sampling procedures have not been followed. The researcher has relied on the supervisor to choose participants, and there is no evidence as to how this has been done. Also, the researcher should not have allowed the supervisor to be present during the discussion. People in positions of power can have considerable influence over other participants in focus group discussions.

The researcher needs to improve his selection and recruitment techniques and ensure that he uses an appropriate and correct sampling method. He should ensure that his participants will feel comfortable conversing with each other in a focus group setting (which means ensuring that people in positions of power are not present). During the discussion he needs to control dominant speakers and watch out for any leadership tendencies that might be present.

Useful information from this focus group concerns research methods: how these can go wrong, how

great care has to be taken when choosing and using methods and how they can be improved. Other useful information could include an analysis of how leadership influences group dynamics. These issues would be relevant to the methodology and methods sections of a research report, but would not help to answer the research question.

Scenario 3

The group of bikers seem to be displaying gang loyalty and support. Although members do not want a fight, they become involved to support, and remain loyal to, their leader. There seems to be a sense of 'brotherhood': the members feel close and connected to each other, and will support and defend each other, even when facing significant personal danger. Gang loyalty seems to create unwritten rules and expectations among gang members.

The researcher, although invited in to observe the gang, is not part of the gang (from the point of view of both the researcher and the gang members). He does not display the same type of loyalty and is not governed by the same rules and expectations, although the gang members displayed trust when they enabled him to live with them and observe their activities. If he had adopted the role of passive observer, it is unlikely that he could or should have prevented the war. However, if he had adopted the role of full participant observer, perhaps he could have tried to prevent the gang war, although this probably would have been unsuccessful.

The researcher should have been aware of the issues surrounding illegal, unlawful, illicit or dangerous behaviour and possible consequences when he decided to undertake this study. Perhaps he could have made this clear to the biker gang at the start of the study – in particular, that he would have to attend court if subpoenaed. He has lost their trust and it will be very difficult to rebuild this trust and renegotiate entry. However, he could try to do this by emphasizing the importance of his study and by highlighting and discussing his findings so far.

Useful terms

‘Group dynamics’ is the term used to describe how people interact in, and between, groups. It can include psychological processes, social interaction, interpersonal patterns and individual behaviours. An understanding of group dynamics is important for researchers who encounter groups of people in their research. This could be during an ethnographic study, in action research or when running a focus group, for example.

Related activities

- Activity 36: Undertaking ethnographic work
- Activity 40: Running a focus group
- Activity 41: Establishing rapport
- Activity 42: Listening to interviewees
- Activity 45: Using observation techniques

Preparatory reading

Farnsworth, J. and Boon, B. (2010) 'Analysing group dynamics within the focus group', *Qualitative Research*, 10(5), 605–24.

Part III of Gastil (2010) has some interesting material on roles, relationships and identity in groups.

Further reading

Forsyth, D. (2013) *Group Dynamics*. Belmont, CA: Wadsworth.

Gastil, J. (2010) *The Group in Society*. Thousand Oaks, CA: Sage.

Activity 44 Recording Techniques

Student handout page 326

Tutor Notes

Purpose: This activity introduces students to the wide variety of recording techniques (equipment and methods) that can be used for different types of research. It covers the following issues: type, brand, procurement, cost, strengths, weaknesses, ethical implications, and advice for potential users (where relevant). This activity utilizes the technological skills and experiences of students themselves, so that the most up-to-date types of equipment and/or methods can be discussed.
Type: Group exercise during independent study followed by group presentations in class (or digitally if contact time is short).
Level: Beginner, intermediate and advanced.
Duration: Several hours of independent study, followed by a 10-minute group presentation and 5 minutes of questioning for each group (four in total).
Equipment/materials: Students will need access to information about the relevant equipment available from relevant schools or departments (manufacturers' websites, departmental administration and software and hardware specifications, for example).
Prerequisite activities: None.
Learning outcome: By the end of this activity students will be able to review, analyse, critique and choose appropriate recording equipment and methods for their research.

The activity

Divide your students into four groups and assign each group one of the tasks contained in the student handout. These ask students to come up with ideas for suitable recording equipment and/or methods for four different types of research: qualitative, quantitative, ethnographic and online. For each piece of equipment and/or method they identify, they must research and note down information (where relevant) about type, brand, procurement, price, strengths, weaknesses, ethical implications, and advice for potential users.

Students will need to present this information to the rest of their class in the next teaching session. Presentations should last 10 minutes, with 5 minutes for questions from fellow students. If contact time is limited (or if you prefer) you can request that your students post their findings on the relevant digital platform so that they can build up a useful resource for students to access when required.

Key issues

This activity has been developed to utilize the technological skills and experiences of students themselves. It also encourages them to consider issues such as strengths and weaknesses, ethical implications, and advice for potential users, which can be issues that tech-savvy students sometimes neglect to think about.

The recording equipment and/or methods chosen by students can include various types of audio- and video-recording equipment, including microphones and tripods; editing, storage and back-up software; Skype, screenshots and downloaded videos; software for email surveys, webpage surveys and online surveys (to produce, record and analyse data); hardware such as laptops, tablets, mobiles, batteries and chargers; pens, paper and personal diaries.

Ethical implications that tend to be discussed include gaining the necessary permissions, data protection and issues of anonymity, confidentiality and informed consent.

Useful terms

In this activity students may suggest recording devices that have a ‘voice-operated switch’ or a ‘voice-operated exchange’. This is a switch that is used to turn a transmitter or recorder on when a user speaks and off when a user stops speaking. It is used to save storage space. However, if students are new to using this type of equipment in research, it should be made clear that care must be taken to ensure that speech is loud enough to operate the switch (this can be influenced by the sensitivity of the microphone, the placement and location of the recorder and the number and seating arrangement of participants, for example).

Related activities

- Activity 20: Choosing research methods
- Activity 37: Conducting interviews
- Activity 40: Running a focus group
- Activity 46: Using visual methods
- Activity 66: Knowing about data protection

Preparatory reading

Chapter 3 in Heath et al. (2010) contains some interesting material on collecting audio-visual data.

Further reading

Heath, C., Hindmarsh, J. and Luff, P. (2010) *Video in Qualitative Research*. London: Sage.

Makagon, D. and Neumann, M. (2009) *Recording Culture: Audio Documentary and the Ethnographic Experience*. Thousand Oaks, CA: Sage.

Activity 45 Using Observation Techniques

Tutor Notes

Purpose: This activity is an entertaining way to introduce and discuss observation techniques. An observation exercise highlights the importance of careful observation using different senses, and a tutor-led discussion introduces the various observation techniques and methods that can be used in research.
Type: Observation exercise and discussion.
Level: Beginner and intermediate.
Duration: Up to 20 minutes for the observation exercise, followed by a class discussion of up to 40 minutes.
Equipment/materials: You will need props for the exercise (see below). This activity needs to be carried out in your usual teaching room.
Prerequisite activities: None, although if observation skills and techniques are important to your students you could run Activity 3: Improving observation skills together with this activity.
Learning outcome: By the end of this activity students will have a heightened awareness of their personal observation skills and will understand how these relate to their research activities.

The activity

You can run this activity only if you use your usual teaching room for this group of students and your students need to have been taught in this room for several sessions prior to this activity. The exercise is used to test the observation skills of your students and to illustrate that students can observe using various senses, not just vision. It is an entertaining way to introduce the topic of observation in research. This exercise can be used by tutors in various disciplines: the props that you use, or the changes that you make, can help to introduce key issues that are pertinent to observation techniques within your subject.

Before your students arrive for their class, make a number of changes in your teaching room (you will need to collect together various props to do this; see below). Some of the changes should be subtle, some obvious. Try to incorporate changes that include other senses, such as sound and smell. The following are examples of the sort of changes that you can make:

- A soft toy placed in the corner of the room.
- A vase of flowers or ornament on your desk.
- Textbooks placed on desks, covering a completely different subject area.
- Chairs and tables rearranged in a slightly strange pattern (if possible).
- A radio with the sound turned down very low, hidden from view.
- A loudly ticking alarm clock placed near to students but out of view.
- A tissue soaked in a strong smelling essential oil (orange blossom or eucalyptus, for example), placed near the entrance to the room.
- Another student/researcher, who is not normally part of the group, sitting in a chair and acting as if they have always been part of the group.
- Inappropriate scientific equipment placed on benches or tables.
- Equipment moved to different locations in the room.
- Cushions placed on a few chairs.

When your students arrive, introduce the subject of observation with a short description of what it is and how it is used in research (see below). Once you have done this, introduce the exercise. Ask your students to look around the room and observe what has changed since the last teaching session. Continue with the exercise until all changes have been spotted. Sometimes students will mention a change that you have not made, so use your discretion about how to deal with this (you can agree that it is a change or point out that you had not noticed this change, for example).

Once the students have spotted all the changes, you can lead a class discussion on the issues that the exercise has raised, illustrating how these issues relate to observation techniques and methods in research.

Key issues

Students tend to enjoy this exercise. It is easy and fun. It introduces relevant issues and can cover more complex issues for those studying at a higher level. Issues that can be raised include the following:

- Did students notice the ‘smell’ and ‘sound’ changes? Are they harder to spot than visual changes? Different senses should be used when observing (sight, sound, smell, taste and touch can all be used in ethnographic observations, and smell can be an extremely important observation in certain types of pure and applied research in the sciences, for example).
- How many students noticed the changes when they first arrived and were listening to (or being distracted by) your introduction? Distractions can influence observation. Students should be aware of distractions that can influence their research (technology, people and unexpected events, for example). Also, changes might not be noticed when students are not looking for them.
- Were changes more readily spotted when students were asked to look for them? Did they become more obvious? Observation becomes easier when the mind is focused on a specified task. Clear, structured and systematic observation is important for experimental research, and immersion, concentration and focus are important for participant observation, for example.
- Were students confused by any of the changes (such as textbooks covering a completely different subject area)? The unexpected can occur when observing. Researchers should be open to new possibilities and unexpected results (some researchers take great care to set aside expectations and prejudgements). Researcher reaction to and recording of unexpected events are important aspects of the observation process.
- If you introduced a new member to the group, did students notice, and what did they feel about this? This is pertinent not only to observation, but also to the issue of how new members fit into a pre-existing group (see Activity 32: Working collaboratively with others).

Useful terms

‘Observation’ involves close monitoring of a phenomenon, and can include noticing facts, taking measurements and recording judgements and inferences. The way that observation is used in research depends, in part, on theoretical perspective and methodology: positivists following the scientific method can use observations to formulate and test hypotheses, whereas ethnographers can use observations to describe, interpret and record everyday lives, relationships and interaction (using all five senses to observe), for example.

‘Participant observation’ is a method used to study a group of people within a particular social and cultural environment. It is used by ethnographers who provide interpretive and descriptive analyses of the symbolic and other meanings that inform the routine practices of everyday life. Participant observation can be carried out within any community, culture or context. Researchers immerse themselves in the community: the action is deliberate and intended to add to knowledge. Various research methods are used during the study, including life story interviews, focus group discussions and analysis of personal documents. Although most participant observation is qualitative in nature, some researchers will employ quantitative techniques (such as coding and counting responses) where appropriate, depending on methodological standpoint.

Related activities

- Activity 3: Improving observation skills
- Activity 36: Undertaking ethnographic work
- Activity 41: Establishing rapport
- Activity 44: Recording techniques
- Activity 46: Using visual methods

Preparatory reading

Chapter 5 in Angrosino (2007) has some useful material on observation techniques in research.

Further reading

Angrosino, M. (2007) *Doing Ethnographic and Observational Research*. London: Sage.

DeWalt, K. and DeWalt, B. (2011) *Participant Observation: A Guide for Fieldworkers*, 2nd edition. Lanham, MD: AltaMira Press.

Smart, B., Peggs, K. and Burridge, J. (eds) (2013) *Observation Methods* (4 volumes). London: Sage.

Activity 46 Using Visual Methods

Student handout page 328

Tutor Notes

Purpose: This activity raises awareness of visual methods in research. It helps students to understand how and why the methods are used and to recognize strengths, weaknesses and ethical implications. Students are asked to find and critique a visual methods study, and post details on the relevant digital platform. This builds a useful digital resource for students to access, review and discuss when required.
Type: Student-centred resource development.
Level: Beginner, intermediate and advanced (the level is reflected in the complexity of post and discussion).
Duration: Several hours of independent study and digital posting, followed by periodic monitoring and discussion.
Equipment/materials: Students will need access to visual methods studies and access to the relevant digital platform.
Prerequisite activities: None. However, Activity 62: Analysing visual data can be used together with this activity as it builds on, and expands, this resource (for students studying at intermediate and advanced level).
Learning outcome: By the end of this activity students will know about the use of visual methods in research, understand how and why they are used and recognize the strengths, weaknesses and ethical implications of visual methods.

The activity

Give the student handout to your students. This asks them to identify, review and critique a research project, report or study that has used one of the four visual methods described in the handout (students studying at intermediate or advanced level can be asked to find and critique two or more studies, to achieve a wider coverage). Ask your students to undertake this activity on an individual basis or in small groups, whichever is most appropriate for your student cohort.

Once they have identified, reviewed and critiqued their chosen example, they should post the information on the relevant digital platform (including links or uploaded images, where relevant). Students should be encouraged to review, discuss and ask questions about the examples posted by fellow students so that a useful resource can be developed. You may need to offer a deadline by which information is posted, to ensure that all students take part in this activity.

Key issues

Questions that can be posted on the digital resource are listed below, depending on subject and level of study and on the examples chosen by your students (you may need to monitor posts and perhaps pose some of these questions yourself to encourage further discussion).

- How and why has the visual representation, or image, been produced? Who has produced it? What is their motivation for producing it?
- Who is the viewer? How and why are they viewing the image?
- Do the people being recorded know that they are being recorded? Does this influence their behaviour and, if so, in what way?
- Are visual images a representation of reality? Can pictures be accurate and true? Do they record phenomena or social behaviour in an objective way (indeed, is it possible to be objective)?
- Are visual images influenced by culture, history and politics (of the producer, viewer or viewed)? If so, in what way?
- Is there any bias present (observer bias or selection bias, for example)? If so, how does this bias influence the visual representation (or how it is viewed)?
- Has the researcher addressed ethical issues such as gaining the necessary permissions, data protection and issues of anonymity, confidentiality and informed consent? Do these vary, depending on the type of visual method?

Useful terms

‘Visual methods’ are used in qualitative research to analyse the ways that human beings communicate through visual images, such as video, film, photographs, drawings, sculptures, graphic novels, cartoons and comics. Images can be produced by the researcher during fieldwork (photographs and videos, for example) or when analysing data (mind maps, graphs or charts). They can also be produced by others, either for the purpose of research (the researcher asks a research participant to draw a picture, for example) or can be produced by other people in their everyday lives, careers or personal endeavours (sculptures or artwork, for example).

Visual methods can also be used in quantitative research to communicate results, depict phenomena that cannot be seen or explain relations between properties, for example. They can include images from electron microscopes, astrophotography, mathematical diagrams, pie charts, flow charts and graphs.

‘Participatory’ or ‘collaborative’ visual methods enable people and communities to communicate, share their lives and illustrate their lived realities, from their perspective, by giving them control of recording equipment. These methods can cross linguistic and cultural boundaries and can be seen as both a form of art and a way to record information. Participatory visual methods include participatory photography, digital storytelling and collaborative or participatory film- and video-making.

Related activities

Activity 2: Finding and using primary sources
Activity 11: Critiquing quantitative research papers
Activity 12: Critiquing qualitative research papers
Activity 62: Analysing visual data

Preparatory reading

Chapter 2 in Banks (2007) provides an interesting history of the use of visual methods in social research.

The following websites provide examples of participatory photography and digital storytelling:

- www.photovoice.org (participatory photography and visual storytelling to build skills within disadvantaged and marginalized communities);
- www.patientvoices.org.uk (telling and sharing of reflective stories to transform healthcare);
- http://myyorkshire.org (digital stories created with communities by museum, library and archive collections in Yorkshire, UK).

Further reading

Banks, M. (2007) *Using Visual Data in Qualitative Research*. London: Sage.

Gubrium, A. and Harper, K. (2013) *Participatory Visual and Digital Methods*. Walnut Creek, CA: Left Coast Press.

Pink, S. (ed.) (2012) *Advances in Visual Methodology*. London: Sage.

Rose, G. (2012) *Visual Methodologies: An Introduction to Researching with Visual Materials*, 3rd edition. London: Sage.

Activity 47 Designing Questionnaires

Student handout page 329

Tutor Notes

Purpose: This is a practical activity that helps students to design a questionnaire for their research project. It enables them to avoid common mistakes and problems with questionnaire design through providing practical tips, advice, discussion and feedback as their questionnaire is designed, developed and modified. This activity should be used together with Activity 38, which helps students to construct their questions, and Activity 48, which helps students to think about how to administer their questionnaire.
Type: Self-guided individual exercise followed by peer review (during independent study).
Level: Beginner, intermediate and advanced (the design and type of questionnaire, along with the complexity of the discussion and feedback, will reflect the level).
Duration: Thirty minutes to 1 hour for tutor introduction in class, followed by independent study time of several hours over a period of days (the number of hours required will depend on the level of study, the type of questionnaire, the piloting methods used and the modifications required).
Equipment/materials: Students will need access to IT equipment, software and printing facilities so that they can produce a suitable questionnaire in the required format.
Prerequisite activities: Activity 38: Constructing questions and Activity 48: Administering questionnaires (for students at beginner and intermediate level).
Learning outcome: By the end of this activity students will have designed, produced, piloted and modified a questionnaire for their research project.

The activity

This activity asks students to develop a questionnaire for their research project. However, you can adapt the activity for students who are studying on a research methods course but not undertaking a personal research project (they can produce a questionnaire on a topic of their choosing to understand more about questionnaire design, for example).

Introduce the topic of questionnaire design in one of your teaching sessions. Once you have done this, ask your students to design a questionnaire for their research project; give them the student handout, which contains questionnaire design tips and advice. The subject, length, type and detail will depend on the subject of their course, level of study and type of research. Students studying at beginner and intermediate level may find it useful to work through Activity 38: Constructing questions together with this activity as it will help them to think about how to word questions correctly and avoid mistakes.

Once students have produced their draft questionnaire, ask them to swap with a fellow student and analyse and critique each other's questionnaire, using the student handout as a guide. Students should take note of any comments made by their fellow students and modify their questionnaire accordingly.

Once they have designed their questionnaire, students should pilot it with a small sample of their research population. This will help them to gather information about expected response rates, data quality, data validity and reliability, and the comprehensibility and relevance of questions. They should then modify their questionnaire accordingly.

Key issues

The points below provide examples of key issues suitable for students studying at beginner level:

- Questionnaires are a popular data collection method used by researchers across the disciplines. They can be researcher-administered (the researcher/student asks the questions and writes in the answers) or self-administered (the respondent reads the questions and writes in the answers). They can be distributed online, by post, by telephone or in person.
- There are three basic types of questionnaire: closed-ended, open-ended or a combination of both.
    - Closed-ended questionnaires are used to generate statistics in quantitative research. Large numbers are required: they follow a set format and utilize scanning and data capture technology for ease of analysis.
    - Open-ended questionnaires are used in qualitative research. Data analysis is more complex because there are no standard answers to the questions (although responses, in some cases, can be quantified). Fewer questionnaires are required.
    - Combination questionnaires generate statistics and explore ideas, beliefs and/or experiences.
- All questionnaires should be piloted (tested) on the type of people who will be taking part in the main survey. This helps to iron out ambiguities, work out which questions are unclear or badly worded, and shows students whether their questionnaire will help to answer their research question. They should alter the questionnaire, if required.

The following points provide examples of key issues that are suitable for students studying at intermediate or advanced level:

- There is no one right way to go about designing and administering a questionnaire. This is because there are different approaches that depend on discipline and subject, epistemological and methodological standpoint, research question, aims and objectives, target population, budget and resources. However, there are many ways that students can go wrong, so it is imperative that they read around the subject, understand what they are doing, construct their questionnaire carefully, pilot the questions and refine as appropriate. Questionnaires should be flawless and robust: they should be well constructed and analysed correctly so that the data are reliable and can lead to valid conclusions.
- For objectivists who hope to describe an objective truth, a stimulus-response model is employed, with standardized questions and answers being the favoured approach for large-scale surveys. Validity and reliability are extremely important when designing this type of questionnaire and when analysing data (see Activity 59).
- Researchers who approach questionnaire design from a more subjective standpoint stress that both questions and answers have to be understood in terms of the social contexts in which they operate. Since it is (the construction of) meaning that is important, the design of the questionnaire and the way it is administered are very different from the survey approach described above. The researcher plays a much more important role in helping to construct meaning and, as such, questionnaires can be flexible and fluid.

Useful terms

See ‘key issues’, above, for a definition of the different types of questionnaire that are used in research.

Related activities

- Activity 38: Constructing questions
- Activity 44: Recording techniques
- Activity 48: Administering questionnaires
- Activity 49: Improving response rates
- Activity 58: Operationalizing and classifying
- Activity 59: Ensuring validity and reliability in quantitative research
- Activity 63: Coding and categorizing qualitative data

Preparatory reading

Chapter 2 of Fink (2013) provides a detailed introduction to questionnaire design, with some useful examples of the different types of question that can be asked.

More information about questionnaire design can be obtained from www.socialresearchmethods.net/kb/survey.php. This website is a ‘web-based textbook that addresses all of the topics in a typical introductory undergraduate or graduate course in social research methods’.

Further reading

Blair, J., Czaja, R.F. and Blair, E.A. (2014) *Designing Surveys: A Guide to Decisions and Procedures*, 3rd edition. Thousand Oaks, CA: Sage.

Ekinci, Y. (2015) *Designing Research Questionnaires for Business and Management Students*. London: Sage.

Fink, A. (2013) *How to Conduct Surveys: A Step-by-Step Guide*. Thousand Oaks, CA: Sage.

Gillham, B. (2007) *Developing a Questionnaire*, 2nd edition. London: Continuum.

Activity 48 Administering Questionnaires

Student handout page 330

Tutor Notes

Purpose: This activity asks students to develop a digital resource that will help them to know about the different methods that can be used to administer questionnaires. It asks them to assess the strengths and weaknesses of each of the methods they have identified, and offer advice to students who may be thinking about using this method.
Type: Student-centred resource development.
Level: Beginner and intermediate.
Duration: Up to 3 hours of group work during independent study.
Equipment/materials: Students will need access to the relevant digital platform.
Prerequisite activities: This activity can be run together with Activity 38: Constructing questions and Activity 47: Designing questionnaires.
Learning outcome: By the end of this activity students will have developed a useful resource that will help them to choose and use a suitable method of administration for their questionnaire.

The activity

Divide your students into small groups and give each group a copy of the student handout. This asks them to think about the different methods that can be used to administer questionnaires, assess the strengths and weaknesses of each, and offer advice to students who might be thinking about using this method to administer their questionnaire. Each group should post their ideas on the relevant digital platform so that they can be reviewed by fellow students. It is useful to give a specific deadline by which time all ideas should be posted. You will also need to monitor the posts (see below) and, if there is repetition, you may need to refine and reduce the list.

Key issues

This activity has most relevance for students who are intending to use questionnaires in their research. Therefore, if students are sure that they are not going to use questionnaires they can be asked, instead, to complete an alternative activity that is relevant to their proposed research methods. However, the digital resource will be available to all students, if some should change their minds as their project develops.

Questionnaire administration methods and some of their strengths and weaknesses are listed below under useful terms. It is important that you monitor the digital resource as it develops to ensure that the information is correct: some students can be too enthusiastic about the strengths of online administration methods, for example.

Students usually raise the issue of ensuring that the questionnaire is designed with administration in mind during this activity; if they do not do this, you will need to emphasize this point. It should also be made clear that there might not necessarily be one right way to go about designing and administering a questionnaire. This is because there are different approaches that depend on their epistemological and methodological standpoint, research question, aims and objectives, target population, budget and resources.

Useful terms

Administration of ‘face-to-face’ questionnaires (also called ‘interviewer-administered’ or ‘researcher-administered’ questionnaires) requires an interviewer to ask the interviewee questions. The strengths and weaknesses of this method depend on the type of research. For example, if it is a large-scale survey where multiple interviewers are to be used and generalization is the goal, all questions must be asked in the same way. The interviewers should ask the questions as they are written down and are required to record the answer from a list that has been predetermined. This method is rigid and inflexible; it is time-consuming and costs can be high.

However, if the questionnaire is to be used in qualitative research or small-scale research where generalization is not the goal, this method can be spontaneous, flexible and intuitive. The researcher can probe for more information, clarify issues that have not been understood and change the sequence of questions if an issue has been raised previously, for example. All questionnaires that are administered face-to-face could be subject to interviewer bias, and this might not be the most suitable method for very sensitive topics. Also, interviewees might be more tempted to give socially acceptable answers when asked questions face-to-face.

‘Telephone-administered’ questionnaires require an interviewer to ask the interviewee questions over the telephone. Again, the strengths and weaknesses depend on the type of research and are similar to those described above. This method can be problematic for people who have hearing difficulties. Great care should be taken when sampling (how to handle people who do not have a phone, are ex-directory or do not give a number, for example).

‘Self-administered’ questionnaires require respondents to complete the questionnaire themselves. Printed questionnaires that are completed with pen or pencil and online questionnaires (see below) fall within this category. Printed questionnaires can be delivered in person or by post. Advantages include reduced travel costs (although postal costs can be expensive) and the questionnaires are useful for respondents who have hearing difficulties. However, this type of questionnaire is easy to ignore or throw away. Also, it can be unclear who has completed the questionnaire and whether questions have been understood fully (if English is not the first language, if people have literacy difficulties or if they are blind or partially sighted, for example).

‘Computerized administration’ of questionnaires requires respondents to fill in a questionnaire that is presented online. It is a form of self-administered questionnaire, described above (with some similar strengths and weaknesses). It can be a cheaper way to administer questionnaires because there are no travel or postage costs, and there are a variety of free web-based tools available to help design and administer questionnaires (some students might provide links to these). However, care must be taken to ensure the quality and reliability of such tools. Also, great care should be taken when sampling (how to handle people without internet access, who cannot read or do not know how to use a computer, for example).

These computerized questionnaires can also be administered using an ‘adaptive’ approach, which enables the software to select questions based on previous responses. Again, care must be taken to ensure that the chosen software or tools are reliable, well designed and used correctly.

All types of self-administered questionnaire (whether paper or online) are open to self-selection bias (see Activity 25: Avoiding sampling problems). Although self-administered questionnaires can enable a greater number of people to be contacted, at a much cheaper cost, response rates tend to be much lower than they are for face-to-face questionnaires. A much higher volume of questionnaires may need to be delivered to account for this (see Activity 49: Improving response rates).

A ‘group-administered’ questionnaire requires a group of people to fill in a questionnaire at the same time, while the researcher or interviewer is available for questions, comments or clarification. This type of administration process can lead to a much higher response rate because a set time and space is made available for respondents to complete the questionnaire and they encourage each other to answer the questions. Again, great care has to be taken with sampling techniques, and the researcher should try to ensure that respondents are not influencing each other’s answers.

Related activities

- Activity 38: Constructing questions
- Activity 47: Designing questionnaires
- Activity 49: Improving response rates
- Activity 50: Using the internet as a tool for research

Preparatory reading

Chapter 8 in Andres (2012) has some useful material on administering surveys and increasing response rates.

Further reading

Andres, L. (2012) *Designing and Doing Survey Research*. London: Sage.

Fink, A. (2013) *How to Conduct Surveys: A Step-by-Step Guide*. Thousand Oaks, CA: Sage.

Gillham, B. (2007) *Developing a Questionnaire*, 2nd edition. London: Continuum.

Activity 49 Improving Response Rates

Tutor Notes

Purpose: This activity asks students, in three groups, to design and present a webpage that will help fellow students and researchers improve response rates. It covers improving response rates for telephone and postal surveys, for online and email surveys and for face-to-face interviews and focus groups.
Type: Group exercise (during independent study) followed by group presentation (in class or digitally).
Level: Beginner and intermediate.
Duration: Several hours for group work during independent study to design and develop a webpage, followed by up to 20 minutes for each presentation and peer feedback (1 hour in total).
Equipment/materials: Students can choose the equipment and materials that they wish to use. This can include presentation and graphics software, web development tools and relevant research methods literature, for example.
Prerequisite activities: None, although it is possible to undertake this activity together with Activity 24: Choosing sample size.
Learning outcome: By the end of this activity students will know how to improve response rates when they conduct their research.

The activity

Discuss what is meant by ‘response rate’ with your students. Divide your students into three groups. Each group is to design and develop a webpage that will help students and researchers to improve response rates in their research. They are to do this during independent study, in preparation for the next teaching session. Each group should be allocated one of the following:

1. Improving response rates in large-scale postal and telephone surveys.
2. Improving response rates in online surveys and email surveys.
3. Improving response rates for face-to-face interviews and focus groups.

Students will need to present their webpage to the rest of the group in the following teaching session. Each presentation should be followed by peer and tutor feedback. If contact time is limited students can upload their webpage to the relevant digital platform for peer review and feedback.

Key issues

Asking students to create a webpage, rather than purely list or brainstorm ideas for improving response rates, adds further interest to this topic. It helps students to think of practical ways to improve response rates and transmit this information in a creative way that is useful to other students and researchers.

Students create a wide variety of webpages in this activity. Some concentrate on transmitting a list of essential ‘do’s and don’ts’, whereas others provide minimal text, instead linking to scholarly articles and academic blogs about increasing response rates. Some students choose to concentrate on ‘best practice’, offering advice and guidance and linking to websites that provide further information, whereas others produce short videos or podcasts that give information and advice to potential visitors. One group produced a series of multiple-choice questions and another group produced humorous examples of mistakes that can be made when trying to increase response rates.

The following issues can be raised in this activity:

- It is important that researchers write a good, clear and concise covering letter, introductory paragraph or email. This should explain clearly the nature and purpose of the research, describe who is carrying out the research and discuss what will happen to the results. It should also give information about anonymity and confidentiality.
- Clear instructions should be given about what is expected of respondents. For example, if they are to fill in a questionnaire they should be told how long it will take (researchers can include a progress bar for online surveys). If participants are to attend a focus group they should be told how long this will take (or that a time will be negotiated by participants).
- Incentives can be provided (care should be taken to ensure that respondents are not ‘bribed’ or coerced into taking part). This could be in the form of refreshments for participants in focus groups, or entry into a competition for people filling in questionnaires, for example.
- Response rates will be improved if participants and respondents feel that there is some personal benefit to be gained by taking part in the research, or if the research is meaningful to them in some way. Participants could feel that they are helping other people in the future (in clinical trials, for example) or they could feel that their participation will lead to important and beneficial policy change. It is important, therefore, to stress the intended outcome, benefits or impact of the research.
- For interviews and focus groups, researchers should contact participants in advance to find out whether they are willing to take part. They should then contact participants the day before to make sure that they have remembered and are still intending to take part.
- Researchers should ensure that respondents do not lose out financially by taking part in research studies. Travel expenses should be paid, childcare provided for focus groups, or stamped addressed envelopes included with questionnaires, for example.
- When producing questionnaires, researchers should:
    - ensure that they are not too long or daunting;
    - use plenty of space;
    - ensure that questions are clear and easy to follow;
    - use clear, plain language;
    - avoid jargon or technical terms;

    - provide questionnaires in alternative languages, if required.
- When conducting an email survey the researcher needs to ensure that their email is not mistaken for spam. Researchers should make it eye-catching, personalized and important.
- Online surveys should be optimized for all devices, including PCs, tablets, laptops and phones. Careful checks should be carried out to ensure that the questionnaire works well on all devices. Researchers should avoid using passwords or identification numbers that respondents need to enter to access a questionnaire, as this can be off-putting.
- For postal surveys, follow-up letters and questionnaires should be sent in cases where a questionnaire has not been returned.
- Researchers should try to find out why people have not responded. The researcher should learn from this experience and try to prevent similar problems from occurring in the future.

Useful terms

‘Response rate’ in survey research refers to the number of people who have taken part in the survey (returned a questionnaire, for example) divided by the number of people in the sample. It is usually expressed as a percentage: the lower the percentage, the more likely some form of bias has been introduced into the research process (certain people with similar traits, characteristics or experiences have been unwilling to respond, for example). This will have an influence on the generalizability of the results.

Researchers undertaking qualitative studies can also refer to ‘response rate’, but will not, necessarily, express this as a specific percentage, instead using the term to discuss the level of participation and how this can be improved upon.

Related activities

- Activity 22: Knowing about probability samples
- Activity 23: Knowing about non-probability (purposive) samples
- Activity 24: Choosing sample size
- Activity 25: Avoiding sampling problems
- Activity 47: Designing questionnaires
- Activity 48: Administering questionnaires

Preparatory reading

Stoop et al. (2010) provide comprehensive and useful information on issues such as nonresponse bias and adjustment, refusal type and refusal conversion, and cooperative and reluctant respondent comparisons.

Dykema, J., Stevenson, J., Klein, L., Kim, Y. and Day, B. (2013) 'Effects of e-mailed versus mailed invitations and incentives on response rates, data quality, and costs in a web survey of university faculty', *Social Science Computer Review*, 31(3), 359–70.

Puffer, S., Porthouse, J., Birks, Y., Morton, V. and Torgerson, D. (2004) 'Increasing response rates to postal questionnaires: A randomised trial of variations in design', *Journal of Health Service Research and Policy*, 9(4), 213–17.

Further reading

Nulty, D. (2008) 'The adequacy of response rates to online and paper surveys: What can be done?', *Assessment & Evaluation in Higher Education*, 33(3), 301–14.

Stoop, I., Billiet, J., Koch, A. and Fitzgerald, R. (2010) *Improving Survey Response: Lessons Learned from The European Social Survey*. Chichester: John Wiley & Sons.

Activity 50 Using the Internet as a Tool for Research

Student handout page 331

Tutor Notes

Purpose: This activity is an entertaining way to raise awareness of how the internet can be used as a tool for research. It asks students to think of ways in which the internet can be used for research and then produce a podcast (audio or video) that highlights relevant issues such as strengths, weaknesses and ethical implications. The podcast is to be uploaded to the relevant platform for peer review and feedback.
Type: Podcast production during independent study.
Level: Beginner and intermediate.
Duration: Several hours during independent study.
Equipment/materials: Students will need access to recording equipment and to the relevant digital platform.
Prerequisite activities: None. However, if students are interested in the visual aspects of this activity (producing a video podcast and/or using photographs and images on the internet, for example) they might find Activity 46: Using visual methods interesting.
Learning outcome: By the end of this activity students will know how and when to use the internet as a tool for research.

The activity

Divide your students into small groups and give them the student handout. This asks them to identify different ways in which the internet can be used as a tool for research. They should then produce a podcast (audio or video) that highlights important issues for students and researchers who are intending to use the internet as a tool for research. This could include strengths, weaknesses and ethical implications, for example. The podcast should be uploaded to the relevant platform for peer review and feedback.

Key issues

This activity can raise the following issues:

- The internet can be used as a tool to gather data, using a variety of research methods such as online questionnaires, online focus groups, online interviews, online ethnographies and online experiments. It enables researchers to contact a large number of people from a wide range of locations. However, researchers should be aware that not all of the population has access to the internet, and some are much more active in their participation than others. Usage can be segregated by demographics such as age, gender, nationality and socio-economic group, for example. Samples need to be designed with these issues in mind and every care taken to limit problems with participation and selection bias. Also, researchers should be aware that there is potential for cross-cultural and multilingual misinterpretations and misunderstandings.
- Researchers can use the internet for unobtrusive research, that is, non-reactive research with 'found' data (perhaps for some type of conversation or discourse analysis, for example). However, researchers need to be aware that users can misrepresent their identity, exaggerate and lie. Also, questions need to be asked about whether online posts are published and can be quoted in the usual way, or whether people engaging in online discussion do so under the presumption that what they say stays within that particular online community. Although data are freely available on the internet, they are not necessarily ethically available for research purposes. Researchers should seek permissions where possible and should undertake a careful evaluation of possible consequences of inquiries on those studied. Researchers should avoid unwarranted intrusions and ensure that there will be no undesired and detrimental effects on those studied.
- Researchers can use the internet to promote their research, increase its visibility, develop new audiences, generate ideas, share the latest information and developments, and seek advice and feedback from interested parties. Social media and micro-blogging sites are useful for sharing and disseminating ideas.
- The internet can be used as a source of data and information for background research. Sources includes:
    - online journal databases;
    - online repositories;
    - websites;
    - datasets;
    - logging software (to record digital activity across multiple devices);
    - blogs;
    - wikis;
    - podcasts;
    - discussion forums;
    - webinars;
    - social networking sites;
    - micro-blogging sites;
    - photographs and videos;
    - virtual worlds.
- Researchers should be aware that data are not equally accessible. For example, users can set their own privacy controls on social networking sites; search engines prioritize data based on

complex algorithms; people publishing data may have complicated reasons for making sure that some data are in the public domain, while limiting access to other data. Researchers need to take account of the type and level of accessibility when designing their research project.

Useful terms

‘Podcasts’ are digital media files (audio or video) that can be streamed or downloaded by the target audience. They can be paused, rewound and played over again. Many are presented as a series and made available as specific episodes over a period of time, available by subscription. Podcasts (especially those presented by eminent researchers) can be useful for students and researchers, in particular where they cover relevant research topics. They can be found on university virtual learning environments, company websites and on websites such as YouTube.

If students have not produced a podcast before, there are various tutorials available on the internet. Also, many universities offer information and advice about producing podcasts on their websites.

Related activities

- Activity 6: Using the internet for background research
- Activity 7: Evaluating sources
- Activity 8: Recognizing statistics, facts, arguments and opinions
- Activity 9: Discovering questionable statistics published online
- Activity 24: Choosing sample size
- Activity 25: Avoiding sampling problems

Preparatory reading

Hooley et al. (2012) provide a useful introduction to the topic of internet research, covering issues such as history, ethics, online surveys, online interviews and online ethnographies.

Ideas Roadshow (www.ideasroadshow.com) is ‘a new educational product centred on extended conversations with a wide variety of academic experts across the arts and sciences’. Videos and e-books can be accessed through library subscriptions.

The Open University in the UK has produced a publicly available written policy on the ethical use of student data for learning analytics. It can be viewed at www.open.ac.uk/students/charter/essential-documents/ethical-use-student-data-learning-analytics-policy [accessed 1 July 2015].

Further reading

Baym, N. (2010) *Personal Connections in the Digital Age*. Cambridge: Polity Press.

Halfpenny, P. and Proctor, R. (eds) (2015) *Innovations in Digital Research Methods*. London: Sage.

Hooley, T., Marriott, J. and Wellens, J. (2012) *What is Online Research? Using the Internet for Social Science Research*. London: Bloomsbury Academic.

McKee, H. and Porter, J. (2009) *The Ethics of Internet Research: A Rhetorical, Case-Based Process*. New York: Peter Lang.

Section 4 Using and Analysing Data

Activity 51 Reading Scientific Material

Student handout page 332

Tutor Notes

Purpose: This activity helps students to feel comfortable with, and get the most out of, reading scientific material by asking them to discuss some real-life statements and suggest solutions to the stated problems. It is aimed at students studying at beginner level who are new to reading scientific material and is of particular use to adult returners who may lack confidence in their ability to read and digest academic papers and books.
Type: Group exercise followed by a tutor-led discussion.
Level: Beginner.
Duration: Up to 40 minutes for the group exercise, followed by up to 20 minutes for a tutor-led discussion.
Equipment/materials: None required.
Prerequisite activities: Students who are new to this type of academic reading may find it useful to know more about primary and secondary sources, so Activities 1 and 2 may be useful. Once they have undertaken this activity, you may find it of benefit to ask students to complete Activities 11 and 12 as these help beginner students to think more about reading and critiquing scientific papers. You can also run this activity together with Activity 54, which asks students to build a digital resource that will help them to make use of statistics during their research, on their course and in everyday life.
Learning outcome: By the end of this activity students will feel comfortable with reading, and understand how to get the most out of, scientific material.

The activity

Divide your students into small groups (three to five students is a good number) and give each group a copy of the student handout. This presents several real-life statements that have been made by students who are new to reading scientific material and asks the groups to discuss the statements and suggest solutions to overcome the stated problems. Once students have discussed all the statements and identified solutions, follow the group exercise with a tutor-led discussion on the issues raised.

This activity works well because it introduces the anxieties, concerns and worries that students may be experiencing, but does not require them to discuss or confess their own feelings. It enables students to discuss these issues with other students in their group, bounce ideas off each other, learn from those with more experience and/or confidence and provide practical and effective solutions to the stated problems, which they can then relate to their own scientific reading.

Key issues

The following issues can be raised during this activity, depending on your students, their previous and present experiences and their level of understanding:

- Maths phobia or anxiety can influence performance at higher education level. These feelings may have arisen from previous experience, poor test results at school or negative attitudes towards maths, for example. Some students also discuss whether some people are 'naturally predisposed' towards maths, whereas others are perhaps predisposed to anxiety about maths. See Finlayson (2014) for an interesting discussion on the causes of maths anxiety and the strategies that are used to overcome the problem.
- All students have the ability to learn new subjects. Students should not let bad school experiences, previous examination results or poor learning environments influence their attitude to learning at higher education level. They should embrace the new learning environment, build networks, utilize expert help and seek advice and guidance, when required.
- Students should read around the subject and take extra maths and science courses, if they are offered and can be incorporated into a student's course.
- Students should overcome their fear of failure. Tutors are friendly and experienced: they want students to do well and will work hard to ensure that students are comfortable with their studies and understand what they are being taught.
- Students should always seek advice if they are struggling, and should not be afraid to admit that they do not understand something. Often, if one student admits that they do not understand, others will follow, and students can be surprised and relieved to find out that they are not alone.
- Tutors must take responsibility. If anxieties have been developed from school and from poor teaching practice, university tutors should not make the same mistakes. They should encourage students in a supportive environment where students are encouraged to ask questions and discuss their concerns. Tutors should not adopt an authoritative tone: they should be approachable, friendly and encouraging. The pace should be slow enough for students to follow. Also, the required level of mathematical or scientific knowledge that is required for the course should be made clear from the outset so that students do not enrol on a course that is totally inappropriate for them.
- Practical information/methods that are discussed by students to improve scientific reading include the following:
    - Students should learn to skim and scan scientific material, rather than wade through whole texts (they can return to relevant texts to read in more detail, if required). They should pay particular attention to the introduction, summary and conclusion.
    - Students should try to build up an overview of the information first by scanning the relevant sections and working out how they all fit together. They should look for keywords or phrases that aid comprehension and help to piece together what is being read.
    - When skimming and scanning a text, students should be aware of new words or terms. They should find a definition within the text or refer to a glossary or dictionary (printed or online) and keep a note of the definition for future reference.
    - Students should try to understand what they are reading rather than memorize facts. If some information needs to be memorized, this will be easier to achieve if students understand what they are reading.

    - Students can try covering up some of the material when reading so that they can work through the ideas mentally to aid understanding.
    - Students should pay particular attention to charts and figures as these tend to summarize the major ideas and facts that are being presented.
- Students should not be afraid to critique and analyse the work of other academics. They should ask questions about the methodology and methods, the results and the conclusions. They should look out for researcher bias and problems with validity and reliability, where appropriate. Students studying at beginner level (and some overseas students) sometimes express surprise that they are required to do this, believing that they are not experienced enough, or lack knowledge and understanding to undertake this type of critique. However, others point out that this is how great science is developed.
- Students should persevere: it will all become clear in the end.

Useful terms

The terms ‘maths anxiety’ or ‘maths phobia’ are used to describe anxious feelings and tensions that people have about maths. These tensions and anxieties influence, or interfere with, a person’s ability to solve mathematical problems or read and interpret mathematical material. There could be many causes of maths anxiety, such as school instruction, teacher behaviour and test experiences, and these are discussed in detail in Finlayson (2014).

Related activities

- Activity 1: Distinguishing between primary and secondary sources
- Activity 2: Finding and using primary sources
- Activity 7: Evaluating sources
- Activity 8: Recognizing statistics, facts, arguments and opinions
- Activity 11: Critiquing quantitative research papers
- Activity 12: Critiquing qualitative research papers
- Activity 13: Evaluating science in the media

Preparatory reading

Finlayson, M. (2014) ‘Addressing math anxiety in the classroom’, *Improving Schools*, 17(1), 99–115.

Further reading

Cheng, E. (2015) *Cakes, Custard and Category Theory: Easy Recipes for Understanding Complex Maths*. London: Profile Books.

Greenhalgh, T. (2014) *How to Read a Paper: The Basics of Evidence-Based Medicine*, 5th edition. Chichester: Wiley-Blackwell.

Yudkin, B. (2006) *Critical Reading: Making Sense of Research Papers in Life Sciences and Medicine*. Abingdon: Routledge.

Activity 52 Improving Data Search Techniques

Tutor Notes

Purpose: This activity helps students to improve their data search techniques by utilizing the skills and knowledge of an expert in the field. The subject liaison librarian (or subject librarian) will introduce, describe, explain and demonstrate the vast array of data search techniques, equipment, materials and services that are available to students.
Type: Specialist tour, talk and demonstration.
Level: Beginner, intermediate and advanced.
Duration: One hour.
Equipment/materials: This activity will take place in the library/learning resource centre (LRC) and will utilize all the relevant specialist facilities, equipment, materials and services that are available.
Prerequisite activities: None, although students studying at beginner level may find it useful to understand the difference between primary and secondary sources, so Activity 1 can be run prior to this activity for these students.
Learning outcome: By the end of this activity students will know how to search for data effectively and efficiently, utilizing all the relevant techniques, facilities, equipment, materials and services that are available to them.

The activity

Contact your subject liaison librarian or subject librarian to organize a session on improving data search techniques. Most will run a one-hour session in the library/ LRC to offer advice and guidance on how to improve data search techniques and to demonstrate the equipment, materials, software, facilities and services that are available. If such a person is not available you can lead a tour and talk yourself.

This activity can be used for students at all levels of study: make sure that the librarian is aware of the level of study and pitches the session accordingly. It is of particular use to beginner students who are new to your institution and to those students who have demonstrated a certain level of reluctance to use the facilities available. It is also of use to advanced students who need to understand how to search for data at a much deeper level. Subject librarians can offer advanced students help with research design strategies, advice about relevant database subscriptions and information about current advances in the field.

If you do not work in an academic institution, contact your local library or, alternatively, contact your national library for information about tours (the British Library organizes general group tours and specialist tours that are available for booking, for example). Also, university libraries may offer visitor access and membership, so contact your local university for more information.

Key issues

The following issues can be covered in this activity, depending on the subject and level of study of your students, the preference of your subject liaison librarian and the equipment, facilities and services that are available in your library/LRC.

- Equipment and materials:
  - Books and journals are available in printed and electronic form. The librarian will highlight the relevant literature (perhaps with a physical and/or virtual tour) and explain search techniques for library and e-resources (see below). They will give information about access to the relevant databases and datasets (free to access, university subscription or CD-ROM, for example). They will also explain how to access rare books and archives, if relevant.
  - Audio-visual equipment (such as microform readers/printers, DVD/video playback equipment and data projectors) is available in most libraries. The librarian will demonstrate the relevance and use of this type of equipment (where operated by debiting printing credit accounts, for example). They will also explain how to search for multimedia materials and data, and discuss borrowing limits.
  - IT facilities and software will be demonstrated and explained, where relevant. This can include information on how to print and photocopy (including issues of copyright), netbooks and laptops available for loan, connecting to the Wi-Fi network, citing references, bibliographic software, statistical software and data mining software, for example (see Activity 55 for information about choosing appropriate statistical software).
- Services:
  - Inter-library loan services are available for students to access materials that are not available in their library. The librarian will explain how to use this service and the costs involved.
  - Most librarians will introduce students to the help-desk service (or subject librarian service) that students can use for information and advice specific to their research. Some universities offer a 'book a librarian' service for one-to-one help and advice.
  - Workshops, training sessions and seminars may be available, covering topics such as citing publications, starting a dissertation, undertaking a literature search and using databases and datasets. Information about accessing these workshops will be provided by the librarian.
  - The librarian may highlight the additional facilities and services that are available for students with disabilities, such as accessible rooms, one-to-one specialist help and reduced costs for printing and photocopying.
- Search techniques. There are a wide variety of search techniques that can be used by students, and the librarian will discuss and demonstrate the most relevant. Examples of these include:
  - Search operators. These are also known as Boolean operators and enable the use of multiple words and concepts in the search. The most common of these operators are AND (used to narrow searches), OR (used to broaden searches) and NOT (used to exclude certain terms).
  - Search statements. These can be created by combining search words using search operators such as those described above. The search words can also be truncated or use wild card symbols (see below). When creating a search statement brackets are used to ensure that

correct processing occurs (searches enclosed with brackets will be performed first).

- Phrase searching. This can be used to make the search more specific. Some databases and internet search engines utilize inverted commas for phrase searches. Students should use the help facility if this is not the case.
- Proximity searching. This can be used to make a search more specific and exclude irrelevant records. These searches only retrieve the two words when they appear in the same sentence. ‘Same’ can be used for a proximity search in some databases, but terms tend to vary, so students should use the help facility to find the correct term.
- Advanced searching. This enables searches to be refined further and includes field-specific searching (such as author, title and date) and index searching (alphabetical lists of authors or subjects, for example).
- Limiting searches. These enable searches to be carried out by date, language or type of publication, for example. This facility is usually available in the advanced search section.
- Truncation. This can be used to widen the search and ensure that important records are not missed. For example, the truncated search econom* will find ‘economy’, ‘economists’ and ‘economics’. In general, an asterisk is used to denote truncation, but some databases will not recognize this symbol. If this is the case, students should use the help facility to find out which symbol is recognized for truncation.
- Wild card symbols. These are used to replace a single letter. This helps to widen the search and is useful to find terms that use alternative spellings or are in the singular or plural. For example, the search wom?n will find both ‘woman’ and ‘women’. Again, although most databases recognize the question mark symbol, some may not, so students should use the help facility to find the relevant wild card symbol.

Useful terms

See ‘key issues’, above, for useful terms relating to data search techniques, and Activity 6: Using the internet for background research for a definition of ‘Boolean logic’.

Related activities

- Activity 1: Distinguishing between primary and secondary sources
- Activity 2: Finding and using primary sources
- Activity 7: Evaluating sources
- Activity 53: Storing and using data
- Activity 56: Finding and using datasets

Preparatory reading

All university library websites contain useful information about using their facilities and services, and offer detailed advice about finding sources of data. They also provide printed or digital guidance leaflets, which are useful preparatory reading for this activity.

Chapter 3 of Ridley (2012) provides a useful guide to finding sources of information and conducting searches.

Further reading

Fink, A. (2014) *Conducting Research Literature Reviews: From the Internet to Paper*, 4th edition. Thousand Oaks, CA: Sage.

Inman, J. and Picton, H. (2012) *Finding Official British Information: Official Publishing in the Digital Age*. Witney: Chandos Publishing.

Markey, K. (2015) *Online Searching: A Guide to Finding Quality Information Efficiently and Effectively*. Lanham, MD: Rowman & Littlefield.

Ridley, D. (2012) *The Literature Review: A Step-by-Step Guide for Students*, 2nd edition. London: Sage.

Activity 53 Storing and Using Data

Student handout page 333

Tutor Notes

Purpose: This activity raises awareness of the issues involved in storing and using data by asking students to imagine that they have been offered a job as a data steward. Their first task is to produce an organization-wide policy statement about the storage and use of data.
Type: Individual exercise followed by tutor-led discussion.
Level: Intermediate and advanced.
Duration: Up to 3 hours during independent study, followed by a one-hour teaching session (if contact time is limited you can ask that students post their policy documents on the relevant digital platform instead; see below).
Equipment/materials: Access to the relevant background material, and access to the relevant digital platform if this option is chosen.
Prerequisite activities: None. However, Activity 66: Knowing about data protection is closely related and can be run together with this activity.
Learning outcome: By the end of this activity students will have a deeper understanding of the issues that are pertinent to the storage and use of data, and will be able to relate this understanding to their own research.

The activity

Give your students a copy of the student handout. This asks them to imagine that they have been given a job as a data steward and their first task is to produce an organization-wide policy statement about storing and using data (they can choose the type of organization for which they work, and the style and content of their policy statement). They must prepare their policy statement for the next teaching session when the issues will be discussed. If contact time is limited you can instead ask students to post their policy statements on the relevant digital platform for peer review, discussion and feedback. This provides a useful digital resource that can be accessed when required.

Key issues

This is an individual activity in which students are able to develop their own policy statements. Style and content tend to vary, depending on level and subject of study, and on the enthusiasm and personal interest of students. The following issues can be addressed in policy statements: these provide useful discussion points for your tutor-led discussion and can be related to students' specific research projects:

- The origin of data. Where do the data come from? How, when and why have they been generated?
- Data quality. What specific data quality rules are to be adopted? How will the deterioration of quality be prevented? How can data quality be improved? How can the data be enriched from outside sources? Is there a difference between the data quality that is required and the data quality that is achieved?
- Quality assurance. How is the quality of data assured? How can others be sure of the quality?
- Data corruption. What processes and/or procedures can corrupt data? Are there particular processes and/or stages when corruption can occur? How can this corruption be avoided?
- Sharing of data. How are data to be shared? Who can access the information, when and how? Is it possible for data to be used in unintended ways? How can this be avoided?
- Statistical confidentiality. How is confidentiality to be protected while ensuring the beneficial use of data? How is unlawful disclosure to be prevented? (See 'useful terms', below.)
- Privacy rules and measures. How is privacy to be assured? What privacy measures are to be taken?
- Information security. How is the information to be kept secure? How are security breaches to be avoided?
- Reference data. How will the referencing system be managed, organized and maintained? How and when can it be accessed?
- Day-to-day operation. How is the system to be maintained and operated from day to day?
- System development. How will the system be developed to meet enterprise, business or scientific standards, in addition to project requirements?
- Ownership and liability. Who owns the data? Who is liable if something goes wrong?
- Conflict resolution. How will possible conflict between different users be handled (business and IT professionals, researchers and employers, for example)? What are the resolution guidelines?
- Communication and dissemination. How is the policy to be communicated to others? Are there to be data management updates, briefs, papers or documents available?
- Policy enforcement. Once the policy has been established, how will it be enforced?
- Glossary and/or business definitions, if required.

Useful terms

The Organisation for Economic Co-operation and Development (https://stats.oecd.org/glossary) defines ‘statistical confidentiality’ as ‘the protection of data that relate to single statistical units and are obtained directly for statistical purposes or indirectly from administrative or other sources against any breach of the right to confidentiality. It implies the prevention of unlawful disclosure’ [accessed 22 September 2015].

Related activities

- Activity 52: Improving data search techniques
- Activity 54: Making use of statistics
- Activity 56: Finding and using datasets
- Activity 57: Analysing quantitative data
- Activity 60: Knowing about data management
- Activity 66: Knowing about data protection

Preparatory reading

Chapter 1 of Duncan et al. (2011) provides an interesting introduction to the topic of statistical confidentiality, covering topics such as providing data and protecting confidentiality, strategies of statistical disclosure limitations, and restricted access and restricted data.

Jisc is running a pilot project called ‘Safe Share’ in collaboration with biomedical researchers from the Farr Institute and the Medical Research Council Bioinformatics initiative in the UK. This project will ‘address the need for UK researchers to use and share sensitive data safely and securely’. More information can be obtained from www.jisc.ac.uk/rd/projects/safe-share [accessed 12 November 2015].

Further reading

Craig, T. and Ludloff, M. (2011) *Privacy and Big Data*. Sebastopol, CA: O'Reilly Media.

Duncan, G., Elliot, M. and Salazar-González, J.-J. (2011) *Statistical Confidentiality: Principles and Practice*. New York: Springer.

Plotkin, D. (2014) *Data Stewardship: An Actionable Guide to Effective Data Management and Data Governance*. Waltham, MA: Morgan Kaufmann.

Activity 54 Making Use of Statistics

Student handout page 334

Tutor Notes

Purpose: This activity asks students to build a digital resource that will help them and fellow students make use of statistics during their research, on their course and in everyday life. This resource can include information about statistics courses, book references, advice, tips, videos/podcasts, links to websites and any other information that will enable students to increase their understanding and use of statistics.
Type: Student-centred resource development.
Level: Beginner, intermediate and advanced (the level of study will be reflected in the type and level of information posted).
Duration: Up to 1 hour of tutor time to set up the resource and a few minutes over the duration of the course to monitor the resource. Students can access the resource when required, monitoring and posting information throughout their course.
Equipment/materials: A suitable digital platform on which to build the resource and the required access details for all students.
Prerequisite activities: Although not prerequisite activities, students who have less experience of using statistics may find it useful to work through Activity 8: Recognizing statistics, facts, arguments and opinions and Activity 9: Discovering questionable statistics published online. Students who are new to reading and interpreting scientific material will find Activity 51 useful.
Learning outcome: By the end of this activity students will have a useful resource on which to draw (and access at any time) for advice, guidance, tips and information that will help them to understand, and make use of, statistics during their research, on their course and in everyday life.

The activity

Choose a suitable digital platform on which you can build this resource. Ensure that all students have access to this platform and that it is available throughout their course. Call it ‘Making Use of Statistics’ and provide a few initial entries (see below).

Once you have done this, give your students a copy of the student handout. This discusses a report by the British Academy that raises concern about the standard of quantitative skills among students in the UK. Students are asked to imagine that they are a course director who has been given the task of improving these quantitative skills. They should think about the type of information that would achieve this aim and post it on the digital platform that has been set up for this purpose. Students should be encouraged to make useful, instructive, imaginative and creative posts.

This activity can be used for students studying at all levels as the type and standard of information posted will reflect the level of study. Explain that the resource will be available for everyone throughout their course so that they can access it when they need it. You may need to remind students to post information and you may also find it useful to post some of your own advice (perhaps to get the resource started or to encourage more entries). Examples of posts that you can include are given below. You will also need to monitor posts to ensure that the information provided by students is correct: sometimes students can post misleading or wrong information, especially where statistical techniques and formulas are concerned, for example.

Key issues

Below are examples of posts that you can make to get the resource started and to encourage more entries:

- Provide a reading list with some introductory textbooks (see further reading, below).
- Find out what statistics courses are offered at your university and post details, including length of course, level of study and enrolment details, if relevant. This can include short courses aimed at students new to statistics, modules that can be taken as part of a degree course and short training sessions aimed at postgraduate students and early-career researchers, for example.
- If you do not work for a university, or if you think the courses will be of benefit to your students, include links to free online statistics courses that are available. For example, the Open University in the UK has a wide selection of short courses that are freely available online, including courses on mathematics and statistics. Visit www.open.edu/openlearn/free-courses for more information.
- If students are new to SPSS they might find it useful to work their way through the 'Getting Started with SPSS' unit, available free of charge from the Open University (www.open.edu/openlearn/free-courses). This unit 'takes a step-by-step approach to statistics software through seven interactive activities', and students do not need access to statistics software to complete the unit.
- Encourage students to contribute to a glossary of statistical terms by making a few of your own entries. See Activity 24 for a definition of 'sample size', 'confidence interval' and 'confidence level', and Activity 25 for a definition of 'sampling frame' and 'margin of error'. 'Response rate' is defined in Activity 49. Other useful terms that you could include are given below.
- Start a list of 'common mistakes' when using statistics that you, and students, can build on throughout the course. This could include the following examples (depending on student experience and level of study):
  - confusing correlation with causation;
  - interpreting causality deterministically when the evidence is statistical;
  - errors in sampling (see Activity 25: Avoiding sampling problems).
- Start a list of 'useful tips' that you, and students, can build on throughout the course. This could include the following examples (depending on student experience and level of study):
  - Think carefully about how you intend to analyse your data before you actually gather them. Become familiar with analysis methods and techniques at an early stage of your research (see Activity 57: Analysing quantitative data).
  - Keep detailed notes as you gather and analyse data. When writing up your research, ensure that enough detail is included to enable the reader to review and critique your data gathering and analysis methods.
  - Don't suggest certainty when this is not possible. Uncertainty is often unavoidable: this can be dealt with by estimating (or quantifying) the degree of uncertainty.

Useful terms

‘Descriptive statistics’ are used to describe the population that is under study. They include measures of central tendency (such as averages) and dispersion (variability about the average). This can include ‘range’ (the difference between the largest and smallest values) and ‘standard deviation’ (the variation from the mean). These statistics are only used to describe: they are not used to generalize.

‘Inferential statistics’ are used by researchers to analyse samples and draw conclusions. They allow deductions to be made from the data collected and enable the researcher to test hypotheses and relate findings to the sample or population. ‘Tests of significance’ (determining whether the null hypothesis is rejected in favour of the alternative hypothesis) are used to address issues of generalizability.

Related activities

- Activity 8: Recognizing statistics, facts, arguments and opinions
- Activity 9: Discovering questionable statistics published online
- Activity 24: Choosing sample size
- Activity 25: Avoiding sampling problems
- Activity 52: Improving data search techniques
- Activity 55: Choosing software for statistical analysis
- Activity 56: Finding and using datasets
- Activity 57: Analysing quantitative data

Preparatory reading

Visit YouTube (www.youtube.com) for some useful and interesting videos on topics such as choosing a statistical procedure, types of data, important statistical concepts, variation and sampling error, and hypothesis testing. Links to the best of these can be posted on your digital resource.

Bakker, M. and Wicherts, J. (2011) 'The (mis)reporting of statistical results in psychology journals', *Behavior Research Methods*, 43(3), 66–78 [electronic].

Further reading

Graham, A. (2013) *Statistics: A Complete Introduction*. London: Hodder & Stoughton.

Hand, D. (2008) *Statistics: A Very Short Introduction*. Oxford: Oxford University Press.

Rowntree, D. (2000) *Statistics Without Tears: An Introduction for Non-Mathematicians*. London: Penguin.

Vigen, T. (2015) *Spurious Correlations*. New York: Hachette Books. The website associated with this amusing book may be of interest to students and can be posted on the digital resource: http://tylervigen.com [accessed 21 October 2015].

Activity 55 Choosing Software for Statistical Analysis

Tutor Notes

Purpose: This activity helps students to choose appropriate software for statistical analysis by utilizing the skills and knowledge of an expert in the field. An IT technician (or software adviser) will introduce, describe, explain and demonstrate the statistical software that is available to students, and provide information about courses and further training that students can access, if required.
Type: Specialist tour, talk and demonstration.
Level: Intermediate and advanced.
Duration: One hour.
Equipment/materials: This activity will take place in a PC lab or specialist computing room and will utilize all the relevant specialist facilities, equipment, materials and software that are available.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will be able to choose the most appropriate software for their statistical analysis, and know where to seek further help about its use, if required.

The activity

Contact your computer services department/IT department to organize a session on choosing software for statistical analyses. Most will run a session in a PC lab or specialist computing room to offer advice and guidance on the statistical software that is available to students. They will discuss what is available, illustrate how to access the software, provide a brief demonstration and supply information about further training and courses that are available, if required. If your IT department does not run this type of session, you will need to book the appropriate PC lab or specialist computing room and run the session yourself.

This activity can be used for students at intermediate and advanced levels of study: make sure that the IT technician or software specialist is aware of the level of study and pitches the session accordingly. It is of particular use to intermediate students who are new to using software for statistical analysis and for those students who are unfamiliar with the software that is available.

If you do not work for an academic institution there are some private companies that will provide training in statistical software, although this can be an expensive option. Instead, you can direct students to free software and online tutorials that are available (see below). Also, some universities have a statistical advisory service, or similar department, that will offer advice, guidance and training to clients both within the university and to external bodies (some will provide this service at a nominal fee for educational establishments).

Key issues

This activity provides a practical, hands-on demonstration of statistics packages that are available for students. It introduces students to the hardware and software that are available, illustrating how to access appropriate computing equipment (including location and booking) and the software available on the institution's network. It is useful to ask an experienced IT technician or software specialist to run this session because they will be aware of the most recent developments in software design and can offer the most up-to-date advice about workshops, training and courses.

There are a wide variety of statistical packages available that are too numerous to mention here. However, you can access an up-to-date, comprehensive list of open source, freeware and proprietary statistical packages on Wikipedia, with links to each of the packages listed: https://en.wikipedia.org/wiki/List_of_statistical_packages [accessed 27 July 2015].

Statistical packages that can be introduced in this session include the following (depending on what is available at your institution, the preference and knowledge of the IT technician or software specialist and the subject that your students are studying):

- SPSS – popular in the social sciences, health sciences, education and marketing. This package is easy to use, with extensive menu options and a wide range of statistical procedures available.
- Minitab – a general statistics package that is popular across a variety of subjects. This package has a wide range of simple and clear statistical procedures.
- Stata – popular in sociology, economics, political science and biomedicine. This is a general-purpose package that has clear, self-contained instructions for ease of use.
- StatCrunch – popular in a variety of disciplines and available online (for a small fee for students). It enables users to perform complex analyses, share datasets and generate reports of their data.
- SAS – a comprehensive statistics package that is useful for data management, graphics, analysis and presentation. It offers a comprehensive selection of statistical procedures.
- JMP – popular in the sciences and engineering, this is an easy-to-use data analysis and graphics tool that is available on a variety of platforms. It provides a broad collection of statistics and graphics tools.
- R – popular in a variety of disciplines, this is a free package that runs on a variety of platforms and produces high-quality graphical output.

Useful terms

‘Statistical analysis’ can be defined as a branch of scientific method that collects, examines, manipulates and interprets quantitative data. It is a process that is undertaken to discover underlying patterns and trends, helping to make discoveries, adding to new knowledge and answering important questions. It can be used to guide decisions and inform policy.

See Activity 24 for a definition of ‘sample size’, ‘confidence interval’ and ‘confidence level’, and Activity 25 for a definition of ‘sampling frame’ and ‘margin of error’. ‘Response rate’ is defined in Activity 49, and definitions of ‘descriptive’ and ‘inferential’ statistics are given in Activity 54.

Related activities

- Activity 53: Storing and using data
- Activity 56: Finding and using datasets
- Activity 57: Analysing quantitative data
- Activity 59: Ensuring validity and reliability in quantitative research
- Activity 61: Analysing qualitative data

Preparatory reading

The Software Sustainability Institute (www.software.ac.uk) 'cultivates better, more sustainable, research software to enable world-class research'. It works with researchers, developers and funders to identify key issues and best practice in scientific software. The website contains an interesting and useful blog that covers up-to-date and pertinent issues. There is also a useful list of resources for researchers using software for their research [accessed 15 August 2015].

ResearchGate (www.researchgate.net) has been set up to connect researchers across the globe. There are some useful debates on this site about the most appropriate statistics packages to use for different types of research. These provide useful preparatory reading for this activity [accessed 11 November 2015].

Further reading

Field, A., Miles, J. and Field, Z. (2012) *Discovering Statistics Using R*. London: Sage.

Longest, K. (2015) *Using Stata for Quantitative Analysis*. Thousand Oaks, CA: Sage.

Pallant, J. (2013) *SPSS Survival Manual: A Step-by-Step Guide to Data Analysis Using IBM SPSS*, 5th edition. Maidenhead: Open University Press.

Silver, C. and Lewins, A. (2014) *Using Software in Qualitative Research: A Step-By-Step Guide*, 2nd edition, London: Sage.

Activity 56 Finding and Using Datasets

Tutor Notes

Purpose: This activity asks students to find and use two datasets that are relevant to their research. It is a useful activity for students who have no experience of using datasets, for those who feel that datasets are not relevant to their research, for those who need encouragement to move on with the background research for their project and for those who need to use datasets to help explain emerging results, for example.
Type: Self-guided individual exercise followed by a tutor-led discussion.
Level: Intermediate and advanced. Students need to be starting or carrying out their research for this activity to be of relevance and benefit.
Duration: Several hours of work during independent study, followed by a one-hour teaching session to discuss the issues raised by the self-guided exercise (if contact time is limited students can post their experiences on the relevant digital platform instead; see below).
Equipment/materials: Students will need access to the relevant datasets.
Prerequisite activities: Students may find Activity 55: Choosing software for statistical analysis useful.
Learning outcome: By the end of this activity students will know where to find, and how to use, datasets that are relevant to their research.

The activity

Ask your students to find and use two datasets that are relevant to their research. As they do this, ask them to take note of information that they can discuss in the next teaching session. This can include, for example:

- Where did they find the dataset?
- How easy was it to find?
- Did they encounter any difficulties when searching for a relevant dataset?
- How well was the dataset presented?
- Was it easy to understand?
- What method(s) did they use to explore the data?
- Did they encounter any difficulties when exploring the data?
- What tasks did they perform (sort, filter, code, query or annotate, for example)?
- How successful were these tasks?
- Did they encounter any problems when performing these tasks?
- Did they find any datasets that were unsuitable or inappropriate? If so, why was this?

Hold a class discussion in your next teaching session to discuss these issues. If contact time is limited you can ask that students post their experiences on the relevant digital platform instead. This will build a useful resource for students to access when they need advice and guidance about finding and using datasets for their research.

Key issues

Some students are able to undertake this activity easily, finding and using relevant datasets without any problems. Indeed, some may have already used them during the background research for their project. Others, however, find this a difficult activity, especially if they believe that datasets are not relevant to their research topic or if they lack confidence with maths and statistics. Some of these students may need additional guidance before they undertake this activity. Alternatively, you can pair students who have experience of using datasets with those who do not have experience.

If you need to offer guidance about finding datasets, the following resources may be useful:

- Students can find the UK government's open datasets at www.data.gov.uk. This site brings together data from all central government departments and a number of other public sector bodies and local authorities.
- The Economic and Social Research Council (www.esrc.ac.uk) in the UK has published details of almost 1,000 datasets generated by ESRC-funded grants. The data are free to access and use.
- Students can find the US government's open datasets at www.data.gov. Data are provided by a wide variety of organizations, including federal agencies, the US Geological Survey and the National Aeronautics and Space Administration.
- The Inter-University Consortium of Political and Social Research (www.icpsr.umich.edu) is a depository of datasets for use in secondary data analysis in the USA. The holdings consist mainly of raw data derived from surveys, censuses and administrative records. Your university will need to be a member of the consortium for you to use the service.

If students need additional guidance about using datasets, you can direct them to relevant short courses, training sessions or modules that are run by staff at your university. If such courses are not available, or if you do not work for a university, you could direct your students to the following:

- The Open University (www.open.edu/openlearn) in the UK provides a number of free courses about finding and using datasets. These include courses such as *Comparing Datasets Using Boxplots*, *Finding and Charting Data*, and *Mapping the World with Data*.
- The School of Data (http://schoolofdata.org) 'works to empower civil society organizations, journalists and citizens with the skills they need to use data effectively in their efforts to create more equitable and effective societies'. It offers various free-to-access training courses, 'data expeditions' (students investigate a research topic in their teams) and community mentoring.
- Most dataset websites contain information about how to use the datasets, and produce guidance leaflets to help students get the most out of the data. Some also provide a help service that offers individual advice to students.

Useful terms

A ‘dataset’ is a collection of data (gathered by a survey, observation or investigation of a particular phenomenon, for example) usually presented in tabular form. ‘Big data’ refers to extremely large and complex datasets, ‘small data’ refers to datasets of a manageable volume that are accessible, informative and actionable, and ‘open data’ refers to datasets that are free to use, reuse, build upon and redistribute (subject to stated conditions and licence).

Related activities

- Activity 52: Improving data search techniques
- Activity 53: Storing and using data
- Activity 54: Making use of statistics
- Activity 55: Choosing software for statistical analysis
- Activity 57: Analysing quantitative data
- Activity 58: Operationalizing and classifying

Preparatory reading

Yau (2011) presents an interesting discussion on using visual tools to work with large datasets and Kitchin (2014) provides an interesting critical analysis of the data revolution.

Further reading

Kitchin, R. (2014) *The Data Revolution: Big Data, Open Data, Data Infrastructures and Their Consequences*. London: Sage.

Leskovec, J., Rajaraman, A. and Ullman, D. (2014) *Mining of Massive Datasets*, 2nd edition. Cambridge: Cambridge University Press.

Yau, N. (2011) *Visualize This: The Flowing Data Guide to Design, Visualization, and Statistics*. Indianapolis: Wiley Publishing.

Activity 57 Analysing Quantitative Data

Student handout page 335

Tutor Notes

Purpose: This activity helps students to focus in on, understand and develop their chosen method(s) of quantitative data analysis for their research. It asks them to write a section of a textbook that explains their chosen data analysis method(s) to other students who are studying at the same level.
Type: Textbook/PDF development.
Level: Intermediate and advanced.
Duration: Several hours of work during independent study. The actual duration will depend on the ease with which students are able to undertake this activity.
Equipment/materials: Access to the relevant quantitative data software and/or literature.
Prerequisite activities: If you have students in your group who are intending to use qualitative data analysis methods (alone or together with quantitative methods) you will need to run this activity in conjunction with Activity 61.
Learning outcome: By the end of this activity students will have focused in on, understood and developed their chosen quantitative data analysis method(s) for their research.

The activity

This activity is for students who are in the process of deciding upon, focusing in on and getting to grips with one or more suitable methods of quantitative data analysis for their research. When they are at this stage of their research, give them a copy of the student handout. This asks them to make a contribution towards a new textbook on data analysis techniques, aimed at students studying at the same level. They must write a section for this textbook on their chosen data analysis method(s).

You may find it useful to give a deadline by which all contributions should be submitted to you (ensuring that all students have time to get to grips with their chosen method). Once you have received all contributions, check, edit and put together into a useful resource that can be given to students (a PDF that can be accessed electronically when required, for example).

If you have students in your group who are intending to use qualitative data analysis techniques (in their entirety or as a mixed methods approach) this activity can be run together with Activity 61. The student handouts are the same for each activity so you only need to give one to your students. The tutor's notes, however, offer information specific to quantitative or qualitative techniques.

Key issues

This activity helps students to understand more about their chosen data analysis method(s) by asking them to provide a written description of the method(s) and its use to other students studying at the same level. In order to explain the method(s) clearly, in a way that can be understood by others, they must first understand in detail what their chosen method(s) entails. For students studying at advanced level, this also helps them to check that their chosen method(s) fits their epistemological and methodological standpoint, suits the purpose of their research and helps to answer their research question.

Most students who choose quantitative data analysis techniques for their research will choose to use a particular statistics software package. They will need to practise using this package, or take part in a training session or online tutorial, so that they can describe the package when they write their section for the textbook. This will help them to understand whether their chosen package will be suitable for their research, while enabling them to understand how to use the technology. It will also encourage them to think about gathering their data in a way that is suitable for their chosen software, and consider issues such as sampling techniques, validity and reliability.

Popular software packages that students could decide to use, and describe in their textbook entry, include SPSS, Minitab, SAS, Stata, R, JMP and StatCrunch (see Activity 55 for more information about each of these).

Students who are not from a numerical discipline sometimes choose to provide a description of simple statistical analysis techniques when they write their piece: examples of these are given below.

Useful terms

The ‘arithmetic mean’ is a simple average of the data where the student adds up the values and divides by the number of items. It is used in ‘interval scales’ when the data are not skewed by extreme values. Interval scales come in the form of numbers with precisely defined intervals and precise comparisons can be made.

The ‘mode’ is the most frequently occurring value in the data, calculated by finding the number that occurs most often. It is used when dealing with ‘nominal scales’. In this type of scale the categories include everyone in the sample, no one should fit into more than one category and the implication is that no one category is better than another.

The ‘median’ is the middle value of the range, calculated by putting the values in order and then finding the middle value. It is used in ‘interval scales’ (when data are skewed) and in ‘ordinal scales’. For ordinal scales answers can be placed on a continuum, with the implication being that some categories are better than others. In this type of scale it is not possible to measure the difference between the specific categories.

See Activity 54 for a definition of ‘descriptive statistics’ and ‘inferential statistics’, Activity 24 for a definition of ‘sample size’, ‘confidence interval’ and ‘confidence level’, and Activity 25 for a definition of ‘sampling frame’ and ‘margin of error’.

Related activities

- Activity 20: Choosing research methods
- Activity 21: Using multiple or mixed approaches
- Activity 22: Knowing about probability samples
- Activity 54: Making use of statistics
- Activity 55: Choosing software for statistical analysis
- Activity 59: Ensuring validity and reliability in quantitative research
- Activity 61: Analysing qualitative data

Preparatory reading

The Software Sustainability Institute (www.software.ac.uk) is a ‘national facility for cultivating and improving research software to support world-class research’. The website contains a wide variety of information that is pertinent to this activity, including information about citing software that has been used in your research, software for data visualization and software evaluation [accessed 15 August 2015].

Further reading

Kent, R. (2015) *Analysing Quantitative Data*. London: Sage.

Treiman, D. (2009) *Quantitative Data Analysis: Doing Social Research to Test Ideas*. San Francisco: Jossey-Bass.

Vogt, W., Vogt, E., Gardner, D. and Haeffele, L. (2014) *Selecting the Right Analyses for Your Data: Quantitative, Qualitative, and Mixed Methods*. New York: Guilford Press.

Activity 58 Operationalizing and Classifying

Tutor Notes

Purpose: This activity is an entertaining way to introduce the topics of operationalizing and classifying. It uses occupation classification, which is an area of classification to which most students can relate. Students are required to think about how occupations are ordered, problems that can occur and how additional dimensions can be incorporated. The discussion that follows the game can include an introduction to classification systems that are used in your country and in other countries, a discussion about how conceptual frameworks are operationalized in empirical research and a critique of operationalization (depending on the level of study and subject).
Type: Game.
Level: Beginner, intermediate and advanced. This game can be used at all levels: the complexity of discussion will reflect the level of study.
Duration: Up to 30 minutes for the game and up to 30 minutes for the class discussion.
Equipment/materials: Card or paper on which to write or print the occupations and a digital timer, clock or stopwatch.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will understand what is meant by operationalizing and classifying and will be able to relate this understanding to their own research, where relevant.

The activity

Write or print the following occupations on to pieces of paper or card (use a large font size so that the occupations can be read at a distance):

Primary school teacher
Catering assistant
Editorial assistant
Company director
Bus driver
Coal miner
Writer
IT technician
Tennis coach
University professor
Personal assistant
Shop assistant
Therapist
Art dealer

Divide your students into two groups. Ideally, you need 9–14 students in Group One and 4–8 students in Group Two. Assign one occupation to each of your students in Group One (you may need to add or delete occupations, depending on the size of your class). Ask members of Group One to stand up at the front of the classroom and rank themselves, with the highest-ranked occupation on the left and the lowest-ranked occupation on the right. They are to hold up their cards so that they can be read easily by members of Group Two who are observing the exercise.

Once the occupations have been ranked, ask everyone, including the observers, if they are happy. If not, discuss the issues raised and ask students to realign themselves accordingly. Some of the occupations listed above are deliberately vague and non-descriptive as this will encourage discussion. For example, a company director could work for a multinational company or for a small business, and a therapist could be a highly qualified psychologist or a self-taught layperson. Students tend to raise and discuss such issues during this game.

When everyone is satisfied with the ranking, ask members of Group Two to introduce changes that might alter the ranking (see below for examples of changes). They are to do this one at a time. Each time a change is introduced the students in Group One must make the required changes within a minute. The goal is for students in Group Two to think of changes that will alter the ranking significantly, or make it hard to decide whether or not to alter the ranking, so that Group One students cannot make the changes within a minute. Time each change and stop students from further movement or discussion after a minute, even if they are not satisfied with the ranking.

Changes that could be introduced include the following (you may need to introduce one or two of these to get the game flowing):

- The teacher takes early retirement.

- The coal miner is made redundant.
- The catering assistant is promoted to supervisor.
- The editorial assistant takes maternity leave.
- The therapist completes a postgraduate degree.

Continue to introduce changes until you feel the game has run its course. Follow with a discussion on the issues raised.

If you have students with mobility restrictions they can be assigned an observer role in Group Two, and if you have students who are blind or partially sighted you can ask students to call out their occupations, in order, after each realignment.

Key issues

This activity introduces the topics of operationalizing and classifying in an entertaining way. It helps students to think about how researchers are able to observe and measure concepts that are intangible, impalpable or difficult to define. This activity uses occupations to introduce these topics as students are able to relate to these issues and tend to be familiar with occupational classification systems that are used in their country (the Standard Occupational Classification and the National Statistics Socio-Economic Classification used in the UK, for example).

The complexity of discussion will reflect the level (and subject) of the course. For students at beginner level it is a useful activity to help them to start thinking more about the issues that are involved in classification: how to identify and overcome problems, how consensus can be reached and controversies overcome, for example. For students studying at intermediate level the discussion can also include issues of how to operationalize and classify in their empirical research project, if relevant (and a critique of operationalization, if approaching their work from alternative theoretical perspectives and methodological standpoints, for example). The discussion with students studying at advanced level can take the critique further: whether it is possible to have absolute control of the meaning of scientific concepts, whether operational definitions are required for all concepts and whether operationalization, when undertaken, should be a public or private process, for example.

Useful terms

‘Operationalizing’ is the process of defining variables (or phenomena) in terms of measurable factors in cases where they are not directly measurable. The process is used in empirical research so that concepts become distinguishable, observable and measurable. For example, in an empirical research study the conceptual framework must be operationalized so that the research question can be answered (proceeding from a concept to a set of questionnaire items to form a numerical scale, for example). Operationalizing can be problematic when concepts are complex and intangible (depending on an individual’s definition, for example) or when measures are not uniform.

‘Classifying’ is used to sort, order or arrange into classes or categories. It is used together with operationalizing so that once variables or phenomena have been defined, observed and measured, they can be categorized in a meaningful way (to provide a framework for description and comparison, for example).

Related activities

- Activity 18: Developing a research question
- Activity 20: Choosing research methods
- Activity 54: Making use of statistics
- Activity 56: Finding and using datasets
- Activity 57: Analysing quantitative data
- Activity 61: Analysing qualitative data

Preparatory reading

The Office for National Statistics (www.ons.gov.uk) in the UK provides some interesting and useful information about standard classifications that are used in the UK (in alliance with European and international standards, where relevant and possible). In the USA more information about classification systems can be obtained from the United States Census Bureau (www.census.gov).

The United Nations Statistics Division has a list (with links) to national statistical offices worldwide: http://unstats.un.org/unsd/methods/inter-natlinks/sd_natstat.asp [accessed 28 July 2015].

Further reading

Bowker, G. and Star, S. (2000) *Sorting Things Out: Classification and Its Consequences*. Cambridge, MA: MIT Press.

Khalidi, M. (2013) *Natural Categories and Human Kinds: Classification in the Natural and Social Sciences*. Cambridge: Cambridge University Press. This book provides an interesting philosophical discussion about classification.

Newsome, B. (2015) *An Introduction to Research, Analysis, and Writing: Practical Skills for Social Science Students*. Thousand Oaks, CA: Sage. Chapter 10 of this book provides some interesting material on operationalizing and classifying.

Activity 59 Ensuring Validity and Reliability in Quantitative Research

Student handout page 336

Tutor Notes

Purpose: This activity is a practical exercise that helps to raise awareness of validity and reliability in quantitative research. It asks students to find, read and review a research paper that is related to their own topic of research, ascertain whether the research is valid and reliable and apply issues of validity and reliability to their own research (if they are undertaking a quantitative study).
Type: Self-guided individual exercise.
Level: Intermediate and advanced.
Duration: Several hours during independent study. The actual time taken will depend on the ease with which students can complete this task.
Equipment/materials: A quantitative research paper on a subject related to the student's research topic (chosen by the student).
Prerequisite activities: Students who are new to critiquing quantitative research papers may find Activity 11 useful as this provides guidance about how to critique this type of paper.
Learning outcome: By the end of this activity students will be able to ascertain whether quantitative research produced by other researchers is valid and reliable, and apply issues of validity and reliability to their own research.

The activity

Give the student handout to your students. This asks them to choose a research paper that reports quantitative research on a topic related to their own research. They must read, review and evaluate the paper, ascertaining whether the research is valid and reliable, based on the information supplied in the handout. They are also asked to ensure that they address these issues in their own research so that other researchers (and tutors and examiners) can assess levels of validity and reliability.

Some of the issues covered in the student handout may not be relevant to your subject area, or you may feel that they are too advanced for your students' level of study, so delete as appropriate.

Key issues

This activity is a self-guided individual exercise that students can work through at their own pace and at a time that suits them. However, if you feel that the activity would benefit from a tutor-led discussion to explain the issues in more depth, you can do so in class either before or after the individual exercise (students will need a deadline to work towards if you intend to hold the discussion after they have completed the exercise). The student handout contains information on which you can base your discussion, if you choose this option. The discussion can also include issues such as threats associated with each type of validity (social threats to internal validity, for example) and the validity of operationalization (translating a concept or construct into a functioning and operating reality, and how this can go wrong).

Useful terms

See the student handout for a discussion of terms relevant to issues of validity and reliability.

Related activities

- Activity 11: Critiquing quantitative research papers
- Activity 22: Knowing about probability samples
- Activity 24: Choosing sample size
- Activity 25: Avoiding sampling problems
- Activity 55: Choosing software for statistical analysis

Preparatory reading

Chapters 9 and 10 in Robinson Kurpius and Stafford (2006) cover the issues of reliability and validity in quantitative research.

The Center for Open Science (https://cos.io) is a 'non-profit technology company providing free and open services to increase inclusivity and transparency of research'. The Center has developed Transparency and Openness Promotion Guidelines on issues of reproducibility for journals, which make interesting preparatory reading for this activity [accessed 19 August 2015].

Further reading

Blasius, J. and Thiessen, V. (2012) *Assessing the Quality of Survey Data*. London: Sage.

Robinson Kurpius, S.E. and Stafford, M.E. (2006) *Testing and Measurement: A User-Friendly Guide*. Thousand Oaks, CA: Sage.

Viswanathan, M. (2005) *Measurement Error and Research Design*. Thousand Oaks, CA: Sage.

Activity 60 Knowing about Data Management

Tutor Notes

Purpose: This activity helps students to understand more about data management by introducing them to relevant institutional data management policy before asking them to produce their own data management plan. It is aimed at students studying at advanced level, in particular, those who need to apply for funding for their research and/or submit their proposal for ethical approval.
Type: Self-guided individual exercise followed by peer review.
Level: Advanced.
Duration: Several hours of work during independent study.
Equipment/materials: Access to the relevant institutional data management policy (university or funding body, for example).
Prerequisite activities: Students who are applying for funding for their research will find Activities 28, 29 and 31 useful, as these help students to cost their project, produce a budget and find a funding body.
Learning outcome: By the end of this activity students will know about relevant institutional data management policy and will have produced a data management plan for their research, in line with the relevant policy.

The activity

Ask your students to read your institutional data management policy. If time permits, and if you think it necessary, discuss the policy with your students so that they are clear about what it entails. Ask them to produce a data management plan (DMP) for their research that is in line with your institutional policy. They will also need to ensure that it is in line with funding body policy, if relevant. Once they have done this, ask your students to swap their DMP with a fellow student for peer review and feedback.

If your institution does not have data management policy you can direct your students to the relevant funding body policy or to the Digital Curation Centre, which provides useful information about data management (see below). Alternatively, you can lead a class discussion on the issues that are addressed in DMPs (see 'key issues', below) or run this activity together with Activity 53, which asks students to produce an organization-wide policy statement about storing and using data.

Key issues

Although specific requirements for DMPs vary, depending on institutional data management policy, a DMP tends to include some or all of the following:

- A description of data that are to be collected and/or created.
- The methods and methodology that will be used to collect and/or create data.
- How data will be stored, preserved and managed:
  - with the highest regard for ethical standards;
  - within the law, regulation and recognized good practice;
  - with the highest regard for security;
  - in an accessible form so that other researchers can access, understand, use and add value to the data.
- When and where data will be made available:
  - the sharing of all primary data, samples and supporting materials (in a form that protects individuals and research participants);
  - the sharing of any inventions or software developed from the research, if relevant;
  - potential limits to sharing (to safeguard research participants or protect intellectual property, for example).
  - Issues pertaining to intellectual property.
  - Strategies for long-term preservation.
  - A description of how data will be of the highest quality and will have long-term validity.
  - Resources that are required to deliver the DMP.

Useful terms

A ‘data management plan’ or ‘data management and sharing plan’ is required by most funding bodies when researchers apply for funding. This plan is used to describe what type of data will be generated and how. It sets out how data will be stored, preserved, shared and disseminated. It also includes information about security and possible restrictions, given the nature of the data. If such a plan is requested the funding body will have a specific data management policy to which students should adhere. They will also need to adhere to their own institutional data management policies. Many funding bodies produce guidance notes and templates for producing a DMP, and these are available on websites or electronic grant application and submission systems.

Related activities

- Activity 53: Storing and using data
- Activity 57: Analysing quantitative data
- Activity 61: Analysing qualitative data
- Activity 66: Knowing about data protection
- Activity 77: Understanding legal requirements

Preparatory reading

Further information and advice about curating and preserving research data can be obtained from the Digital Curation Centre (www.dcc.ac.uk). This is a ‘centre of expertise in digital information curation with a focus on building capacity, capability and skills for research data management across the UK’s higher education research community’. Useful information about data management is available on this website. There are also various tools, checklists and guidance leaflets available that will help students to develop their DMP [accessed 22 September 2015].

Further reading

Corti, L., Van den Eynden, V., Bishop, L. and Woollard, M. (2014) *Managing and Sharing Research Data*. London: Sage.

Jones, S. (2011) 'How to Develop a Data Management and Sharing Plan', DCC How-to Guides. Edinburgh: Digital Curation Centre. Available online: http://www.dcc.ac.uk/resources/how-guides [accessed 26 October 2015].

Pryor, G. (ed.) (2012) *Managing Research Data*. London: Facet Publishing.

Activity 61 Analysing Qualitative Data

Student handout page 338

Tutor Notes

Purpose: This activity helps students to focus in on, understand and develop their chosen method(s) of qualitative data analysis for their research. It asks them to write a section of a textbook that explains their chosen data analysis method(s) to other students who are studying at the same level.
Type: Textbook/PDF development.
Level: Intermediate and advanced.
Duration: Several hours of work during independent study. The actual duration will depend on the ease with which students are able to undertake this task.
Equipment/materials: Access to the relevant qualitative data software and/or literature.
Prerequisite activities: If you have students in your group who are intending to use quantitative data analysis methods (alone or together with qualitative methods) you will need to run this activity together with Activity 57.
Learning outcome: By the end of this activity students will have focused in on, understood and developed their chosen qualitative data analysis method(s) for their research.

The activity

This activity is for students who are in the process of deciding upon, focusing in on and getting to grips with one or more suitable methods of qualitative data analysis for their research. When they are at this stage of their research, give them a copy of the student handout. This asks them to make a contribution towards a new textbook on data analysis techniques, aimed at students studying at the same level. They must write a section for this textbook on their chosen data analysis method(s).

You may find it useful to give a deadline by which all contributions should be submitted to you (ensuring that all students have time to get to grips with their chosen method). Once you have received all contributions, check, edit and put together into a useful resource that can be given to students (a PDF that can be accessed electronically when required, for example).

If you have students in your group who are intending to use quantitative data analysis techniques (in their entirety or as a mixed methods approach) this activity can be run together with Activity 57. The student handouts are the same for each activity so you only need to give one to your students. The tutor's notes, however, offer information specific to qualitative or quantitative techniques.

Key issues

This activity helps students to understand more about their chosen data analysis method(s) by asking them to provide a written description of the method(s) and its use to other students studying at the same level. In order to explain the method(s) clearly, in a way that can be understood by others, they must first understand in detail what their chosen method(s) entails. For students studying at advanced level, this also helps them to check that their chosen method(s) fits their epistemological and methodological standpoint, suits the purpose of their research and helps to answer their research question.

Some students who choose qualitative data analysis techniques for their research will choose to use a particular software package. They will need to practise using this package, or take part in a training session or online tutorial, so that they can describe tools and techniques when they write their section for the textbook. This will help them to understand whether their chosen package will be suitable for their research, while enabling them to understand how to use the technology. It will also encourage them to think about issues such as sampling methods, the tools they intend to use to gather and record their data and the conclusions that can be drawn from their data (see Activity 65: Drawing conclusions from qualitative data).

Popular qualitative software packages that students could decide to use, and describe in their textbook entry, include NVivo, ATLAS.ti, MAXQDA, ANTHROPAC, LibreQDA and HyperRESEARCH (many more are available). Software can be used to analyse texts and media files. It can help with the mechanical tasks of sorting, structuring and analysing large amounts of text, but will not provide interpretations. Some data analysis software is easy to use, free and open source. Other software is freely available from institutions (IT staff will offer advice and guidance on its use). Students should be encouraged to include all relevant information in their textbook entry.

Students can also choose to write about a variety of qualitative data analysis methods in this activity. Examples of the more popular of these are given below in ‘useful terms’.

Useful terms

‘Content analysis’ is used in qualitative research to provide an objective, systematic and quantified description of the data. Using this method, the researcher works through textual data identifying, coding and counting the presence of certain words, phrases, themes, characters or sentences. Coding categories can emerge directly from the text or can be predetermined, based on observation or background reading, for example. This method can include conceptual analysis (a concept is chosen for examination and the number of occurrences recorded) and relational analysis (the relationship between concepts is examined).

‘Comparative analysis’ is used to identify, analyse and explain similarities across groups, societies, institutions and cultures. It can be approached in different ways, depending on the type of research and epistemological and methodological standpoint. It is often used alongside other methods such as thematic and content analysis.

‘Thematic analysis’ enables the researcher to work through textual data to identify specific themes (clusters of linked categories that convey similar meanings). To do this, categories are coded, counted, altered and modified in light of new data. Thematic analysis is a method favoured by students studying at beginner or intermediate level because the techniques are easily understood, flexible and not dependent on a specific epistemology or theoretical perspective.

‘Discourse analysis’ is a general term that is used to describe a number of different approaches to studying and analysing the uses of language. This can be written, vocal or sign language, for example. Different approaches include ‘semiotics’ (focusing on how signs and symbols create meaning), ‘deconstruction’ (exposing contradictions and binary opposites in texts through taking apart the structure of language) and ‘narrative analysis’ (focusing on how people construct and use stories to interpret the world).

‘Conversation analysis’ is the study of social interaction within conversation. The focus is on the construction of reality, rather than the discovery of reality. Researchers are interested in understanding how participants interact with each other, how they contribute during interactions and how they make sense of the contribution that others make during the interaction. The analysis is based on audio or visual recordings of interactions.

Related activities

- Activity 20: Choosing research methods
- Activity 21: Using multiple or mixed approaches
- Activity 23: Knowing about non-probability (purposive) samples
- Activity 57: Analysing quantitative data
- Activity 63: Coding and categorizing qualitative data
- Activity 64: Evaluating qualitative analyses
- Activity 65: Drawing conclusions from qualitative data

Preparatory reading

Miles et al. (2014) in its entirety provides useful preparatory reading for this activity.

Woods, M., Paulus, T., Atkins, D.P. and Macklin, R. (2015) ‘Advancing qualitative research using qualitative data analysis software (QDAS)? Reviewing potential versus practice in published studies using ATLAS.ti and NVivo, 1994–2013’, *Social Science Computer Review*, published online before print August 27, 2015, doi: 10.1177/0894439315596311.

Further reading

Bazeley, P. (2013) *Qualitative Data Analysis: Practical Strategies*. London: Sage.

Miles, M., Huberman, M. and Saldaña, J. (2014) *Qualitative Data Analysis: A Methods Sourcebook*, 3rd edition. Thousand Oaks, CA: Sage.

Silver, C. and Lewins, A. (2014) *Using Software in Qualitative Research: A Step-By-Step Guide*, 2nd edition. London: Sage.

Silverman, D. (2015) *Interpreting Qualitative Data*, 5th edition. London: Sage.

Activity 62 Analysing Visual Data

Tutor Notes

Purpose: This activity helps students to learn about the different techniques that can be used to analyse visual data by building a digital resource of visual analysis methods. It expands on the digital resource that was developed in Activity 46: Using visual methods.
Type: Student-centred resource development.
Level: Intermediate and advanced (the level is reflected in the complexity of post and discussion).
Duration: Several hours for independent study and digital posting, followed by periodic monitoring and discussion.
Equipment/materials: Students will need access to the relevant visual analysis literature, and access to the relevant digital platform.
Prerequisite activities: This activity builds on the resource developed in Activity 46.
Learning outcome: By the end of this activity students will have a greater understanding of the different techniques that can be used to analyse visual data and know how to apply these techniques in their own research, if relevant.

The activity

This activity builds on the digital resource that was developed in Activity 46: Using visual methods. However, it can also work as a stand-alone activity if you think it is more appropriate for your students.

Write down on paper a number of visual data analysis methods (see below). Place them in a hat/bowl and ask your students to draw one piece of paper each (if you have a large number of students, ask them to undertake this activity in pairs or groups). Ask your students to find out about the method of analysis that they have drawn and then post relevant information on the digital platform that was set up for Activity 46. It is their choice what to post, but it could include information such as a definition of the analysis method, strengths, weaknesses, advice offered to students who may be thinking about using the method and links to useful resources and publications.

You will need to monitor the resource periodically to ensure that the information is correct and posted in a timely manner (you can give students a deadline by which posts should be made, if required). Encourage them to make creative and interesting posts that will be of use to fellow students.

The methods of analysis that you choose to include depend on your subject and level of study, but can include the following (see 'useful terms', below, for a definition of each of these methods):

- quantitative content analysis of the visual;
- inductive content analysis of the visual;
- visual semiotics;
- visual rhetoric;
- psychoanalysis of the visual;
- discourse analysis of the visual;
- iconographic analysis;
- visual hermeneutics.

You can also include one or two 'wild cards' such as 'invent a method of visual data analysis' and 'your choice of visual analysis method'. These wild cards can open up the digital discussion and produce some interesting and inventive topics that can further engage and motivate students.

Key issues

This activity produces a useful digital resource that can be accessed at any time if and when students decide to use visual methods in their research. Once students have posted their information about the relevant method of analysis, they should be encouraged to post questions, or research dilemmas, so that you and other students can offer advice and guidance, when required. It may be helpful if you post some questions to get the digital discussion started, for example:

- At what point in a research project does the visual analysis begin?
- What role does the gaze of the viewer have in constructing meaning about an image?
- How does framing of an image (the literal presentation and the interpretative markers) influence our interpretation of an image?
- How can software help in the analysis of visual images?

Useful terms

‘Quantitative content analysis’ of the visual is a procedure that is used to quantify visual images (and text) using reliable and previously defined categories that are exhaustive and mutually exclusive. It is a systematic method that is simple to administer, provides descriptions and enables comparisons to be made. Researchers can consider image priority (frequency, size or duration), bias in image placement or historical, social or cultural changes, for example. This type of content analysis is used to test a hypothesis.

‘Inductive content analysis’ of the visual, instead of testing a hypothesis and having predefined categories, uses an inductive approach to develop categories, identify themes and develop theory from the visual images.

‘Visual semiotics’ considers the way that visual images communicate a message through signs, the relationship between signs (including systems of meaning that these create) and patterns of symbolism. Researchers can look at dominant visual images (how they are described and what they symbolize), consider the function of messages in terms of semiotic meaning or investigate how semiotic meanings differ in terms of frequency and type of impact on viewer perception, for example.

‘Visual rhetoric’ is related to visual semiotics in that it considers the message that is being portrayed in an image and the meaning that is being communicated. However, it is a broader method of analysis in that, in addition to considering signs and symbols, it considers other forms of human communication through image, such as colours, form, medium, scale, location, audience, context and purpose. Every part of an image has significance in the message that is being communicated.

‘Psychoanalysis’ can guide the interpretation of visual images and their effects on individual spectators. Researchers work with psychoanalytic concepts to explore how they are articulated through a particular image. They are interested in issues such as space, gaze, spectator, difference, resistance and identification, for example. In particular, feminist psychoanalysts are interested in how films and media images position audiences in gendered terms that serve to disempower women or support patriarchy, for example.

‘Discourse analysis’ of the visual involves an interpretative and deconstructive reading of an image but does not provide definitive answers or reveal the truth. Using this method, researchers systematically deconstruct (and reconstruct) the various layers of meaning derived from different contexts of use. Researchers ask how images are given particular meanings, how meanings are produced and how a particular image works to persuade (with a focus on claims to truth), for example.

‘Iconographic analysis’ is used to establish the meaning of a particular image at a particular time. This type of analysis requires a familiarity with, and knowledge of, concepts and themes represented in the image, along with knowledge of any external sources on which concepts and themes can be based. Researchers also seek to gain an understanding of the content and meaning of symbolic values and representations.

‘Visual hermeneutics’ is used to seek understanding rather than offer a definitive explanation of the visual image. The hermeneutic view is that the use and understanding of visual images is based on socially established symbolic codes, and that the meaning and interpretation of images are created by social interaction between the person who created the image, the image itself and the viewer.

Related activities

- Activity 45: Using observation techniques
- Activity 46: Using visual methods
- Activity 64: Evaluating qualitative analyses
- Activity 65: Drawing conclusions from qualitative data

Preparatory reading

The Image and Identity Research Collective (IIRC) is ‘an informal network of professors, researchers, artists and other professionals interested in using images, artistic forms of representation, and/or innovative interdisciplinary research methodologies in work around issues related to identity and self-study’. There is some useful information about visual methodology and analysing visual data on this site [accessed 24 September 2015].

Chapter 8 of Paulus et al. (2013) discusses analysing images, audio data and visual data and is useful preparatory reading for this activity.

Further reading

Heath, C., Hindmarsh, J. and Luff, P. (2010) *Video in Qualitative Research*. London: Sage.

Margolis, E. and Pauwels, L. (eds) (2011) *The SAGE Handbook of Visual Research Methods*. London: Sage.

Paulus, T., Lester, J. and Dempster, P. (2013) *Digital Tools for Qualitative Research*. London: Sage.

Rose, G. (2012) *Visual Methodologies: An Introduction to Researching with Visual Materials*, 3rd edition. London: Sage.

Activity 63 Coding and Categorizing Qualitative Data

Student handout page 339

Tutor Notes

Purpose: This activity helps students to understand how to code and categorize qualitative data. It provides part of a transcript from an interview with an apprentice and asks students, in their groups, to code and categorize the data. They must then present their analysis to fellow students in a 10-minute presentation. This activity illustrates that coding and categorizing qualitative data can be done in very different ways, and that it can be a systematic, detailed, inventive and/or imaginative process, depending on student preference, theoretical perspective, methodological standpoint and personal experience.
Type: Group exercise (during independent study) followed by group presentations (in class).
Level: Intermediate and advanced.
Duration: Several hours of independent study in their groups, followed by a one-hour teaching session in which the groups make their presentations.
Equipment/materials: Students can choose equipment, materials and relevant software, which should be made available for their use, if required.
Prerequisite activities: None, although students might find it beneficial to work through Activity 61 as this gives them an overview of the different methods that can be used to analyse qualitative data.
Learning outcome: By the end of this activity students will know about the different methods and techniques that can be used to code and categorize qualitative data, and will be able to relate this knowledge to their own research, where relevant.

The activity

Divide your students into four groups (if you only have a small number of students they can undertake this activity on an individual basis; this is useful for students studying at advanced level, for example). Give each group a copy of the student handout. This asks them to work through an interview transcript, in their groups, coding and categorizing themes, topics, issues and/or concepts that they deem important. The method(s) that they choose is a group choice.

Once they have completed this task, they will make a 10-minute presentation to their fellow students, in the next teaching session, to explain how they have coded and categorized. Set aside a few minutes after each presentation for questions and answers, and a few minutes after the final presentation to discuss the issues that have been raised. For students with less experience you may need to introduce this activity with a discussion about what is meant by coding and categorizing qualitative data (see below).

Key issues

A section of transcript from an interview with an apprentice in the UK has been chosen because it has relevance and interest to most university students (permission has been granted to use the transcript). However, you can choose a more appropriate transcript for this activity, perhaps if you feel that you need it to be more relevant to your subject or country of study, or if you need a longer and more detailed transcript, for example.

If you think it would be helpful to your students you can code and categorize the transcript yourself, to illustrate how an experienced researcher might approach this task (and to introduce other coding and categorizing techniques; see below). You can let students decide whether they are going to use software to code and categorize the transcript: some groups choose to do so, whereas others do not. However, it is important not to mention specific software for this activity: if all groups decide to use the same software, alternative coding and categorizing techniques cannot be demonstrated. Again, you may find it useful to have examples of the different ways that software can be used so that students can be exposed to a wide range of techniques.

Useful terms

‘Coding’ is the process of marking parts or passages of text (or visual images) that cover the same issue, topic, theme or concept. These are marked with a name, number or colour that is associated with a longer explanation of what the code means. There are different stages or levels of coding. These can include first-stage or first-level coding (main headings) and second-stage or second-level coding (subheadings), for example.

Some students choose to code in a highly detailed and systematic way that enables them to count and quantify how many times the same issue is raised. Others choose to identify and ‘categorize’ (classify or organize into categories) general themes that can guide further data collection, perhaps using thematic analysis techniques. In some cases students choose to highlight concepts and categories and then concentrate on the conditions that have led to or influenced these concepts or categories. Students should be encouraged to discuss these different coding and categorizing techniques (you may need to highlight some of these, if they are not chosen by students during this activity).

Related activities

- Activity 61: Analysing qualitative data
- Activity 62: Analysing visual data
- Activity 64: Evaluating qualitative analyses
- Activity 65: Drawing conclusions from qualitative data

Preparatory reading

The E-Qual app has been developed by Hilary McDermott and her team at Loughborough University. It is a free interactive iPad app available from the App Store. The aim is to demonstrate the basic concept of coding qualitative data: students are able to code a section of data and compare their coding with that of an experienced researcher. More information about the E-Qual app can be obtained from the Loughborough University teaching and learning blog http://blog.lboro.ac.uk/teaching-learning [accessed 16 April 2015].

Part 2 of Bazeley (2013) contains comprehensive and detailed advice on the different methods that can be used to code and categorize qualitative data.

Further reading

Bazeley, P. (2013) *Qualitative Data Analysis: Practical Strategies*. London: Sage.

Miles, M., Huberman, M. and Saldaña, J. (2014) *Qualitative Data Analysis: A Methods Sourcebook*, 3rd edition. Thousand Oaks, CA: Sage.

Saldaña, J. (2016) *The Coding Manual for Qualitative Researchers*, 3rd edition. London: Sage.

Activity 64 Evaluating Qualitative Analyses

Student handout page 342

Tutor Notes

Purpose: This activity is a practical exercise that helps students to understand how to evaluate qualitative analyses. It asks them to evaluate a research paper (related to their own topic of research) and ensure that their own research stands up to similar rigorous evaluation.
Type: Self-guided individual exercise.
Level: Intermediate and advanced.
Duration: Several hours during independent study. The actual time taken will depend on the chosen research paper and the ease with which students can complete this task.
Equipment/materials: A research paper on a subject related to the student's research topic (chosen by the student).
Prerequisite activities: Students who are new to critiquing qualitative research papers may find Activity 12 useful as this provides guidance about how to critique this type of paper.
Learning outcome: By the end of this activity students will know how to evaluate qualitative analyses and ensure that their own research stands up to rigorous evaluation (if they are undertaking a qualitative analysis).

The activity

Give your students a copy of the student handout. This asks them to choose a research paper that reports qualitative research on a topic related to their own research. They must read the paper and undertake an evaluation, based on the information supplied in the handout. They are also asked to ensure that they address these issues in their own research so that other researchers (and tutors and examiners) can undertake a thorough evaluation of their qualitative analysis. If you feel that some of the issues presented in the handout are too advanced for your students, delete as appropriate.

Key issues

This activity is a self-guided individual exercise that students can work through at their own pace and at a time that suits them. However, if you feel that the activity would benefit from a tutor-led discussion to explain the issues in more depth, you can do so in class either before or after the individual exercise (students will need a deadline to work towards if you intend to hold the discussion after they have completed the exercise). The student handout contains information on which you can base your discussion, if you choose this option.

Useful terms

See the student handout for a discussion of terms relevant to the evaluation of qualitative analyses.

Related activities

- Activity 12: Critiquing qualitative research papers
- Activity 61: Analysing qualitative data
- Activity 65: Drawing conclusions from qualitative data

Preparatory reading

Part VII of Creswell (2016) covers the topics of evaluating a study and using qualitative designs, which is useful preparatory reading for this activity.

Chapters 2 and 12 of Braun and Clarke (2013) provide some useful information relating to qualitative research evaluation for people who are new to qualitative research.

Further reading

Braun, V. and Clarke, V. (2013) *Successful Qualitative Research: A Practical Guide For Beginners*. London: Sage.

Creswell, J.W. (2016) *30 Essential Skills for the Qualitative Researcher*. Thousand Oaks, CA: Sage.

Trainor, A. and Graue, E. (2014) 'Evaluating rigor in qualitative methodology and research dissemination', *Remedial and Special Education*, 35(5), 267–74.

Activity 65 Drawing Conclusions from Qualitative Data

Student handout page 343

Tutor Notes

Purpose: This activity asks students to think about and produce a description of the process or procedure that they intend to use to draw conclusions from their qualitative data, and present their description to fellow students for peer feedback and discussion. It is for students who are intending to carry out qualitative research and should be undertaken when they are at the stage of thinking about their methodology and methods.
Type: Individual exercise followed by individual presentation.
Level: Advanced (this activity can be adapted for students studying at intermediate level; see below).
Duration: Students will need to spend several hours during independent study to produce their description. Each student will need up to 10 minutes to present their ideas, followed by a five-minute discussion and feedback session.
Equipment/materials: Students will need access to the relevant qualitative research literature and presentation software, if required.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have thought about, developed and received feedback on the process or procedure that they intend to use to draw conclusions from their qualitative data, and will understand how the conclusions they intend to draw fit within their methodological framework and theoretical perspective.

The activity

Give your students a copy of the student handout. This asks them to produce a description of the process or procedure that they intend to use to draw conclusions from their qualitative data, which they must present to fellow students. This can be a mechanical, technical or creative process or procedure that is used to draw conclusions, and it can be described in a variety of ways, such as visually, in linear form or with the use of flow diagrams, for example.

Their descriptions should be produced during independent study and should be presented to fellow students in the next teaching session. Allow up to 10 minutes for them to make their presentation and up to 5 minutes for discussion and feedback. If contact time is limited you can ask students, instead, to present their description for discussion and feedback using the relevant digital platform.

The student handout contains information about how students must ensure that the process or procedure that they intend to use to draw conclusions must fit within their methodological framework and theoretical perspective. If you wish to use this activity for students studying at intermediate level, you can omit this information if you think it will be too complex for your students.

This activity is for students who are intending to undertake qualitative research. Alternative activities are available for students intending to undertake quantitative research (Activity 57: Analysing quantitative data, for example).

Key issues

This activity encourages students to think about how they intend to draw conclusions from their qualitative data. It is useful to undertake this activity when they are developing their methodological framework because it helps students to think about whether the types of conclusions they intend to draw are actually possible within their methodological framework. It will help them to check again that they have chosen the right methodology for the intended purpose and aims and objectives of the research, and that the types of conclusions they intend to draw will answer their research question (see Activity 17: Producing aims and objectives and Activity 18: Developing a research question).

Useful terms

In this activity ‘conclusions’ are defined as judgements, decisions or results that are based on reason and argument, developed as a research study draws to a close, after thorough and comprehensive data analysis. ‘Type of conclusion’ refers to the type of outcome, judgement or decision that can actually be produced, given methodological framework and theoretical perspective.

Related activities

- Activity 61: Analysing qualitative data
- Activity 62: Analysing visual data
- Activity 63: Coding and categorizing qualitative data
- Activity 64: Evaluating qualitative analyses
- Activity 92: Understanding methodology
- Activity 93: Asking methodological questions

Preparatory reading

Chapter 11 in Miles et al. (2014) covers the issues of drawing and verifying conclusions and makes useful preparatory reading for this activity.

Further reading

Coffey, A. and Atkinson, P. (1996) *Making Sense of Qualitative Data: Complementary Research Strategies*. Thousand Oaks, CA: Sage.

Miles, M., Huberman, M. and Saldaña, J. (2014) *Qualitative Data Analysis: A Methods Sourcebook*, 3rd edition. Thousand Oaks, CA: Sage.

Richards, L. (2015) *Handling Qualitative Data: A Practical Guide*, 3rd edition. London: Sage.

Activity 66 Knowing about Data Protection

Student handout page 344

Tutor Notes

Purpose: This activity introduces and highlights the importance of data protection. It provides real-world examples that students can analyse and relate to their own experiences, helping them to think about how they can keep their own research data safe and secure and comply with data protection legislation.
Type: Group exercise in class followed by a tutor-led discussion. If contact time is limited you can run this activity as a self-guided individual exercise during independent study.
Level: Intermediate and advanced (the level of study is reflected in the complexity of discussion).
Duration: Up to 30 minutes for the group exercise, followed by up to 30 minutes for the tutor-led discussion.
Equipment/materials: None required.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will know how to store their research data safely and securely, and understand how to comply with relevant data protection legislation.

The activity

Divide your students into small groups and ask them to consider the real-world cases contained in the student handout. They should identify the type of data protection breach that has taken place and decide what action should have been taken to prevent the breach. Follow the activity with a tutor-led discussion to talk about the issues raised and to discuss relevant data protection legislation (see below).

Key issues

Case 1

In this data security breach the burglar had potential access to the pension details of 26,000 employees, which could have been used for malicious purposes and/or sold to others for similar purposes. The breach could have caused substantial damage or distress, including harm, anxiety or injury to feelings suffered by individuals, and/or financial loss to individuals and the company. The personal data should have been protected by encryption and the laptop by strong password (containing upper- and lower-case letters, a number and a symbol, for example). The member of staff should have received training in the importance of data protection. The employers should have had a good understanding of data protection legislation and should have put in place appropriate and effective security measures.

Case 2

In this breach personal data, which were not anonymous, were published online. The breach could have caused substantial damage, distress or harm to individuals. The university should have checked all documents before they were published. All staff should have had comprehensive data protection training. The university should have introduced a robust system to manage electronic and paper systems in compliance with data protection legislation to ensure that all staff and student information was kept secure. Security should have been reviewed on a regular basis, given rapid advances in technology. Also, the university should have set up a process for deleting personal information once it was no longer required (the published information related to former staff and students).

Case 3

These data were not stored securely and were not made anonymous. The filing cabinet was used by other students, was not locked and the room was accessible to anyone in the building. The student had no idea where the missing data had gone. The student should have provided an account of how the anonymity of participants was to be protected and how the security of the data was to be guaranteed. These issues should have been discussed with his supervisor who should have received comprehensive training in data protection legislation. The student could have contacted the university data protection officer or records manager for more information and advice.

Case 4

In this data breach the portable devices were not encrypted and personal details were lost. The breach could have caused substantial damage or distress, including harm, anxiety or injury to feelings suffered by patients. All portable devices that contain personal information, including laptops and memory sticks, should be encrypted. The member of staff should have received adequate training in data protection issues. The healthcare trust should have ensured that all training was up to date and that members of staff were aware of their responsibilities. As a result of this breach the healthcare

trust had to sign an undertaking to comply with the seventh data protection principle (in the UK; see below).

In 2015 the Information Commissioner's Office (ICO) in the UK was given the right to force public healthcare organizations to carry out a compulsory audit of their data protection procedures, following similar breaches and public concern about these breaches.

Case 5

In this breach personal data, which were not anonymous, were sent to other university staff. The breach could have caused substantial damage or distress to research participants, including harm, anxiety or injury to feelings. The researcher should have had comprehensive data protection training, comprehensive IT training and should have checked the email before sending. The university should have introduced a robust system to manage electronic systems in compliance with data protection legislation to ensure that all information about research participants was kept secure. The researcher could have contacted the university data protection officer or records manager for information and advice.

Data protection legislation

The Data Protection Act 1998 is the primary piece of legislation that covers the issue of data protection in the UK. In the European Union the Data Protection Directive covers the protection of individuals in relation to the processing of personal data and the free movement of such data. At this present time, the United States does not have comparable, single piece of legislation concerning data protection. However, in March 2015 the White House released details of a draft bill (the Consumer Privacy Bill of Rights) that will require companies to explain their privacy and security systems and give customers greater control of how their data are stored and managed. The text of this draft bill can be obtained from the White House website: www.whitehouse.gov [accessed 24 July 2015].

In the UK the Data Protection Act relates to all data about living and identifiable individuals that are held, or intended to be held, on computers or in a 'relevant filling system'. This includes contact details such as telephone numbers, email addresses, names and addresses. It also includes identifiable sensitive data such as health, sex life, criminal record, politics, religion, trade union affiliation, ethnicity and race.

If students intend to store data about living and identifiable individuals they have to comply with eight important principles of the Act, which state that data must be:

- fairly and lawfully processed;
- processed for limited purposes;
- adequate, relevant and not excessive;
- accurate and up to date;
- not kept for longer than is necessary;
- processed in line with the rights of the individual;
- secure;
- not transferred to other countries without adequate protection.

If data are anonymous or aggregated (combined from several measurements) they are not regulated by the Act. In these cases extreme care must be taken to ensure that the method used to make the data anonymous or aggregated cannot be reversed in any way (see Activity 53: Storing and using data for more information).

Useful terms

A definition of ‘statistical confidentiality’ can be found in Activity 53: Storing and using data.

A ‘data management plan’ or a ‘data management and sharing plan’ is required by most funding bodies when researchers apply for research funding. This plan is used to describe the type of data that will be generated, how they will be generated and how they will be kept secure (see Activity 60: Knowing about data management for more information).

Related activities

- Activity 53: Storing and using data
- Activity 57: Analysing quantitative data
- Activity 60: Knowing about data management
- Activity 61: Analysing qualitative data
- Activity 77: Understanding legal requirements

Preparatory reading

A guide to data protection in the UK can be obtained from the ICO website: https://ico.org.uk.

The Social Research Association (SRA) in the UK has produced a publication called *Data Protection Act 1998: Guidelines for Social Research*. It is a useful and detailed publication that covers all the issues relevant to social research such as data security, disclosure of personal data from research projects and data protection scenarios. A free PDF can be downloaded from the SRA website: www.the-sra.org.uk [accessed 4 April 2015].

Carey (2015) provides interesting and comprehensive coverage of data protection law in the UK and EU.

Further reading

Carey, P. (2015) *Data Protection: A Practical Guide to UK and EU Law*. Oxford: Oxford University Press.

Craig, T. and Ludloff, M. (2011) *Privacy and Big Data*. Sebastopol, CA: O'Reilly Media.

Duncan, G., Elliot, M. and Salazar-González, J.-J. (2011) *Statistical Confidentiality: Principles and Practice*. New York: Springer.

Section 5 Disseminating Results

Activity 67 Presenting to a Lay Audience

Student handout page 345

Tutor Notes

Purpose: This activity helps students to present their research topic, purpose and methods to a lay audience by asking them to produce a description of how they would discuss and/or describe their research to three different lay audiences.
Type: Individual exercise followed by individual presentation.
Level: Advanced.
Duration: Several hours during independent study. The actual time taken will depend on individual students, their level of motivation and the ease with which they are able to think about and describe how they would present to lay audiences. Students will need adequate time to present their ideas to the rest of the class: this will depend on whether or not students have produced actual presentations (see below).
Equipment/materials: If students choose to produce an actual presentation, rather than a written description, the relevant presentation/graphics software should be made available for their use, if required.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will know how to present their research topic, purpose and methods to different lay audiences.

The activity

Give your students a copy of the student handout. This asks them to produce a description of how they would present their research topic, purpose and methods to the following three lay audiences (they can produce actual presentations if this is better suited to their research):

1. school children aged 12–13 in a classroom setting;
2. non-university friends at a social gathering;
3. lay members of a grant-awarding body.

Once they have produced their three descriptions (or presentations), ask them to present their ideas to fellow students when you next meet. Students can produce a written or visual description of how they would present their research to each lay audience, or they can produce actual presentations for some or all of the lay audiences (you will need to make sure that enough time is available for them to make their presentations, if they choose this option). If contact time is limited you can ask that descriptions and/or presentations are posted, instead, on the relevant digital platform for peer review and feedback.

Key issues

This is a useful activity to undertake with students who are studying at advanced level because it helps them to think about and describe their research activities in a simple, interesting way that will engage a variety of lay audiences. It helps them to focus their thoughts, think about what they are doing and discuss their research in a meaningful way. It also encourages them to think about how perceptions of research purpose, type and methods may differ between lay audiences.

This activity asks students to consider three very different lay audiences (and the circumstances in which they would make their presentations). It encourages them to think about issues such as appearance, speech, introductions, acronyms and jargon, brevity, visuals and graphics, stories, metaphors, analogies, anecdotes and interactivity. It also encourages them to think about and assess the previous experiences, knowledge and understanding of the particular lay audience and decide how they would pitch their presentation at the right level.

Students have been very creative when this activity has been undertaken in the past, producing visual representations of their work for school children, suggesting that they perform mimes or tell jokes about their research for friends at a social gathering, and producing a slick presentation for members of a funding body panel, for example.

Useful terms

A ‘lay audience’ is a group of spectators, listeners or readers who do not have expert knowledge on the issues that are being presented (research methodology, methods, purpose or topic, for example). ‘Lay summaries’ are short accounts of research that are targeted at a general audience and are often required for research grant applications. They are also used to encourage the wider public to become more involved in research (see Duke, 2012).

Related activities

- Activity 26: Justifying your research topic
- Activity 68: Dealing with the media
- Activity 71: Disseminating via social media
- Activity 72: Publishing online
- Activity 74: Overcoming writer’s block

Preparatory reading

Duke, M. (2012) ‘How to Write a Lay Summary’, DCC How-to Guides. Edinburgh: Digital Curation Centre. Available online: www.dcc.ac.uk/resources/how-guides [accessed 26 October 2015].

Chapters 3 and 4 of Thody (2006) provide some useful material on adapting writing for specific audiences and purposes.

Further reading

Bowater, L. and Yeoman, K. (2013) *Science Communication: A Practical Guide for Scientists*. Chichester: John Wiley & Sons.

Daly, I. and Haney, A. (eds) (2014) *53 Interesting Ways to Communicate Your Research*. Newmarket: The Professional and Higher Partnership.

Thody, A. (2006) *Writing and Presenting Research*. London: Sage.

Activity 68 Dealing with the Media

Tutor Notes

Purpose: This activity helps students to understand how to deal with the media by utilizing the skills and knowledge of an expert in the field. The specialist member of staff will offer advice, guidance and tips on issues such as producing a press release, speaking to journalists and writing articles and pieces for the media.
Type: Specialist talk.
Level: Intermediate and advanced.
Duration: One hour.
Equipment/materials: The specialist member of staff will bring in the relevant equipment and materials. In some cases you may be able to arrange a tour of your local newspaper office or TV station (see below).
Prerequisite activities: Although not prerequisite activities, students might find it of benefit to work through Activities 13 and 14, which help them to understand how science is reported by the media and how media and political bias can have an influence on the reporting of science.
Learning outcome: By the end of this activity students will understand how to deal with the media if, and when, it is required for their research.

The activity

Invite a member of staff from your university press office, communications office, public relations office or media relations office to talk to your students about dealing with the media in relation to research. This could include writing press releases about research outcomes, using the media to recruit participants or speaking to journalists about ongoing research, for example.

If you do not work for an academic institution, contact your local newspaper or local TV station to find out whether they would be willing to send someone to talk to your students. Some are even willing to invite students for a tour of their offices if they feel that there is an interesting news story that can be developed from the activity.

Key issues

This activity provides practical, up-to-date information from an expert who knows how to deal with the media. It encourages students to consider how the media could be of benefit to their research in ways that they may not previously have thought about. For example, a local newspaper can be used to recruit participants: the media expert will let students know the best way to contact the newspaper and the best way to increase their chances of having their piece published. The expert can also offer advice and guidance on producing press releases, providing information to journalists and sharing and disseminating findings via local and national media. Specific information that is provided in this activity can include:

- ensuring that comments/writing can be understood easily by the layperson (see Activity 67);
- producing a personalized account or personal stories with which members of the public can identify;
- concentrating on the overall message, rather than on intricate detail;
- understanding the news agenda and connecting your research to topical and ongoing news items;
- understanding that journalists are busy and want researchers to be brief and to the point (and that they will choose what to report and what to omit);
- not responding immediately to an inquiry from a journalist, but instead contacting the journalist back at a later time once thoughts have been organized and refined;
- practising and getting it right for live TV where there are no retakes (and understanding that accurate and uncontroversial reports or appearances tend to have less impact than mistakes or obvious howlers);
- avoiding disclosing confidential information, or negative comments about the institution;
- planning ahead if research is controversial or risky;
- passing requests on to another expert (some university press officers keep a list of experts for this type of inquiry).

Useful terms

All universities have a department or member of staff that offers advice and guidance about writing a ‘press release’ (an official statement about a particular topic that is issued by a university or company to the media). Students should be encouraged to contact this person or department before they contact the media: indeed, some universities now insist on this course of action so that they can monitor (and control) all media contact.

Related activities

- Activity 67: Presenting to a lay audience
- Activity 70: Writing journal papers
- Activity 71: Disseminating via social media
- Activity 72: Publishing online
- Activity 74: Overcoming writer’s block

Preparatory reading

Part II of Welch-Ross and Fasig (2007) provides some interesting and useful material on understanding mass media priorities and processes.

The Science Media Centre (www.sciencemediacentre.org) was established in the UK in 2002. It was originally based in the Royal Institution of Great Britain, until it became a separate charity in its own right in April 2011. Its mission is to ‘provide, for the benefit of the public and policymakers, accurate and evidence-based information about science and engineering through the media, particularly on controversial and headline news stories when most confusion and misinformation occurs’. The website contains some useful publications for scientists on topics such as why engage with the media, top tips for media work and communicating uncertainty and risk [accessed 11 October 2015].

Further reading

Filak, V. (2015) *Dynamics of Media Writing: Adapt and Connect*. Thousand Oaks, CA: Sage. Although this book is aimed at undergraduate students and early-career professionals in journalism, public relations and advertising, it has some interesting material for students from other disciplines who may be hoping to write for the media.

Tyson, W. (2010) *Capture Your Audience: Communicating with Traditional and Social Media for Scholars, Researchers, and Academic Leaders*. Sterling, VA: Stylus Publishing.

Welch-Ross, M.K. and Fasig, L.G. (2007) *Handbook on Communicating and Disseminating Behavioral Science*. Thousand Oaks, CA: Sage.

Activity 69 Presenting Conference Papers

Tutor Notes

Purpose: This activity requires students to produce and present a conference paper at a ‘micro-conference’. This is a small, informal conference that enables postgraduate students to practise presenting papers and receive constructive feedback from fellow students.
Type: Micro-conference.
Level: Advanced. This activity is for postgraduate students who are at the stage of their research where they are able to produce a suitable conference paper.
Duration: Several hours over a few weeks to write the conference paper, followed by several hours to attend, and present at, the micro-conference. A few hours will be required to organize and run the micro-conference (tutor time or student time, depending on your preference).
Equipment/materials: A suitable micro-conference venue with refreshments and the relevant presentation equipment (depending on student requirements).
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have produced, delivered and received feedback on their conference paper.

The activity

Organize a ‘micro-conference’ for your students (alternatively, you can ask that your students organize the conference). This is a short (perhaps one-day) conference that has a small number of delegates: this can be the students on your course, students in your doctoral training centre or other invited students, for example. Try to make the experience authentic by running the micro-conference as a typical academic conference would be run. The only differences are that you are going to accept all papers that have been submitted, delegates are going to attend all sessions and delegates are going to offer feedback on the content and delivery of each paper.

Inform your students when and where the micro-conference is to take place (leave enough time for them to submit an abstract, have their abstract accepted and produce a full paper). Give them a deadline by which the abstract must be submitted to you. The full paper should be finalized and ready for presentation by the date of the conference.

Organize a timetable for each presentation (30 minutes for the presentation and discussion is usually enough). Tell your students that they must present their paper at, and within, the allotted time and leave enough time for responses and feedback from delegates. This should be positive and constructive feedback about the topic, style, structure and content of the paper, and about the style of presentation. You will need to play an active role in the feedback session to ensure that positive and constructive feedback is offered and that the discussion remains relevant and useful.

If you have time you can conclude the conference with a discussion about thoughts, feelings, experiences and learning outcomes from this activity.

Key issues

The following issues can be raised in this activity:

- Abstracts should be clear and concise and should give information about the topic, methods and original contribution to knowledge. They should demonstrate clearly that the paper will be relevant to the topic of the conference, relevant to the audience and pitched at the right level (using the right terminology). All abstracts should be submitted before the stated deadline and in the correct format. It is useful for students to know how much time has been allotted for each paper at the conference before an abstract is produced.
- Students should ensure that their paper follows the criteria set by the conference organizers, in terms of length, structure and style (if relevant). They should grab attention quickly, ensuring that they stay focused on their theme and paying close attention to grammar, spelling and punctuation. Although they should not assume that everyone is an expert, they must take care not to insult the intelligence of their audience.
- When presenting their paper students should provide oral markers and cues, such as making transitions in their argument clear, dividing arguments into bullet points, finding simple ways to discuss complex ideas and making it clear when they are quoting others (lengthy quotations should be kept to a minimum). They should also prepare their visual aids and/or use presentation software where relevant (make it clear that they will need to give their technology requirements to the conference organizer before the conference takes place).
- Students should let their audience know whether they are happy to receive questions during or after their presentation. All questions should be answered with courtesy and respect. Students may need to decide whether they wish to ask delegates to refrain from live tweeting during their presentation (some conferences outlaw this, whereas others leave it to individual speakers or encourage tweeting by providing a live Twitter wall, for example).
- Students should anticipate questions and rehearse answers. It is useful to anticipate criticism so that they can rehearse arguments and prepare a defence of their ideas. Although students should be encouraged to offer positive and constructive advice in this activity, it might be useful for them to discuss how they would deal with negative comments if they should occur in the future.

Useful terms

A ‘micro-conference’ is a short conference with a small number of delegates that can be used to enable students to practise producing and presenting conference papers in a supportive and positive environment. It enables them to receive constructive feedback on their paper and presentation style.

Related activities

- Activity 70: Writing journal papers
- Activity 72: Publishing online
- Activity 73: Writing an impact statement
- Activity 74: Overcoming writer’s block

Preparatory reading

Becker (2014) in its entirety is useful preparatory reading for this activity.

YouTube (www.youtube.com) contains some interesting videos on how to present a paper at an academic conference.

Further reading

Becker, L. (2014) *Presenting Your Research*. London: Sage.

Malmfors, B., Garnsworthy, P. and Grossman, M. (2004) *Writing and Presenting Scientific Papers*, 2nd edition. Nottingham: Nottingham University Press.

Shephard, K. (2005) *Presenting at Conferences, Seminars and Meetings*. London: Sage.

Thody, A. (2006) *Writing and Presenting Research*. London: Sage.

Activity 70 Writing Journal Papers

Student handout page 346

Tutor Notes

Purpose: This activity requires students to write and submit a journal paper. It asks them to choose an appropriate journal, become familiar with manuscript and submission guidelines, write a suitable paper of the correct length and style, present it to another student for peer review, modify it and submit it to the chosen journal, if appropriate.
Type: Self-guided individual exercise, followed by peer review and feedback.
Level: Advanced.
Duration: Several hours of independent study over a few weeks to write the paper, followed by 1–2 hours for the peer review process.
Equipment/materials: Students will need access to the relevant journal databases.
Prerequisite activities: Although there are no specific prerequisite activities, students will need to be at the stage of their research where they are able to produce a scholarly paper of the right standard. If students are conducting a quantitative study they might find Activity 59 useful as this helps them to assess the validity and reliability of their research. If they are conducting a qualitative study they might find Activity 64 useful as this helps them to ensure that their research stands up to rigorous evaluation.
Learning outcome: By the end of this activity students will have produced, modified and submitted an appropriate and suitable journal paper that has been reviewed by a fellow student.

The activity

Ask your students to choose a journal to which they can submit a paper (students should be wary of ‘predatory’ journals; see ‘useful terms’, below). The relevant databases will need to be made available for their use. Once they have chosen a suitable journal, students should write a paper, following the journal guidelines (you can give them a copy of the student handout, which offers advice and guidance, if you think it would be of use to them).

When they have written their paper, ask students to swap it with a fellow student for peer review and feedback. Students should modify their paper accordingly and submit it to their chosen journal, if appropriate. Some journal editors ask that potential authors write a short letter or email about their proposed paper before they submit: students should be encouraged to do this so that they do not waste valuable time and effort producing a paper that will not be accepted.

Key issues

The student handout contains some key issues pertinent to producing and submitting a journal paper.

Asking students to undertake a process of peer review, and provide feedback, on the work of another student is useful for the following reasons:

- Giving feedback is cognitively engaging and can be more productive than receiving feedback.
- Reviewing another paper exposes students to alternative approaches and different styles. It highlights differences in standards and encourages personal improvement.
- Detecting problems in the work of fellow students helps to highlight problems in their own work.
- Students learn to offer criticism in a constructive way, providing practical advice for improvement (specific references to follow up, for example).
- Constructive feedback helps to build empathy and trust.
- Students get to understand the requirements of journal editors, and relate these requirements to the paper they are reviewing and to their own paper.
- Students gain experience in peer review and giving feedback: this is good practice and preparation for students who wish to work in academia.

Useful terms

‘Peer review’ is the assessment and evaluation of scientific, academic or professional work by others who have similar status or standing within that particular field. It is seen to be a type of ‘quality control’ that can be used in teaching, for grant applications and for journal papers, for example. Opinion is divided about the effectiveness of peer review; Smith (2006) provides an interesting discussion on the issues involved.

‘Predatory’ journals are journals that lack checks on quality and rigour, publishing papers rapidly for a high fee. They are open access journals with questionable peer-review practices and aggressive marketing campaigns. Students should be encouraged to assess the reputation and quality of journals before they write and submit a paper.

Related activities

- Activity 69: Presenting conference papers
- Activity 72: Publishing online
- Activity 73: Writing an impact statement
- Activity 74: Overcoming writer’s block
- Activity 78: Avoiding plagiarism

Preparatory reading

Murray (2013) in its entirety provides useful and comprehensive background reading for this activity.

Students at the South West Doctoral Training Centre (the universities of Bath, Bristol and Exeter, UK) have set up *TOR: The Open Review for the Social Sciences*. This is a student-led, peer-reviewed and open access journal for the social sciences. The project provides the opportunity for students to publish their work and gain experience of working on a journal, including editing and peer review. More information can be obtained from www.swdtc.ac.uk/swdtcstudentjournal-tor [accessed 4 August 2015].

Smith, R. (2006) 'Peer review: A flawed process at the heart of science and journals', *Journal of the Royal Society of Medicine*, 99(4), 178–82.

Further reading

Belcher, W. (2009) *Writing Your Journal Article in Twelve Weeks: A Guide to Academic Publishing Success*. Thousand Oaks, CA: Sage.

Murray, R. (2013) *Writing for Academic Journals*, 3rd edition. Maidenhead: Open University Press.

Thomson, P. and Kamler, B. (2013) *Writing for Peer Reviewed Journals: Strategies for Getting Published*. Abingdon: Routledge.

Weinberger, C., Evans, J. and Allesina, S. (2015) 'Ten simple (empirical) rules for writing science', *PLoS Computational Biology*, 11(4), e1004205.

Activity 71 Disseminating via Social Media

Tutor Notes

Purpose: This activity requires students to use social media to develop, share and disseminate information about their research project. It also asks them to assess and critique the use of social media for this purpose and discuss their findings with other students on their course.
Type: Individual exercise followed by a tutor-led discussion.
Level: Intermediate and advanced.
Duration: Students will be required to use social media over the duration of their research project. The time spent on this activity will depend on factors such as individual student preference, the research topic, chosen research methods, level of study and amount and type of engagement with others.
Equipment/materials: Students will need to register or have an account with their chosen social media channel(s).
Prerequisite activities: This activity is related closely to Activity 72: Publishing online. Choose the most appropriate activity for your student cohort.
Learning outcome: By the end of this activity students will have used social media to develop, share and disseminate information about their research project, and will have assessed and critiqued the use of social media for this purpose.

The activity

Ask your students to use social media to help them to develop, share and disseminate information about their research project. They should start this process at the beginning of their research and continue right through to the conclusion and writing-up stage. You may find it useful to begin this activity with a short discussion on what is meant by ‘social media’ and the type of websites and/or apps that students can use to share their information (see below).

If contact time is available, run a session with your students (mid-project or mid-term) to discuss their ongoing use of social media. Discuss strengths, weaknesses, problems they have encountered and advice they can offer to other students when using social media for developing, sharing and disseminating information. If contact time is not available you can ask students to post this information on the relevant digital platform instead.

Key issues

The main strengths of using social media to develop, share and disseminate research information are that this method is free, easy to use and can potentially reach a global audience. Students also highlight strengths by showing what social media can be used for, such as to:

- develop ideas for a research project;
- share information about their research topic and methods;
- exchange ideas with interested parties and experts in the field;
- test ideas;
- collaborate and make connections on a global basis;
- gain tips and advice from students, tutors and experts in the field;
- gain support from other students;
- build networks;
- flag up calls for papers and conference opportunities;
- disseminate results quickly and reach a wide audience.

The weaknesses of using social media to develop, share and disseminate research information can include:

- a tendency to waste time by following irrelevant leads or feeds;
- too much time taken weeding out flawed or disreputable reports, articles or feeds;
- too much clutter, irrelevant or pointless posts;
- offensive, abusive or upsetting responses;
- academic trolling (bullying by scholars who are critical of another's work);
- inappropriate boundary transgressions;
- ruining of professional reputations;
- problems with plagiarism, copyright, libel, slander or breaches of confidentiality;
- concerns over sharing information that can be 'stolen' by others.

Advice offered to other students when using social media to develop, share and disseminate information can include the following:

- Regular engagement reaps its rewards. An active presence is important to build networks and gain an 'audience' for your research. Ask questions, answer questions, chat, send constructive comments and seek advice. Keep on communicating and networking.
- Work with partners (other researchers or students, for example) to widen your research and increase engagement.
- Only share information when you have something interesting to share.
- If you are sharing papers try to make them open access so that anyone can read them.
- Only share information that you are ready to put into the public domain. Ensure that you do not share anything that could breach confidentiality or is commercially sensitive.
- Understand rules, regulations and legal issues surrounding plagiarism, copyright, libel and slander and ensure that these are not breached.
- Information can be viewed by anyone and is, potentially, available forever. Think before you post: do not post when you are angry or upset; never be abusive or offensive; and think about the

feelings of others. If you have doubts about posting something, delay acting: seek advice from others and do not post if you still have doubts. Remember your professional reputation and do not do anything online that would have a detrimental effect on this reputation.

- When sharing with researchers in your own country, share information about your research at the right time (during working hours on Monday to Thursday): if you want a quick reply do not post at midnight or at weekends as fewer people will read your posts. Obviously, time differences mean that this does not apply when sharing globally.

Useful terms

‘Social media’ is the term used to described websites and apps that enable users to create content (user-generated content), share information and/or participate in social networking across the globe. It includes social bookmarking sites (tagging and searching websites bookmarked by others), social photo and video sharing sites, social networking sites and social news sites, for example. In this activity students can choose to use social media such as Twitter, Facebook, LinkedIn, YouTube, Instagram and Flickr. There are plenty of other social media channels available: the choice should be left to students so as to take account of their personal preferences.

Related activities

- Activity 6: Using the internet for background research
- Activity 50: Using the internet as a tool for research
- Activity 67: Presenting to a lay audience
- Activity 72: Publishing online
- Activity 78: Avoiding plagiarism

Preparatory reading

The London School of Economics produces The Impact Blog, which is ‘a hub for researchers, administrative staff, librarians, students, think-tanks, government, and anyone else interested in maximising the impact of academic work in the social sciences and other disciplines’. There is an interesting blog on this site that discusses the use of social media for research collaboration and publication engagement: http://blogs.lse.ac.uk/impactofsocialsciences/2015/06/26/reading-list-using-social-media-for-research [accessed 3 August 2015].

The British Medical Association has produced a downloadable document called *Using Social Media: Practical and Ethical Guidance for Doctors and Medical Students*, which provides essential guidance about issues such as patient confidentiality, defamation law, online images and professional standing: http://www.medschools.ac.uk/SiteCollectionDocuments/social_media_guidance_may2011.pdf [accessed 3 August 2015].

Further reading

Baym, N. (2010) *Personal Connections in the Digital Age*. Cambridge: Polity Press.

Carrigan, M. (2016) *Social Media for Academics*. London: Sage. This book was published in early 2016, so I have not yet had chance to read it. However, initial indications are that it will provide useful background information for this activity.

Clemens, R. (2016) *Using Social Media for Qualitative Research: A Theoretical and Practical Guide*. Thousand Oaks, CA: Sage. This book is due to be published in early 2017. Again, I have not had chance to read it, but the indications are that it will be useful for this activity.

Sauter, T. (2014) '"What's on your mind?" Writing on Facebook as a tool for self-formation', *New Media & Society*, 16(5), 823–39.

Activity 72 Publishing Online

Tutor Notes

Purpose: This activity helps students to think about the issues involved in publishing their research online, including the different methods that can be used, the advantages, disadvantages, problems that could be encountered and advice for other students who are thinking about publishing online. It utilizes the knowledge and experiences of digitally savvy students to get the most out of the discussion.
Type: Tutor-led class discussion.
Level: Intermediate and advanced.
Duration: One hour.
Equipment/materials: None required.
Prerequisite activities: This activity is related closely to Activity 71: Disseminating via social media. Choose the most appropriate activity for your student cohort.
Learning outcome: By the end of this activity students will know about the strengths, weaknesses and problems associated with publishing online. They will understand how to overcome these problems and know how to get the most out of publishing their own research online.

The activity

Hold a tutor-led discussion with your students to discuss the following issues (if contact time is limited you can produce a student worksheet using the following questions and ask students to complete the work during independent study):

1. What are the different methods that you can use to publish your research online?
2. What are the advantages of publishing your research online?
3. What are the disadvantages of publishing your research online?
4. Can you identify any problems that could occur if you decided to publish your research online?
5. What advice would you offer to other students or researchers who are thinking about publishing their research online?

Key issues

This activity can raise the following issues, depending on your student cohort and the subject of their research.

Question 1

Ongoing research and research results can be published online in the following ways:

- blogs;
- podcasts;
- microblogging sites;
- social media;
- personal and/or university websites;
- photograph and image databases, banks and repositories;
- datasets;
- e-journals;
- online repositories;
- e-portfolios.

Question 2

Advantages include:

- rapid dissemination of data;
- worldwide reach;
- exposure to global experts;
- students can engage in complex discussion with different researchers and other students from around the world;
- networking and collaboration opportunities;
- students can receive constructive feedback about their ongoing research;
- there are no financial costs, or only minimal costs, involved for individual students.

Question 3

Disadvantages include:

- exposure to trolls;
- negative, insulting or hurtful comments about the standard and/or topic of research;
- not being taken seriously by experts in the field;
- false or misleading information can spread quickly and can be attributed to the wrong person;
- some social media or micro-blogging sites are seen to be of little worth to serious academics.

Question 4

Problems can include:

- premature or mistaken reporting of commercially sensitive data;
- accidentally publishing materials on which the copyright is held by a third party (graphs, images and diagrams, for example);
- copyright issues on the researcher's own work – if the researcher has had their work published in a journal they might not be able to publish it on their own website, for example;
- most publishers will not accept a paper for publication that has already been published elsewhere, and this can include papers that have been published on personal websites.

Question 5

Advice to other students:

- Ensure that you do not mistakenly or prematurely report commercially sensitive data. If in doubt, consult with your supervisor or funding organization.
- If a third party holds the copyright on some work you wish to publish, obtain the necessary permissions before you publish. If in doubt, seek advice from an expert.
- Find out whether you transferred copyright to the publisher if you have had a paper accepted for publication in a journal. If so, you will not be able to publish the paper elsewhere unless the publisher decides to grant you permission. However, you may be able to publish an earlier version of your paper (this could be an unformatted version of your manuscript that was sent prior to publication, for example). This practice has become widespread due to a loophole in copyright agreements that enables authors to share preprint versions of their work, although some publishers have now closed this loophole.
- If you hope to get a paper published in a journal, think carefully about whether you should place the final version on your website before you have sent it to a journal editor for acceptance and publication.
- You should check your online presence on a regular basis to make sure that that you are not being incorrectly associated or credited with work that could damage your scholarly reputation (see 'useful terms', below).
- Do not enter into bitter and prolonged arguments: keep everything on a professional, academic level (intellectual analysis and critique should be taken on board, while personal insults should be ignored).

Useful terms

An ‘Open Researcher and Contributor Identifier’ (ORCID) is a unique code that is assigned to each researcher who publishes online. This makes it easier for electronic databases to identify authors accurately. It enables researchers to attach their identity to research objects such as datasets, equipment, articles, media stories, citations, experiments, patents and notebooks. This service is not-for-profit, community-driven and free to individuals. More information can be obtained from http://about.orcid.org [accessed 18 August 2015].

Related activities

- Activity 50: Using the internet as a tool for research
- Activity 67: Presenting to a lay audience
- Activity 71: Disseminating via social media
- Activity 74: Overcoming writer’s block

Preparatory reading

Luzón, M. (2013) 'Public communication of science in blogs: Recontextualizing scientific discourse for a diversified audience', *Written Communication*, 30(4), 428–57.

The Journal of Brief Ideas (http://beta.briefideas.org) is an online platform that publishes 200-word 'idea' articles from a variety of disciplines. All 'ideas' are archived, searchable and citable, enabling researchers to share their ideas quickly with the wider research community [accessed 19 August 2015].

Further reading

Hall, G. (2013) ‘The unbound book: Academic publishing in the age of the infinite archive’, *Journal of Visual Culture*, 12(3), 490–507.

Vannini, P. (2013) ‘Popularizing ethnography: Reflections on writing for popular audiences in magazines and blogs’, *Qualitative Research*, 13(4), 442–51.

Weller, M. (2011) *The Digital Scholar: How Technology is Changing Academic Practice*. London: Bloomsbury Academic.

Activity 73 Writing an Impact Statement

Student handout page 347

Tutor Notes

Purpose: This activity helps students to write an impact summary and statement for their research (or pathways to impact attachment for students applying for research council funding in the UK). It is aimed at students studying at advanced level who need to write an impact statement for their grant application or for their research proposal.
Type: Individual exercise followed by peer feedback.
Level: Advanced.
Duration: Several hours of work during independent study, depending on the ease with which an impact statement can be produced.
Equipment/materials: Access to the relevant funding body guidelines, application procedures and attachment forms, where relevant.
Prerequisite activities: Students will find it useful to have produced a research proposal (see Activity 30).
Learning outcome: By the end of this activity students will understand what is meant by ‘impact’ and will have produced a suitable impact summary and statement in the required format for their research.

The activity

Give your students a copy of the student handout. This asks them to produce an impact summary and statement for their research, in the required format, which they must then swap with a fellow student for peer review and feedback. Students should modify their summary and statement accordingly. Student Handout 1 offers generic advice for students applying for funding, whereas Student Handout 2 is for students who are applying for research council funding in the UK.

Key issues

This activity is a practical exercise that requires students to produce an impact summary and statement for their research (or pathways to impact attachment for students applying for research council funding in the UK). It utilizes peer review and feedback to highlight strengths, weaknesses and areas for improvement in their peer's work. Students tend to become more cognitively engaged because they are offering feedback to their peers. Also, because students are encouraged to provide honest, constructive feedback in a timely manner, this activity helps to build trust, support and engagement with their peers. Advice and guidance about producing and reviewing impact statements is provided in the student handouts.

Useful terms

See the student handouts for a definition of ‘impact summary’, ‘impact statement’ and ‘pathways to impact’.

Related activities

- Activity 28: Costing a research project
- Activity 29: Producing and justifying your budget
- Activity 30: Producing a research proposal
- Activity 31: Obtaining funding
- Activity 32: Working collaboratively with others

Preparatory reading

The Medical Schools Council in the UK has published a report that highlights the effect that medical research has had on people, policy and the economy, both nationally and worldwide. The report *Health of the Nation: the Impact of UK Medical Research* provides a selection of impact statements that were submitted by medical schools as part of the research excellence framework (REF). This includes impact case studies submitted to the REF's clinical medicine, public health, primary care and health services subpanels. A PDF of the report is available from the Medical Schools Council website: www.medschools.ac.uk/Publications [accessed 18 September 2015].

The Economic and Social Research Council website (www.esrc.ac.uk) contains some useful documents that are pertinent to this activity, including 'What is Impact?', 'How to Maximize Impact' and 'Developing an Impact Strategy' [accessed 18 September 2015].

Further reading

Bastow, S., Dunleavy, P. and Tinkler, J. (2014) *The Impact of the Social Sciences: How Academics and their Research Make a Difference*. London: Sage.

Denicolo, P. (ed.) (2014) *Achieving Impact in Research*. London: Sage.

Activity 74 Overcoming Writer’s Block

Tutor Notes

Purpose: This activity provides student-centred advice and guidance about how to overcome writer's block. The information is developed into a digital resource that can be accessed at any time when required by students. This activity is of particular use for students who are writing their dissertation or thesis, but can also be of use to students who are new to writing essays and extended essays.
Type: Student-centred resource development.
Level: Beginner, intermediate and advanced.
Duration: Up to 20 minutes of tutor time to set up the resource and a few minutes over a few days to monitor the resource. Students can take up to 20 minutes to add their advice and guidance over a few days, depending on individual preference and motivation.
Equipment/materials: A suitable digital platform on which to build the resource and the required access details for all students.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have a useful resource on which to draw (and access at any time) for advice and guidance if they experience writer's block during their course.

The activity

Choose a suitable digital platform on which you can build this resource. Ensure that all students have access to this platform and that it is available throughout their course. Call it ‘Overcoming Writer’s Block’ and ask students to provide advice, guidance, information and tips about how other students can overcome this problem. Ask them to be as useful, practical and creative as possible. Explain that the resource will be available for everyone throughout their course so that, if they experience writer’s block at any time during their studies, they can access this resource for help and advice.

It is useful to undertake this activity before students are required to write their dissertation, thesis or extended essay as it will provide information, advice and guidance when they need it most. You may need to remind students to post information and you may also find it useful to post some of your own advice (perhaps to get the list started or to encourage more entries). Examples of the type of post that you can include are given below.

Key issues

Below is a selection of posts that have been made by students when this activity has been undertaken in the past (posts have been summarized, where necessary):

- Create a space for writing. Make sure there are no distractions. Make sure your space is comfortable with good lighting.
- Get into a routine for writing. Make sure that everyone knows that you are not to be disturbed when you are writing.
- Enjoy your writing. Choose a topic that is of interest, if possible. It will help you to stay motivated and remain enthusiastic.
- Read around your subject for ideas and inspiration.
- Brainstorm ideas. Write down everything you can think of without judgement. You can do this at any time, but it is best when you are relaxed and not rushing to get something done. Return to your list and sort out the most important issues or topics.
- Write down a list of bullet points with all the things you want to include. It is easier to write bullet points than complete sentences and paragraphs and it may help you to get over the block. You can write up each bullet point later when you feel it is easier to write.
- If you are finding it hard to start an essay or dissertation, don't start at the beginning. Write the middle part, your analysis or the conclusion first. Sometimes the introduction can be the hardest part to write.
- Don't put yourself under pressure, because it can be harder to write when you've got a deadline looming. Start early so that you have plenty of time to complete your work without feeling stressed out.
- Don't try to be perfect all the time. It can stifle the writing process and stop you writing. Write something down, even if you are not completely happy. Have a break and then change what you have written to make it better, if you need to.
- Don't worry about your work not being good enough. Get a draft together and go through it with your supervisor. They will offer advice about how it can be improved, if needed.
- Build a network with fellow students. Help each other through the writing process.
- Stop trying. Go out and enjoy yourself. Start again tomorrow, refreshed and invigorated.
- Use a thesaurus (paper or online) when struggling for the right word.
- Keep a notebook (or mobile device) with you at all times so that you can record ideas as soon as they pop into your head. Blocks can be overcome at very strange times: make sure you take notes so that you don't forget.
- Control your social media and texting addiction.
- If you are struggling with academic writing, write something else for a while. Maybe a poem, blog or short story. Be creative and imaginative as it can help you when you go back to your academic writing.
- Search 'overcoming writer's block' on YouTube. But don't get sidetracked.
- Read academic/PhD blogs about overcoming writer's block. They tend to talk more about 'procrastination' or 'perfectionism', but most are really covering the issue of being unable to write or finish your work. They show how it is important to set realistic goals, read around your subject, develop a good support network, have faith in yourself and your ability, know when to start (and stop) and get writing.

Useful terms

‘Writer’s block’ is a condition experienced by students/writers that prevents them from starting, continuing or completing their writing. For students it can include difficulties with getting started, forming ideas, structuring work, finding the right word(s), writing paragraphs or specific sentences, articulating arguments, summarizing and concluding. For a minority of students this problem can be stressful and cause extreme anxiety, making the writing process even more difficult.

However, students should be shown that writer’s block tends to be temporary: they will be able to overcome their block and continue with their writing if they receive sensible and timely advice. It is useful to make this advice and guidance ‘student-centred’ because students understand what their peers are experiencing and tend to take notice of each other when they encounter similar problems.

Related activities

- Activity 70: Writing journal papers
- Activity 71: Disseminating via social media
- Activity 72: Publishing online

Preparatory reading

Chapter 23 in Levin (2009) covers the issue of writer's block for students when they are writing essays.

Search 'overcoming writer's block' on YouTube and search blogs by writers, academics or PhD students for more information and advice (as suggested by students; see above). Links to the best of these can be posted on your digital resource.

Further reading

Levin, P. (2009) *Writing Great Essays*, 2nd edition. Maidenhead: Open University Press. This book is useful for beginner and intermediate students who want to know more about writing essays.

Oliver, P. (2014) *Writing your Thesis*, 3rd edition. London: Sage. This book provides detailed and sensible advice for postgraduate students.

Page, M. and Winstanley, C. (2009) *Writing Essays for Dummies*. Chichester: John Wiley and Sons. This is a useful book to recommend to students who are new to writing essays, or those who need some extra help with essay writing. It uses straightforward language to guide students through the writing process.

Activity 75 Planning and Writing a Dissertation

Tutor Notes

Purpose: This activity helps students to plan and write their dissertation by building and utilizing a support network of fellow students, alumni, tutors, specialist staff and experts in the field.
Type: Support network.
Level: Intermediate.
Duration: No specific duration: the amount of time spent on this activity (by tutors and students) will depend on the support needs of individual students and their motivation to use the resource and help fellow students.
Equipment/materials: Access to the relevant digital platform.
Prerequisite activities: Students should be at the stage of their course where they are planning and/or writing their dissertation, so most of the activities given in Section 2 of this book will be useful, although they are not prerequisite activities.
Learning outcome: By the end of this activity a useful support network will have been established to offer advice, support and encouragement to students who are planning and/or writing their dissertation.

The activity

This activity is for students who need to produce a dissertation for their undergraduate course. If you wish, it could also be adapted for postgraduate students who are planning and/or writing their thesis. The aim is to build a support network of fellow students, alumni, tutors, specialist staff and experts who can offer advice, guidance and encouragement to students. Information about the support network is initially presented in digital form. Students can access this information when they need to, and find out where they can go for further help and advice (digital or face-to-face).

Begin this activity by setting up a support network on the relevant digital platform. Make a few initial entries, for example:

- information about yourself and the advice and support you can offer, including contact details and times;
- information about relevant training sessions, seminars and workshops;
- information about any experts in the field who are willing to offer advice (such as fellow tutors or specialist staff in learner support units), along with contact details and times;
- details of any existing, and relevant, student support groups;
- advice, encouragement and support from students or alumni who have completed their dissertation (such as previous students from your course).

The digital component of the support network can also include any other information that will be of use to students. For example, RefME (www.refme.com) is a free online tool that enables students and researchers to scan the barcode of the book or journal that they are reading to create citations, references lists and bibliographies. The app creates a reference instantly in a style chosen by the student or researcher. It also includes wider references such as websites and YouTube videos. This app is of particular use to students who are writing their dissertation or thesis.

Introduce the support network to your students at the relevant time and ask them to make their own entries. This could include information about themselves, their proposed research and the ways in which they are willing to help and support fellow students. They can also post questions they may have about planning and writing their dissertation, and provide answers to questions that have been posted by other students.

Key issues

You will need to monitor the digital component of the support network to ensure that the information is correct, supportive and encouraging. You may also need to encourage students to become involved, where relevant and if required. However, not all students will use this support network. Some prefer to work independently and are motivated enough to plan and write their dissertation with little input from other people. Others find this support network invaluable and post questions, offer advice and meet up to support and encourage each other. The level of involvement should be an individual choice, and students should not be forced to take part if they do not wish to do so.

It is useful if you can convince other tutors, specialist staff and experts to post their details and/or help with queries that students might have. This provides additional information and perspectives for students and can help to reduce the amount of questions directed at you, as their research methods tutor.

Useful terms

A ‘support network’ is a group of interconnected people who provide practical and emotional support and encouragement for other people within the group. For the purpose of this activity, this includes students on the course, other students at the university, alumni, tutors, specialist support staff and experts in their field.

Related activities

- Activity 16: Choosing a research topic
- Activity 20: Choosing research methods
- Activity 74: Overcoming writer’s block
- Activity 78: Avoiding plagiarism

Preparatory reading

All three books listed below are useful for students who are planning and/or writing their dissertation. These can be listed on the digital component of your support network.

Further reading

Greetham, B. (2014) *How to Write your Undergraduate Dissertation*, 2nd edition. Basingstoke: Palgrave Macmillan.

Walliman, N. (2014) *Your Undergraduate Dissertation: The Essential Guide for Success*, 2nd edition. London: Sage.

Williams, K. (2103) *Planning your Dissertation*. Basingstoke: Palgrave Macmillan.

Section 6 Acting Ethically

Activity 76 Recognizing Ethical Issues

Tutor Notes

Purpose: This activity helps students to think about and discuss ethical issues that are pertinent to their research during a 'social think-tank'. The discussion is held in a social, supportive environment away from the classroom, so that students can take time to think about the issues involved and discuss their thoughts with fellow students.
Type: Social think-tank.
Level: Intermediate and advanced.
Duration: Up to 3 hours, at a time that suits all students, away from the classroom.
Equipment/materials: This activity should take place in a friendly, relaxed environment that is free from distractions and disturbances. If finances permit, refreshments can be provided.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will be able to recognize and address ethical issues that are pertinent to their research.

The activity

Discuss the idea of a social think-tank with your students. Find out when they would be willing and able to attend a session with fellow students to discuss ethical issues that are pertinent to their research. If you have a very diverse range of students who have family and/or work commitments, it may be difficult to arrange a session that is at a different time than your usual teaching time. If this is the case, find out whether your students would be willing and able to add an hour or so to the usual time. Explain that the social think-tank will take place at a different venue, where students can relax and take time to think about and discuss the issues in a supportive and friendly environment. Let them know that refreshments will be available (if you choose this option).

Once you have negotiated a time of day and length of time, find a venue that will be suitable for your social think-tank. Ensure that it is a venue in which all students will feel relaxed and comfortable, and where there will not be any disturbances. Your goal is to create an environment where students can feel creative, confident, relaxed and able to express their views. All views should be listened to, without criticism, so that a productive and creative discussion can take place. You may want to negotiate some group ground rules, or a code of conduct, at the beginning of the session so that all students know what is expected of them. You should act as a facilitator, encouraging discussion, ensuring that students adhere to the negotiated code of conduct, summing up and winding down.

This activity works best if you have no more than nine students. If your group is much larger than this, divide into smaller groups and run two or three social think-tanks, if you have the time available.

Key issues

This activity provides the opportunity for students to engage in a stimulating and enjoyable discussion that is seen to be less formal than those held in the classroom. As such, students are sometimes more creative and more willing to put forward imaginative ideas that can lead to an in-depth and productive discussion.

Examples of issues that can be raised in this activity are given below (these vary, depending on the level and subject of study, and on the experiences and understanding of your students).

- Acting ethically within established moral and social values. This includes:
  - respecting human dignity, privacy and fundamental rights;
  - paying close regard to animal welfare:
  - taking note of, and adhering to, issues of health and safety for all members of the research team and for research participants;
  - avoiding discrimination.
- Acting ethically within the general research aims of discovering knowledge and avoiding error. Researchers must act with integrity and honesty and must not fabricate, falsify or misrepresent data.
- Acting ethically when working with research participants. They must treat participants with dignity, privacy and autonomy, minimize harm and risk, and consider issues of informed consent and data protection. All participants should be treated with respect and nobody should be exploited, bullied or cajoled into taking part in research or into offering an opinion. Research should not cause unnecessary anxiety, stress or give rise to false hopes. Researchers must try to minimize the disruption to people's lives, and if someone has found it a distressing or upsetting experience researchers should find out why and ensure that the same situation does not occur again. When working with research participants, researchers should:
  - ensure anonymity;
  - ensure confidentiality;
  - ensure safety and security of information (see Activity 60: Knowing about data management).
- Acting ethically with vulnerable people (see Activities 88 and 89).
- Acting ethically when dealing with the wider public. Researchers must strive to promote social good through their research practice and results, and must take action to mitigate social harms through research. Research must be seen to be trustworthy and researchers should strive to ensure that their work is respected by the wider public. Conflict of interest and biased financial relationships must be avoided as these reduce levels of trust and can have a detrimental impact on specific research projects and on research practice in general (see Activities 82 and 83).
- Acting ethically when collaborating and cooperating with other researchers, academics and industry (see Activity 86). Close attention must be paid to:
  - copyright;
  - patents;
  - data protection;
  - plagiarism;
  - intellectual property.
- Acting ethically when dealing with funding bodies. Research is more likely to be supported and

funded if researchers are seen to be accountable and act with integrity. Reputable funding organizations will only fund research that meets their ethical criteria. Also, when applying for funding, researchers should only use reputable funding organizations that act ethically.

- Acting ethically when publishing and disseminating results. This involves issues of confidentiality and anonymity, in addition to respecting the wishes and rights of those who have taken part in the research. It is important to resist all sponsor/funder control of, or influence on, publication decisions.

Useful terms

‘Research ethics’ concerns the issues related to acceptable and unacceptable behaviour in the planning, conducting, analysis and dissemination of research. It involves methods, procedures and perspectives about how researchers should act and includes issues such as honesty, integrity, competence, carefulness, openness, legality, social responsibility, animal welfare and non-discrimination.

Related activities

- Activity 79: Producing a code of ethics
- Activity 80: Understanding issues of informed consent
- Activity 81: Treating participants with respect
- Activity 82: Avoiding conflict of interest
- Activity 86: Collaborating and cooperating ethically
- Activity 87: Conducting research that involves risk
- Activity 88: Conducting research with vulnerable people
- Activity 89: Conducting research with children

Preparatory reading

A publication called *Ethical Guidelines* has been produced by the Social Research Association in the UK and is available for download from their website (http://the-sra.org.uk). This is a full and comprehensive guide that covers all ethical issues for social researchers [accessed 27 September 2015].

Visit the website of the National Centre for the Replacement, Refinement and Reduction of Animals in Research for information about animal welfare in research: www.nc3rs.org.uk.

A concordat about standards and integrity in UK research has been developed by Universities UK in collaboration with research councils, the Wellcome Trust and various government departments. This 'sets out five commitments that assure Government, the wider public and the international community, that the highest standards of rigour and integrity will continue to underpin research in the UK'. A copy of the document can be downloaded from www.universitiesuk.ac.uk [accessed 27 September 2015]. You can also order a hard copy of the document from the website.

Further reading

Comstock, G. (2012) *Research Ethics: A Philosophical Guide to the Responsible Conduct of Research*. Cambridge: Cambridge University Press.

Ransome, P. (2013) *Ethics and Values in Social Research*. Basingstoke: Palgrave Macmillan.

Wiles, R. (2013) *What Are Qualitative Research Ethics?* London: Bloomsbury Academic.

Activity 77 Understanding Legal Requirements

Tutor Notes

Purpose: This activity raises awareness of the various legal requirements, rules and regulations that students need to know about in relation to their research. It adopts a brainstorming technique that enables students to raise the legal issues that are pertinent to their research topic, type and level of research.
Type: Brainstorm followed by tutor-led discussion.
Level: Intermediate and advanced.
Duration: Up to 20 minutes for the brainstorm and up to 40 minutes for the tutor-led discussion.
Equipment/materials: Interactive whiteboard, flip chart or chalkboard for the brainstorm.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will know about, and understand how to comply with, relevant legal requirements, rules and regulations associated with their research.

The activity

Brainstorm with your students the question ‘what legal requirements, rules and regulations are relevant to your research?’ Write their answers on your board or flip chart without judgement, analysis or reflection. The brainstorm is completed when the students cannot think of anything else to add. This usually takes around 20 minutes, depending on the experience and knowledge of your students. Once you have completed the brainstorm, lead a class discussion to clarify, and expand on, the issues raised (see ‘key issues’, below).

Some students may be unfamiliar with the brainstorming technique. If this is the case, ask them to give any answer they can think of in relation to the question. They are not going to be judged and they should not judge or critique the answers given by other students (even if they do not agree with another’s contribution). Each answer they give will be written on your board: the goal is to come up with a comprehensive list of legal requirements, rules and regulations, which students need to know about in relation to their research project. Brainstorming should generate free-flowing ideas, promote creative thinking, encourage participation and interaction, pool knowledge and illustrate what students already know.

If you wish to extend this activity you can allocate particular pieces of legislation to small groups of students, ask them to research the legislation and then report back to their fellow students (either in class or on the relevant digital platform).

Key issues

Legal requirements vary, depending on the type, level and subject of your students' research and the country in which they are studying and carrying out their research. Examples of possible legal requirements include:

- Human rights legislation. In the UK the 1998 Human Rights Act guarantees the right to respect for private and family life, home and correspondence. Researchers must adhere to the relevant legislation when conducting research with human beings. Similar legislation applies in other countries.
- Duty of confidentiality. This exists in UK law, although it can be difficult to interpret this law clearly because it was established through case law rather than by statute. In general, it means that confidential or sensitive information should not be disclosed to third parties without prior consent. If a person supposes that the information supplied is given in confidence, it must be treated as such. Researchers must obtain written consent if they wish to share data with other researchers (under strict terms and conditions). However, there are exceptions, such as when information is subpoenaed by police or courts or where there is an overriding duty to the public (child abuse is suspected or there are life-threatening circumstances involved, for example). Similar legislation, rules or regulation may apply in other countries.
- The common law duty of confidentiality with regard to patient information. In the UK the duty of confidentiality can be set aside in specific circumstances (where patient consent is not practicable, for example). In the UK these issues are covered by the National Health Service Act 2006.
- Consent. This must be given freely by a person who is acting voluntarily, who is sufficiently informed and who has the capacity to make a decision. In the UK legal issues relating to consent are covered in the Mental Capacity Act 2005 (England and Wales) and the Adults with Incapacity (Scotland) Act 2008 for research with adults ('adults' are aged 18 or over, although these Acts also apply to people aged 16 and 17). See Activity 80 for more information about informed consent and Activity 89 for information about issues of consent when conducting research with children.
- Data protection registration. In the UK the Data Protection Act 1998 requires every data controller (e.g. organization or researcher) who is processing personal information to register with the Information Commissioner's Office, unless they are exempt. In the European Union the Data Protection Directive covers the protection of individuals with regard to the processing of personal data and the free movement of such data. At this present time, the United States does not have comparable, single piece of legislation concerning data protection, although a draft bill (the Consumer Privacy Bill of Rights) was released in March 2015 (see Activity 66).
- A Disclosure and Barring Service (DBS) check. If research includes access to children (aged under 18) or contact with vulnerable adults, in the UK it is a requirement by law for researchers to undergo a DBS check (previously known as a Criminal Records Bureau check). Ethical approval application forms and application forms for funding will require a DBS disclosure number. Similar approval will be required in other countries. See Activity 89 for more information.
- Clinical Trial Authorization (CTA) approval from the Medicines and Healthcare Products Regulations Agency (MHRA) . This is required in the UK to ensure that products are safe and

effective, and that the quality of the product is sufficient. Similar approval will be required in other countries.

- The Freedom of Information Act 2000 and the Freedom of Information (Scotland) Act 2002. This UK legislation gives people the right to access information that is held by or on behalf of public authorities. There are certain exemptions to this right to information that are relevant to researchers and students (the right to personal information and information that has been provided in confidence, for example).

Useful terms

Institutions that employ researchers have ‘legal liability insurance’, ‘legal indemnity insurance’ or ‘professional indemnity’ arrangements for negligent or non-negligent harm, which cover for possible action brought against researchers. In most cases research ethics committees (or institutional review boards) are responsible for ensuring the adequacy of these arrangements (see Activity 85: Knowing about the ethical approval process). However, institutions’ legal liability for an employee is dependent on that employee adhering to institutional policy and procedures in relation to ethics review processes and research conduct. Students should be familiar with institutional policy before they conduct their research, where relevant.

Related activities

- Activity 76: Recognizing ethical issues
- Activity 79: Producing a code of ethics
- Activity 80: Understanding issues of informed consent
- Activity 85: Knowing about the ethical approval process
- Activity 88: Conducting research with vulnerable people
- Activity 89: Conducting research with children

Preparatory reading

In the UK the Government Social Research Profession (www.civilservice.gov.uk/networks/gsr) sets out the main areas of law that are relevant to research ethics, including information about confidentiality, consent and human rights. This website provides useful preparatory reading for this activity [accessed 29 September 2015].

Information about the Data Protection Act 1998 in the UK can be obtained from the ICO website: www.ico.org.uk [accessed 29 September 2015]. See Activity 66 for more information about data protection.

More information about CTA approval can be obtained from the MHRA website: www.mhra.gov.uk [accessed 29 September 2015].

Further reading

The Research Ethics Guidebook: A Resource for Social Scientists (www.ethicsguidebook.ac.uk) is an online resource that covers a wide range of ethical and legal issues for students and researchers [accessed 29 September 2015].

Biggs, H. (2010) *Healthcare Research Ethics and Law: Regulation, Review and Responsibility*. Abingdon: Routledge-Cavendish.

Israel, M. (2015) *Research Ethics and Integrity for Social Scientists*, 2nd edition. London: Sage.

Activity 78 Avoiding Plagiarism

Tutor Notes

Purpose: This activity helps students to avoid plagiarism by asking them to build a digital resource that offers advice, guidance and tips to fellow students about avoiding plagiarism. Students must first understand what is meant by plagiarism before they are able to offer advice to others.
Type: Student-centred resource development.
Level: Beginner.
Duration: Up to 20 minutes of tutor time to set up the resource and a few minutes over a few days to monitor the resource. Students can take up to 20 minutes to add their advice and guidance over a few days, depending on individual preference and motivation.
Equipment/materials: A suitable digital platform on which to build the resource and the required access details for all students.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have created a digital resource that they can access to help them to understand what is meant by, and to avoid, plagiarism.

The activity

Choose a suitable digital platform on which you can build this resource. Ensure that all students have access to this platform and that it is available throughout their course. Call it ‘Avoiding Plagiarism’ and ask students to provide advice, guidance, information and tips about how other students can avoid this problem. Ask them to be as useful, practical and creative as possible. This is a beneficial activity to undertake because students must first understand, and become familiar with, what is meant by plagiarism before they can offer advice to others.

Explain that the resource will be available for everyone throughout their course so that they can access it when they need it most. You may need to remind students to post information and you may also find it useful to post some of your own advice (perhaps to get the list started or to encourage more entries). Examples of the type of post that you can include are given below.

You will need to monitor the posts to ensure that the information is sound: sometimes students can post misleading or unreliable information that will need correcting or deleting. For example, if students provide advice about referencing correctly (see below), you will need to check that the appropriate referencing system for your institution is provided, and alter or modify the post, if required. If students do not post this information, it might be useful to provide it yourself, or provide a link to institutional referencing information.

Key issues

Below is a selection of posts that have been made by students when this activity has been undertaken in the past (posts have been summarized for brevity):

- Understand what is meant by plagiarism and what it covers. It can include stealing (whether deliberately or by mistake) the words, sentences, paragraphs, ideas, thoughts, results and conclusions of other students, researchers, academics or writers. It can also include the unauthorized use of computer code, webpages, graphs, pictures and illustrations, and unacknowledged assistance from other people in your work, such as lab technicians, experts in the field or fellow students.
- Plagiarism is unethical, wrong and goes against everything we are here to do. We are here to learn, to find out more and to develop our intellect and scholarly ability. We can only do this if we work hard and develop our academic skills to the best of our ability.
- Read Pears and Shields (2013) as it is really useful (see 'further reading', below).
- Use the correct referencing procedure as soon as your course begins so that you can develop good habits from the start. For example, for books, you need:
    - author's surname and initials,
    - date of publication,
    - title of the book in italics,
    - edition,
    - place of publication,
    - publisher,

    - page numbers of specific information or quotations.

      For journals, you need:
    - author's surname and initials,
    - year of publication, in brackets,
    - title of the article in quotation marks,
    - title of the journal in italics,
    - date, volume, number and/or issue of the journal,

    - page numbers of the article within the journal.

      For online sources, you need:
    - author's surname and initials (if known),
    - date of publication or last revision,
    - title of document,
    - title of complete work (if relevant),
    - URL/web address,
    - date of access.
- Don't copy chunks of text from books or journals. Read the relevant sections, think about what you have read and make a few brief notes written in your own words, acknowledging all sources as you go. This will help you to understand what you are reading and ensure that you don't use the sentences of other people in your written work.

- If you come across a useful quotation, write it down exactly, word for word. Check that you have copied it correctly if you intend to use it in an essay. In your notes, write ‘quotation’ in the margin, or use quotation marks so that you are clear that it is a quotation. Take note of all the required bibliographical details so that you can put this in your assignment. This will help you to avoid plagiarizing the work of other people.
- Write a brief summary of another person’s ideas, rather than paraphrasing particular sections (remember to take note of the source). This will help to make sure that you don’t accidentally include a paraphrase without acknowledging the source.
- Think about plagiarism in relation to social media or tweeting.
- Be careful when undertaking group work. Make sure that everyone understands what is meant by plagiarism and that they don’t make mistakes that could reflect badly on the whole group. Direct other group members to this resource or discuss plagiarism with your group members before you start your work.
- Don’t ever be tempted to use essay mills or buy or copy an essay from someone else. This could lead to expulsion and will lead to failure. We are all here to learn and you can’t learn properly if other people are doing your work for you.

Useful terms

‘Plagiarism’ involves taking the thoughts, ideas, words, arguments, results or conclusions of another person and using them as if they were your own, without acknowledgement or consent. It also applies to media such as graphs, illustrations, webpages and computer codes.

Some students studying at beginner level have not come across this term and need it explained to them in detail. Others have come across the term, but are not familiar with the details: some believe, for example, that they can reuse an idea if they reword it slightly, or that it is acceptable practice to use information they find on the internet because it is ‘publicly available’. In these examples students can plagiarize unintentionally. In other cases plagiarism may be deliberate or intentional, so it is useful to direct students to your institutional policy so that they are aware of the consequences of plagiarism (deduction of marks, a fail mark or expulsion from the university, depending on the extent and severity of plagiarism).

Related activities

- Activity 2: Finding and using primary sources
- Activity 7: Evaluating sources
- Activity 8: Recognizing statistics, facts, arguments and opinions

Preparatory reading

PlagiarismAdvice.org (www.plagiarismadvice.org) was set up as the Plagiarism Advisory Service in the UK in 2002 by the Joint Information Systems Committee (now called Jisc). The original aim of the service was ‘to address growing concerns about plagiarism and the authenticity of student work’. A wide range of resources, including teaching resources, student leaflets and information about plagiarism detection software, is available on this site [accessed 1 October 2015].

Further reading

Neville, C. (2010) *The Complete Guide to Referencing and Avoiding Plagiarism*, 2nd edition. Maidenhead: Open University Press.

Pears, R. and Shields, G. (2013) *Cite Them Right: The Essential Referencing Guide*, 9th edition. Basingstoke: Palgrave Macmillan.

Williams, K. (2009) *Referencing and Understanding Plagiarism*. Basingstoke: Palgrave Macmillan.

Activity 79 Producing a Code of Ethics

Student handout page 349

Tutor Notes

Purpose: This activity is a practical exercise that requires students to produce a code of ethics that they can give to their research participants. Advice and guidance about what to include in their code is provided in the student handout.
Type: Self-guided individual exercise.
Level: Intermediate and advanced.
Duration: Several hours of work during independent study. The actual time taken will depend on the ease with which students can undertake this activity, the level at which they are studying, their topic, the type of research and the level of understanding and engagement of their research participants.
Equipment/materials: Access to the relevant ethics literature.
Prerequisite activities: Students might find it useful to have taken part in Activity 76, which is a social think-tank to discuss ethical issues pertinent to their research.
Learning outcome: By the end of this activity students will have thought about, researched, developed, tested and modified their code of ethics, which is to be given to their research participants.

The activity

Give your students a copy of the student handout. This asks them to produce a code of ethics that can be given to their research participants (usually in written form, but if their participants cannot read, or there are language difficulties, students may need to think about producing their code of ethics in an alternative format). The structure, type, length and content of their code of ethics will depend on their research topic, level and type, and on the level of understanding and engagement of research participants. The student handout offers advice and guidance about how to produce a suitable code of ethics.

Once students have produced their code of ethics, they should test it with a member of the public (preferably someone who is similar to the type of people who will be sampled in their research). They should check that their code is easily understood and provides the required amount of information in the required format. If you feel it will be of benefit, you can ask students to submit their code of ethics to you (or a fellow student) for review and feedback before they test their code with a member of the public. Once they have received feedback, they should modify their code accordingly.

Key issues

Students will need to think about the content and depth of information required, and how this can be presented in a way that will be understood and acknowledged by research participants. They will also need to think about their research participants and the type, amount and level of information that they would want to be given. Topics that can be considered for inclusion are listed in the student handout (you can delete any that are not appropriate for your students).

Useful terms

A ‘code of ethics’ in research is a statement produced by the researcher that outlines the ethical standards that will be adopted by the researcher. Different versions can be produced: a longer version for researchers and collaborators, a shorter version for research participants, for example. This activity requires students to produce a code of ethics that is to be given to research participants, so the length, content, style and structure will depend on research subject, type and level, and the type of research participants (for example, professionals with prolonged contact, who understand the research process, may require more detailed information than participants who have fleeting contact and have little interest in, or knowledge of, the research process).

Related activities

- Activity 76: Recognizing ethical issues
- Activity 80: Understanding issues of informed consent
- Activity 81: Treating participants with respect
- Activity 82: Avoiding conflict of interest
- Activity 87: Conducting research that involves risk
- Activity 88: Conducting research with vulnerable people
- Activity 89: Conducting research with children

Preparatory reading

The British Psychological Society has produced a comprehensive *Code of Ethics and Conduct*, which can be downloaded from www.bps.org.uk [accessed 29 September 2015].

The Social Research Association in the UK has produced a publication called *Ethical Guidelines*, which can be downloaded from http://the-sra.org.uk [accessed 29 September 2015].

Professional codes of ethics are discussed in Chapter 2 of Ransome (2013).

Further reading

Farrimond, H. (2013) *Doing Ethical Research*. Basingstoke: Palgrave Macmillan.

Ransome, P. (2013) *Ethics and Values in Social Research*. Basingstoke: Palgrave Macmillan.

Activity 80 Understanding Issues of Informed Consent

Student handout page 350

Tutor Notes

Purpose: This activity is a practical exercise that helps students to think about informed consent in relation to their own research project. It asks them to produce an information sheet that can be given to potential participants before their research project begins, so that people can make an informed decision about whether or not to take part in the research.
Type: Self-guided individual exercise followed by tutor feedback.
Level: Intermediate and advanced (students will need to be at the planning, design or development stage of their research project).
Duration: Several hours during independent study.
Equipment/materials: Access to the relevant literature.
Prerequisite activities: None, although this activity is linked closely with Activity 76: Recognizing ethical issues.
Learning outcome: By the end of this activity students will have thought about, produced and received feedback on an information sheet that can be given to potential research participants to help them decide whether or not take part in the research.

The activity

Give your students a copy of the student handout. This asks them to produce an information sheet that can be given to potential research participants to help them make an informed decision about whether or not to consent to taking part in the research. Ask your students to produce their information sheet and hand it in to you for feedback. Having received feedback, they should modify their information sheet accordingly.

Key issues

The following issues can be raised in this activity:

- The amount of information required to help participants decide whether or not to take part in a study varies from study to study. It can depend, in part, on the type of research, the topic, the research population (level of education and understanding, or whether they belong to a 'vulnerable' group, for example), the moral stance of the researcher and dissemination methods.
- Some students may decide to include a 'consent form' with their information sheet, which must be signed by the participants before they take part in the research. If students choose to do this, they must pay close attention to issues of anonymity and confidentiality. Also, signed consent forms may not be appropriate for some types of research, so students should be encouraged to think carefully about whether such a form is required (some funding bodies and ethics committees, however, will insist on the use of appropriate consent forms). If students are dealing with 'vulnerable' groups, they must ensure that the participants understand, and agree to, what they are signing. These participants may need to take time to discuss the issues with a responsible and trusted adult, for example.
- In certain circumstances it may be difficult to obtain informed consent before the research takes place (in observation studies or where non-anonymized data from a different study are used, for example). In these cases students should illustrate how they would obtain consent post hoc, if possible. For other types of research (such as bio-bank research) researchers can ask that participants provide 'broad' consent that enables data to be used for additional research projects in the future.
- Students should take cultural factors into account when considering issues of informed consent; Halkoaho et al. (2015) provide a discussion on these issues.
- Students must be mindful of legal frameworks and regulations that relate to issues of informed consent. For example, in the UK this can include the Data Protection Act 1998 and the Human Rights Act 1998 (see Activity 77: Understanding legal requirements).

Useful terms

See the student handout for a definition of ‘informed consent’.

Related activities

- Activity 76: Recognizing ethical issues
- Activity 79: Producing a code of ethics
- Activity 81: Treating participants with respect
- Activity 87: Conducting research that involves risk
- Activity 88: Conducting research with vulnerable people
- Activity 89: Conducting research with children

Preparatory reading

The Social Research Association (SRA) in the UK has produced *Ethical Guidelines* that cover the issue of informed consent in depth. These guidelines can be downloaded from the SRA website: http://the-sra.org.uk/research-ethics/ethics-guidelines [accessed 24 August 2015].

The Economic and Social Research Council (ESRC) in the UK has produced a document called the *ESRC Framework for Research Ethics*, which lays out the principles, procedures and minimum requirements for all types of research supported by the ESRC, including a detailed section on informed consent. The document can be downloaded from the ESRC website: www.esrc.ac.uk/aboutesrc/information/framework-for-research-ethics [accessed 24 August 2015].

Further reading

Bowman, D., Spicer, J. and Iqbal, R. (2012) *Informed Consent: A Primer for Clinical Practice*. Cambridge: Cambridge University Press.

Halkoaho, A., Pietilä, A.-M., Ebbesen, M., Karki, S. and Kangasniemi, M. (2015) 'Cultural aspects related to informed consent in health research: a systematic review', *Nursing Ethics*, doi: 10.1177/0969733015579312.

Activity 81 Treating Participants with Respect

Student handout page 351

Tutor Notes

Purpose: This activity helps students to understand what is meant by treating participants with respect. It asks them to identify, during independent study, examples (current and/or historical) where researchers have *not* treated participants with respect. A tutor-led discussion in the following teaching session discusses what is meant by treating participants with respect, why it is so important and how students can ensure that they do this in their own research.
Type: Individual exercise (during independent study) followed by a tutor-led discussion.
Level: Beginner, intermediate and advanced (the level will be reflected in the complexity of discussion).
Duration: Several hours spread over a week for students to monitor relevant channels and to find out about historical cases, and a one-hour session for the tutor-led discussion.
Equipment/materials: Students will need access to the relevant channels and platforms over a week.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will know what is meant by treating participants with respect, understand why this is important and know how to apply these issues to their own research.

The activity

Give your students a copy of the student handout at the end of a teaching session. This asks them to look out for cases where research participants have not been treated with respect, over the next week, and report back during a tutor-led discussion when you next meet. They can consider present-day and historical cases, using local and national newspapers, television, social media, micro-blogging sites, blogs, websites and any other relevant channel or platform.

Lead a discussion on treating participants with respect when you next meet with your students (if contact time is short you can ask that students post their findings and begin a discussion on the relevant digital platform, or you can develop the activity into a student worksheet to be worked through during independent study). Examples of questions that can be discussed include:

1. What is the definition of ‘respect’?
2. What do we mean by ‘treating participants with respect’?
3. What examples have you found where participants were not treated with respect?
    1. What happened?
    2. Why did the researchers act in this way?
    3. What were/are the consequences of their actions?
    4. What could or should the researcher have done differently?
4. Why is it important to treat participants with respect?
5. When you carry out your research what can you do to ensure that you treat your participants with respect?

Key issues

The type and level of discussion in this activity depends on your subject and level of study (this activity tends to have a great deal of relevance to students studying healthcare or social work courses, for example, and an in-depth and complex discussion can arise among students who have previous work experience in these areas). This activity can raise the following issues:

- Informed consent must be obtained: this must be voluntary, free and given by a person who has the capacity to make the decision (see Activity 80: Understanding issues of informed consent).
- Research participants should not be coerced, bullied, cajoled or offered undue inducement to take part in research or to offer an opinion. It should be made clear that participants, once they become involved, can leave a study at any time they wish.
- Researchers must not exploit participants (perhaps because researchers are in a position of power, wealth or greater knowledge, for example).
- Some research participants may be vulnerable, perhaps because of their age, social status or position of powerlessness. Proxies or guardians may need to be involved, and special care must be taken to ensure that the relationship between proxy or guardian and the participant is not affected by taking part in the research.
- Becoming a research participant can affect people in different ways. Some people may find participation a rewarding process, whereas others may not. Taking part in a research study should not give rise to false hopes or cause unnecessary anxiety. Researchers must try to minimize the disruption to people's lives and should monitor participants as the study progresses to ensure that there are no problems.
- Conflict of interest must be avoided (or disclosed, if it cannot be avoided; see Activity 82).
- All information should be kept confidential, safe and secure (see Activity 66: Knowing about data protection).
- All results should be shared with participants, and they should be given the opportunity to make comments, if they wish.
- Poor research practice gives research (and researchers) a bad name. It enables others to denigrate, belittle or attack research (and researchers).
- Participants who have been treated with disrespect may not take part in research again. They may feel upset, angry, annoyed, cheated or betrayed. Researchers need human participants in order to develop medicines, improve practice and enhance understanding. They should do everything they can to ensure that people are willing to participate in future projects.

Useful terms

‘Respect’ is about having due regard for a person’s feelings, emotions, wishes and rights. Researchers need to take steps to ensure that they treat their participants with respect: this includes respecting their dignity, privacy and autonomy, ensuring that harm and risk is minimized and paying close attention to issues of informed consent, data protection, data security, confidentiality and anonymity.

Related activities

- Activity 76: Recognizing ethical issues
- Activity 79: Producing a code of ethics
- Activity 80: Understanding issues of informed consent
- Activity 87: Conducting research that involves risk
- Activity 88: Conducting research with vulnerable people
- Activity 89: Conducting research with children

Preparatory reading

The National Institutes of Health Department of Bioethics in the USA has produced a document called *Research Ethics: How to Treat People who Participate in Research*. It lays out seven principles for ethical research: social value, scientific validity, fair subject selection, favourable risk–benefit ratio, independent review, informed consent and respect for the enrolled subject. The document can be downloaded from http://bioethics.nih.gov/education [accessed 30 September 2015].

The RESPECT guidelines are 'intended to form the basis of a voluntary code of practice covering the conduct of socio-economic research in Europe'. The full code, along with other useful information about ethics, scientific standards and compliance with the law, can be downloaded from www.respectproject.org/code [accessed 30 September 2015].

Further reading

Emanuel, E.J., Grady, C., Crouch, R.A., Lie, R.K., Miller, F.G. and Wendler, D. (eds) (2008) *The Oxford Textbook of Clinical Research Ethics*. Oxford: Oxford University Press.

Pettit, P. (2015) *The Robust Demands of the Good: Ethics with Attachment, Virtue, and Respect*, Oxford: Oxford University Press. Chapter 3 of this book presents an interesting philosophical discussion on how respect is given.

Activity 82 Avoiding Conflict of Interest

Student handout page 352

Tutor Notes

Purpose: This activity helps students to recognize when, where and how conflict(s) of interest occurs in research studies, understand how conflict can influence research processes and outcomes, and develop ways to ensure that they avoid conflict of interest in their own research. Students are asked to find, analyse and critique some research (current or historical) in which conflict of interest has occurred, relate this to their own research and post and share this information with fellow students.
Type: Student-centred resource development.
Level: Beginner, intermediate and advanced (the level of study will be reflected in the complexity of posts).
Duration: Several hours during independent study to find, review, analyse and post the information, and a few minutes to monitor the posts of other students. The actual time taken will depend on the ease with which students are able to undertake this activity. Around 20 minutes of tutor time will be required to set up the relevant digital resource, with a few minutes to monitor the posts.
Equipment/materials: A suitable digital platform on which to build the resource and the required access details for all students. They will also need access to the relevant literature and resources.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have developed a useful resource that will help them to recognize conflict(s) of interest in the work of other researchers and understand how to avoid conflict of interest in their own research.

The activity

Give your students a copy of the student handout. This asks them to choose a research study (current or historical) where there is, or has been, conflict(s) of interest. They must describe the research; discuss the conflict of interest; analyse how this has influenced (or could potentially influence) the research process or outcomes; discuss how this conflict could or should have been avoided; and develop ways to avoid conflict of interest in their own research.

They are to post their findings on the relevant digital platform. It is useful to set a deadline by which all posts should be made. Ensure that students read the posts made by fellow students, as this will be a useful resource that will help them to recognize and avoid conflict of interest. You will also need to monitor the posts to make sure that information is correct and cannot be considered libellous, defamatory or derogatory (using an internal platform for this activity is probably the best course of action).

This activity has been developed as a student-centred resource (rather than taking up contact time) because the topic may not be of personal relevance to all students in your group. However, if it is of specific and immediate relevance to your students (perhaps if you are teaching employees in a private company or students who are part of a research team in which there could be conflict of interest) then you could, instead, use class contact time to hold a tutor-led discussion on these issues.

Key issues

There are various conflicts of interest that can occur during a research project. These influences could be the personal, political or financial interests of the researcher(s), the financial or reputational influence of the employer or the political influence of a particular funding body, for example. These conflicts can occur at various stages of the research process, from choosing a research topic through to disseminating (or withholding) results.

Conflict of interest should be avoided so that research integrity can be maintained. However, if this is not possible it needs to be declared and managed carefully. Some conflicts will need only a written declaration to be kept within the organization/university records, whereas others will need a detailed action plan about how the conflicts will be managed. Institutional policy is provided to help researchers recognize, declare and manage conflict of interest.

There are various techniques that students can use to avoid conflict of interest (depending on the type of research and level of study):

- Increase personal awareness and learn how to recognize and identify when conflict of interest occurs.
- Ensure that research is not influenced (or seen to be influenced) by any internal or external interests. This can include personal, political or financial interests, for example.
- Ensure that there is no personal gain involved (other than completing a successful research project and gaining further research experience).
- Understand why research is commissioned (if relevant) and be clear about the justification for the research.
- Find out about the funding body, the employer and other researchers on the team.
- Seek out information that will help you to comply with current rules and regulations. For example, large funding bodies will have detailed guidelines and policy about conflict of interest and universities offer training related to regulations and their financial conflict of interest policy.
- Break all ties with the person or organization that is causing the conflict of interest, if possible.

Useful terms

‘Conflict of interest’ refers to a situation where a person or organization is in a position to derive some kind of personal (or organizational) benefit from the research that is to be conducted. It occurs when a researcher, team member, funding body or organization has conflicting interests that affect the integrity of the research. These conflicts can be financial or political, or can be to do with commitment or loyalty, for example. Conflicts can be actual or perceived (by the wider public): students need to pay close attention to both types, especially where large sums of money are involved or where the research is politically sensitive, for example.

Related activities

- Activity 15: Recognizing research(er) bias
- Activity 76: Recognizing ethical issues
- Activity 79: Producing a code of ethics
- Activity 81: Treating participants with respect
- Activity 83: Understanding biased financial relationships
- Activity 84: Recognizing and managing the funding effect

Preparatory reading

Part 4 of Moore et al. (2005) provides some interesting material on conflict of interest and public policy research.

Further reading

Lo, B. and Field, M. (eds) (2009) *Conflict of Interest in Medical Research, Education, and Practice*. Washington, DC: National Academies Press.

Moore, D., Cain, D.M., Loewenstein, G. and Bazerman, M.H. (eds) (2005) *Conflicts of Interest: Challenges and Solutions in Business, Law, Medicine, and Public Policy*. Cambridge: Cambridge University Press. A digital version of this book was published in 2010.

Rodwin, M. (2011) *Conflicts of Interest and the Future of Medicine: The United States, France, and Japan*. New York: Oxford University Press.

Activity 83 Understanding Biased Financial Relationships

Student handout page 353

Tutor Notes

Purpose: This activity helps students to understand how biased financial relationships can influence research topics, methods and outcomes. It asks them to work through, and discuss, five real-world scenarios that present different biased financial relationships.
Type: Group exercise followed by a tutor-led discussion. If contact time is limited students can undertake this activity as a group or individual exercise during independent study.
Level: Intermediate.
Duration: Up to 30 minutes for the group exercise followed by up to 30 minutes for the tutor-led discussion.
Equipment/materials: None required.
Prerequisite activities: None. However, this activity covers similar ground to Activity 84, so you should choose the most appropriate activity for your students.
Learning outcome: By the end of this activity students will be able to recognize when and how biased financial relationships have an influence on research topics, methods and outcomes.

The activity

Divide your students into small groups and give each group a copy of the student handout. This asks students to consider five real-world scenarios and provide answers, in their groups, to the questions posed. Follow the group exercise with a tutor-led discussion on the issues that have been raised.

Key issues

This activity can raise the following issues:

- Examples of biased financial relationships are: funding that comes with strings attached; researchers who own shares in the funding organization or the body commissioned to carry out the research; payments and incentives given to members of the research team; funding that originates from unethical practice.
- Biased financial relationships can occur at various stages of the research process. For example, they can influence the topic of the research, the design of the project, the methodology, the reporting of results, or they can be the reason for the research being conducted in the first place.
- Funding organizations can supress results until they believe market conditions are favourable, or can supress results that portray them or their product unfavourably. They can also insist on maintaining editorial control of publications and dissemination of data.
- When large sums of money are involved in a research project it can attract misconceptions and rumours about biased financial relationships and misconduct. Researchers must pay close attention to perceptions of research integrity as well as actual research integrity.
- When reviewing, analysing and critiquing the work of other researchers, students should consider the following:
    - Who funded the research? Is this made clear in the research paper? If not, why not? Is it possible to find out who funded the research?
    - Who is the researcher? What other work has he or she published? Does this work differ greatly in content, scope and method? If so, can this be justified? Is there any indication that the content, scope and methods have been influenced by funding?
    - When was the paper published? Is the material up to date? Was there any delay in publication and, if so, why? Can this delay be justified?

Useful terms

‘Funding bias’ and ‘sponsorship bias’ are terms that relate to the observation that research conclusions support the interests of the funding body. Safeguards are used to detect and reduce such biases (for example, the system of peer review that requires experts to review the work of colleagues as a form of quality control and self-regulation).

‘Publication bias’ and ‘reporting bias’ are terms that relate to the influences on what is published, when it is published and how it is published. This can take several forms: for example, positive results might be reported more quickly and more often than negative results; funding bodies with a financial stake may suppress certain results; or topics that are not high on the political or scientific agenda may be harder to publish.

‘Funding effect’ is a term that has been coined by social scientists to explain why research outcomes are sometimes significantly different in publicly funded and privately funded research. More information about the funding effect is provided in Activity 84.

Related activities

- Activity 11: Critiquing quantitative research papers
- Activity 12: Critiquing qualitative research papers
- Activity 15: Recognizing research(er) bias
- Activity 82: Avoiding conflict of interest
- Activity 84: Recognizing and managing the funding effect

Preparatory reading

Krimsky, S. (2013) ‘Do financial conflicts of interest bias research? An inquiry into the “funding effect” hypothesis’, *Science, Technology & Human Values*, 38(4), 566–87.

Lexchin, J. (2005) ‘Implications of pharmaceutical industry funding on clinical research’, *Annals of Pharmacotherapy*, 39(1), 194–7.

Further reading

D' Angelo, J. (2012) *Ethics in Science: Ethical Misconduct in Scientific Research*. Boca Raton, FL: Taylor and Francis Group.

Hammersley, M. and Traianou, A. (2012) *Ethics in Qualitative Research: Controversies and Contexts*. London: Sage.

Activity 84 Recognizing and Managing the Funding Effect

Student handout page 355

Tutor Notes

Purpose: This activity is an entertaining way to raise awareness of the 'funding effect' on research. Students are asked to take part in a role-play (a committee meeting attended by researchers, the company director and shareholders), which raises 'funding effect' dilemmas and ethical issues related to the funding (and control) of research outcomes and dissemination of data. The role-play is followed by a class discussion to expand on the issues raised.
Type: Role-play.
Level: Intermediate and advanced.
Duration: Ten minutes to introduce the role-play and for students to prepare their roles. Twenty minutes for the role-play and up to 30 minutes for the class discussion.
Equipment/materials: A venue that is suitable for the role-play.
Prerequisite activities: None. However, this activity covers similar ground to Activity 83, so you should choose the most appropriate activity for your students.
Learning outcome: By the end of this activity students will be able to recognize possible funding effects on research carried out by others and to eliminate, manage or control the funding effect on their own research, where relevant.

The activity

This activity is a role-pay of a committee meeting to discuss when and how the results of some research about a particular breakfast cereal (funded by the cereal manufacturer) should be disseminated. The meeting is attended by members of the research team, the director of the cereal company and some company shareholders. You will chair the committee, to ensure that the meeting progresses well.

Divide your class into two groups: the first group is to undertake the role-play and the second is to observe (if the class is small, all students can take part in the role-play: you can add more shareholder roles, if necessary). Give your students a copy of the student handout and assign a role to each student.

After 20 minutes of role-play (or longer if it is proceeding well) lead a class discussion on the issues raised. Students should be encouraged to talk about how the cereal company has influenced the research outcomes and publication of results (if at all) and, if relevant, discuss the methods that were adopted by the researchers to overcome problems with any possible funding effect. This will vary, depending on how well the roles have been played. You should relate this discussion to students' own research projects, where relevant.

Key issues

Companies that fund research into their own products have a commercial interest in ensuring that the research results are favourable. They can adopt a variety of methods to do this, such as pressurizing researchers into misreporting results or choosing researchers who are more compliant or have lower ethical standards, for example. Pressure can come from company directors, employees or shareholders. However, researchers should resist this pressure, even if they are desperate to further their research careers. They should work with integrity, adhering to a strict code of ethics/conduct, so that these problems can be avoided (see Activity 79).

Researchers (and students, if applying for funding) can reduce, manage or eliminate the funding effect by:

- voluntarily refusing to accept funding that is seen to be influenced by the funding body (where there is a predetermined conclusion, for example);
- steering clear of funding bodies that take part in unethical practices;
- approaching with caution funding bodies that have a significant financial stake in the outcome of a study;
- finding out whether the funding body has a history of influencing research methods or outcomes to promote their financial goals;
- only using funding bodies that have a strict code of ethics that includes issues of financial conflict of interest (see Activities 79 and 82);
- checking all funding contracts carefully to ensure that all investigator decisions, publication decisions and editorial control remain with the researcher;
- ensuring that the funding contract includes a clause stating that funders cannot interfere with research methods, results or publication;
- reaching agreement about reporting methods and publication time-frames;
- avoiding signing non-disclosure agreements before they are funded;
- updating their knowledge and/or training in research methods, paying attention to the particular types of bias that can influence how research is chosen, conducted, analysed and/or reported (see Activity 15).

Useful terms

‘Funding effect’ is a term that has been coined by social scientists to explain why research outcomes are sometimes significantly different in publicly funded and privately funded research. Initially, this effect was seen to occur mostly in drug research. However, it is possible for it to be present in all types of funded research. Krimsky (2013) provides an interesting and comprehensive insight into the funding effect on research.

Related activities

- Activity 11: Critiquing quantitative research papers
- Activity 12: Critiquing qualitative research papers
- Activity 15: Recognizing research(er) bias
- Activity 79: Producing a code of ethics
- Activity 82: Avoiding conflict of interest
- Activity 83: Understanding biased financial relationships

Preparatory reading

Krimsky, S. (2013) 'Do financial conflicts of interest bias research? An inquiry into the "funding effect" hypothesis', *Science, Technology & Human Values*, 38(4), 566–87.

Lundh, A., Sismondo, S., Lexchin, J., Busuioc, O. and Bero, L. (2012) 'Industry sponsorship and research outcome', *Cochrane Database of Systematic Reviews* 12.

Further reading

Comstock, G. (2012) *Research Ethics: A Philosophical Guide to the Responsible Conduct of Research*. Cambridge: Cambridge University Press.

Resnik, D. and Elliott, K. (2013) 'Taking financial relationships into account when assessing research', *Accountability in Research*, 20(3), 184–205.

Activity 85 Knowing about the Ethical Approval Process

Tutor Notes

Purpose: This activity introduces students to the ethical review and approval process (required for all research that involves human subjects). It utilizes the knowledge and experience of a professional member of staff who can demonstrate how the process works, discuss when approval is required and guide students through the application process.
Type: Specialist talk.
Level: Intermediate and advanced.
Duration: One hour.
Equipment/materials: The specialist member of staff will bring in the relevant materials, such as sample application forms and guidance notes (paper or digital).
Prerequisite activities: None, although students may find it useful to have worked through Activity 76: Recognizing ethical issues.
Learning outcome: By the end of this activity students will understand the ethical approval process, know whether they need to apply for ethical approval and, if so, know how to make an application.

The activity

Invite a member of staff from your university research ethics committee to talk to your students about the process of ethical approval at your institution. If you do not have an ethics committee at your institution, find out about your local ethical approval and review body and ask whether a member of staff would be willing to talk to your students. If not, you will need to run this session yourself.

Ask the member of staff to describe the ethical approval procedure, discuss when ethical approval is required and bring in examples of (or links to) all the forms and guidance notes that students will need to apply for ethical approval (if relevant).

Key issues

Universities have a panel or committee that is responsible for ethical issues within the university. Tasks and remits vary, depending on the country and type of university, but in general the work of ethics committees (and ethics subcommittees) within universities is to:

- undertake reviews of individual research ethics applications, or provide advice and guidance to individual departments or schools about how to undertake their own reviews;
- offer guidance in cases of uncertainty about whether an ethical review is needed;
- protect the safety of research participants and ensure that all research meets the highest academic standards of quality, honesty, integrity and ethics;
- reassure researchers that their proposals have taken account of ethical issues and all risk, and that proposals are ready for submission (to funding bodies or higher-level ethical review committees, for example);
- hear appeals against decisions that have been made by schools or departments;
- offer advice on ethical issues in research;
- promote recognition and understanding of ethical issues in research among members of staff;
- keep abreast of external ethical issues in research and ensure that the university responds to all external obligations and requirements.

Medical or clinical research, in many countries, requires outside approval from a specialist ethics committee or review board. University research ethics committees will be able to offer advice about whether this is the case and, if so, provide contact details of the relevant committee or review board.

The information given below has been summarized from a document called *Defining Research*, which has been produced by the National Research Ethics Service in the UK and can be downloaded from www.hra.nhs.uk/documents/2013/09/defining-research.pdf [accessed 3 October 2015]. Although rules and regulations vary between countries, ethical approval will almost certainly be required for research involving human subjects where:

- the research will generate new knowledge;
- hypotheses will be generated and tested;
- themes will be identified and explored following an established methodology;
- a clear research question has been developed and the research seeks to answer the question;
- the research has well-defined aims and objectives to answer the research question;
- data on human subjects are to be collected (additional to data collected for routine care, for example);
- the research will involve some type of intervention;
- the sampling frame is underpinned by theoretical justification;
- the study involves randomization.

Examples of research that may not need approval include the following (rules and regulations may vary between countries):

- A review of existing literature.
- Research that does not involve human beings or data about them.

- Quality assurance activities or evaluation projects designed for self-improvement or programme evaluation, not intended to contribute to new and generalizable knowledge.
- Clinical audits or service evaluations that are undertaken to provide information that will help to ensure that the best care is given, where existing data are analysed and there is no allocation of intervention or randomization.
- Usual medical practice where the goal of the activity is to benefit a specific and well-defined group of people in a predictable and calculable way, such as blood donations and vaccinations.
- Usual public health practice. This can include monitoring and surveillance of an outbreak or incident using systematic, statistical methods, for example. Data are used to ascertain the source of the outbreak and assess risk, but do not affect treatment.
- The use of public datasets. Researchers must not merge any of the sets in a way that individuals can be identified and must not enhance the public dataset with identifiable, or potentially identifiable, data. The use of restricted datasets and those that require the signing of a user agreement may need approval. More information about datasets is provided in Activity 56.

Useful terms

‘Research ethics committees’ and ‘institutional review boards’ are bodies that have been set up around the world to protect the rights, safety, health and well-being of human subjects involved in clinical trials, medical research and any other research that involves human subjects. The work of approval and review bodies is to assess, and make rulings on, the suitability of research proposals, investigators, research methods and facilities.

Related activities

- Activity 76: Recognizing ethical issues
- Activity 80: Understanding issues of informed consent
- Activity 81: Treating participants with respect
- Activity 87: Conducting research that involves risk
- Activity 88: Conducting research with vulnerable people
- Activity 89: Conducting research with children

Preparatory reading

The Health Research Authority provides detailed information about applying for approval and the review process for medical research in the UK (www.hra.nhs.uk/news/rec). Contact details for all National Health Service research ethics committees can be obtained from this website.

The Medical Research Council has produced a Health Research Authority decision tool (www.hra-decisiontools.org.uk/research) that helps students and researchers in the UK to find out whether their work is classed as research.

Further reading

Farrimond, H. (2013) *Doing Ethical Research*. Basingstoke: Palgrave Macmillan.

Israel, M. and Hay, I. (2006) *Research Ethics for Social Scientists: Between Ethical Conduct and Regulatory Compliance*. London: Sage.

Activity 86 Collaborating and Cooperating Ethically

Tutor Notes

Purpose: This activity helps students to think about the issues involved in collaborating and cooperating ethically by asking them to undertake a role-play in which they must develop a ‘code of ethical cooperation’. This code must be presented to, and discussed with, their potential collaborators.
Type: Role-play.
Level: Intermediate and advanced.
Duration: A one-hour session.
Equipment/materials: None required.
Prerequisite activities: None, although this activity would work well with Activity 32: Working collaboratively with others.
Learning outcome: By the end of this activity students will know about, and will be able to apply, issues of ethical conduct when collaborating and working cooperatively with other researchers.

The activity

Divide your students into two groups. One group is a team of researchers from your home country and the other group is a team of researchers from another country. There is a possibility that the two teams can work together on an international research project (it is useful if you assign a specific project, relevant to your subject or discipline). However, before the research can get underway the teams must develop a ‘code of ethical cooperation’.

Ask your students, in their roles, to think about the issues that are involved in ethical cooperation and collaboration. They are to develop a code that addresses these issues, which they must present to, and discuss with, the other team. Allow up to 30 minutes for the teams to discuss and develop their codes with their team members, and up to 30 minutes for the teams to present their codes to each other (15 minutes for each team). At the end of the activity you can ask the two teams whether or not they would begin a collaboration project, based on their codes of ethical cooperation and on the discussion they have just held.

If you have a large number of students you can divide your class into four groups and run the exercise twice (simultaneously).

Key issues

Issues that can be included in a code of ethical cooperation include the following:

- All team members must be trustworthy and accountable and must act with mutual respect and fairness.
- All team members must be treated with respect and courtesy. Requests for help, information, meetings, and so on should be dealt with promptly and efficiently.
- An overall communication routine should be established, with team members encouraged to take part in personal and informal exchange.
- All researchers must act with integrity. If conflicts of interest arise they must be disclosed and managed, following the relevant institutional guidelines (see Activity 82).
- All team members must treat participants with dignity, privacy and autonomy. Informed consent must be sought, and harm and risk must be minimized (see Activity 80).
- Roles and functions within the project should be made clear from the outset, and every team member should understand, and meet, their commitments. There should be a healthy balance in duties such as mentorship and grant writing.
- Management and leadership issues must be addressed from the outset. All team members must know their manager and to whom they are accountable. Special attention must be given to problems that can arise when two very different management cultures are merged.
- Budgets need to be clear and transparent so that all team members understand what money is available, where it has come from and what is available for their use.
- Ownership issues must be addressed from the outset. This can include ownership of equipment that was bought with grant funds for use on the research project. It can also include ownership of research output:
    - All team members must adhere to accepted author protocols concerning published material, including parity in first authorship.
    - Agreement must be reached concerning data release, intellectual property, the sharing of potentially sensitive information, patents and copyright.
- A suitable data management and sharing plan must be established and all team members must understand, and adhere to, the plan (see Activity 60).
- Credit should be shared appropriately.

Useful terms

‘Collaboration’ projects help to share and transfer skills and knowledge, generate knowledge and ideas, increase research output and raise the profile of researchers and their work. They are carried out for political, economic, scientific, professional and social reasons. Collaboration can be between individual researchers in centres of excellence or interdisciplinary research groups, between sectors such as academia and industry, and internationally between individual researchers, research teams or scientific departments, for example.

Related activities

- Activity 32: Working collaboratively with others
- Activity 76: Recognizing ethical issues
- Activity 79: Producing a code of ethics
- Activity 82: Avoiding conflict of interest
- Activity 83: Understanding biased financial relationships
- Activity 84: Recognizing and managing the funding effect

Preparatory reading

The UK government has made available five model research collaboration agreements for universities and companies that wish to undertake collaborative research projects together: www.gov.uk/government/publications/lambert-toolkit-model-research-collaboration-agreements [accessed 1 October 2015]. These provide an insight into the issues that should be considered when working collaboratively with other researchers and organizations.

The European Science Foundation (ESF) has produced a *European Code of Conduct for Research Integrity*, which includes collaboration and cooperation ethics. The document can be downloaded from the ESF website: www.esf.org/fileadmin/Public_documents/Publications/Code_Conduct_ResearchIntegrity.pdf [accessed 1 October 2015].

Further reading

Anderson, M. and Steneck, N. (eds) (2011) *International Research Collaborations*. New York: Routledge.

Griffin, G., Bränström-Öhman, A. and Kalman, H. (eds) (2013) *The Emotional Politics of Research Collaboration*. New York: Routledge.

Activity 87 Conducting Research that Involves Risk

Tutor Notes

Purpose: This activity has been designed for students who are thinking about, or intending to conduct, research that involves some kind of risk (actual or perceived). It begins first with a class brainstorm and then builds and utilizes a support network of fellow students, tutors, researchers, specialist staff and experts in the field to offer advice, guidance, support and encouragement for students throughout their research project.
Type: Brainstorm and support network.
Level: Beginner, intermediate and advanced.
Duration: Up to 40 minutes in class for the brainstorm and to introduce the support network. The amount of time spent using the support network will depend on the needs of individual students and their motivation to use the resource and help fellow students. A few minutes of tutor time will be required to monitor the digital component of the support network.
Equipment/materials: An interactive screen, board or flip chart, and access to the relevant digital platform.
Prerequisite activities: There are no specific prerequisite activities, although it might be useful for students to have thought about the ethical issues involved in research (see Activity 76).
Learning outcome: By end of this activity students will understand what is meant by research that involves risk and will know where to go for help and support if their research project involves risk (to participants and/or to students).

The activity

This activity is for students who are thinking about, or intending to, conduct research that involves risk (actual or perceived). It begins with a brainstorm and then goes on to build a support network of fellow students, tutors, researchers, specialist staff and experts who can offer advice, guidance, support and encouragement for students throughout their research project. Information about the support network is initially presented in digital form. Students can access this information when they need to, and find out where they can go for further help and advice (digital or face-to-face).

Begin this activity by setting up a support network on the relevant digital platform. Make a few initial entries. This can include, for example:

- information about yourself, other researchers and experts, and the advice and support that can be offered, contact details and contact times;
- information about training sessions, seminars and workshops that are relevant to conducting research that involves risk;
- details of any existing, and relevant, student support groups;
- examples of previous research that involved risk, conducted by researchers at your institution;
- links to relevant institutional rules, regulations, policy or protocols concerning ethics and risk;
- information about the risk assessment procedures required by your institution (or relevant funding body) before a research project can start;
- links to useful resources and references (see below).

In your next teaching session hold a brainstorm on what is meant by ‘research that involves risk’ (see ‘key issues’, below). Write students’ answers on your screen/board/flip chart without judgement, analysis or reflection. The brainstorm is completed when the students cannot think of anything else to add. This usually takes around 20 minutes, depending on the experience and knowledge of your students. When the brainstorm has finished, refine and clarify the issues raised (these can be added to your digital resource).

Once you have done this, introduce the support network to your students. Explain the purpose: to provide information, guidance, support and encouragement for students engaged in research that involves risk. Ask them to monitor the digital component of the support network, making their own entries when required or when relevant. This could include information about themselves, their proposed research and the way that they are willing to help and support fellow students, for example. They can also post questions or concerns they have about conducting research that involves risk, and provide answers to questions or concerns that have been posted by other students.

You will need to monitor the digital component of the support network to ensure that the information is correct, constructive, supportive and encouraging. You may also need to encourage students to become involved in the support network, and encourage face-to-face support, where relevant and if required.

Key issues

Not all students will use this support network. Some research will not involve risk (or a perception of risk), and some students prefer to work independently and are motivated and confident enough to plan and conduct their research with little input from others. However, other students find this support network invaluable and post questions, offer advice and meet up to support and encourage each other. The level of involvement should be an individual choice, and students should not be forced to take part if they do not wish to do so.

The following list provides examples of research that can involve risk. These will have arisen from your brainstorm and should be included in the digital component of your support network (some students are unaware that their research will involve risk and are surprised to hear it mentioned during the brainstorm):

- research that can cause psychological harm (stress, anxiety, discomfort or humiliation, for example);
- research that can lead to social, cultural, political or economic harm (embarrassment among peers, loss of employment or criminal prosecution, for example);
- research involving sensitive topics (sexual behaviour, violent behaviour, illegal behaviour, abuse or exploitation, for example);
- research involving vulnerable groups (children and young people, those with a learning disability or cognitive impairment or individuals in an unequal power relationship, for example – see Activities 88 and 89);
- research that involves intrusive interventions (vigorous exercise, the administration of drugs or alternative therapies, for example);
- research that involves access to confidential and personal records;
- covert research that involves deception (in cases where the participants are unaware that the research is taking place, do not know its purpose and/or participants have not given informed consent, for example);
- research that may require the researcher to take part in, or observe, illegal or unlawful behaviour;
- research that places the researcher in danger (physical threat or abuse, psychological trauma or compromising situations, for example);
- research that requires the use of a proxy (the participant is too ill or is older with diminished decision-making capacity, for example) where the relationship between proxy and participant could be affected;
- research that requires the researcher to get involved through an initial gatekeeper who may hold influence, control or power over research participants.

Useful terms

Research that involves ‘risk’ is research that could lead to danger, harm, peril, fear, loss or jeopardy for the research participants and/or for the researcher. Risk should be minimized so that the extent of harm is not significantly greater than that encountered in everyday life, or when undertaking medical or psychological tests (often referred to as ‘minimal risk’).

Most institutions require that a formal ‘risk assessment’ takes place before a research project can start. This will consider the risks, harms, costs and benefits of the research, and look at whether it is possible to reduce risks. This assessment will help students to understand about informed consent and how possible risks must be disclosed so that participants can make an informed choice (see Activity 80).

Related activities

- Activity 76: Recognizing ethical issues
- Activity 79: Producing a code of ethics
- Activity 80: Understanding issues of informed consent
- Activity 81: Treating participants with respect
- Activity 88: Conducting research with vulnerable people
- Activity 89: Conducting research with children

Preparatory reading

The Social Research Association in the UK has produced a *Code of Practice for the Safety of Social Researchers*, which can be downloaded from their website: http://the-sra.org.uk/sra_resources/safety-code [accessed 2 October 2015]. This is a comprehensive guide that includes issues such as clarifying responsibilities, budgeting and planning for safety and assessing risk.

A document called *Responsible Research: Managing Health and Safety in Research* can be downloaded from the Institution of Occupational Safety and Health website: http://bit.ly/1ObnhEp [accessed 2 October 2015]. It has been produced in association with the Universities and Colleges Employers Association and the Universities Safety and Health Association and provides a useful guide on health and safety issues in research. Although this document has been produced in the UK it is relevant to researchers worldwide.

Further reading

Dickson-Swift, V., James, E. and Liamputtong, P. (2008) *Undertaking Sensitive Research in the Health and Social Sciences: Managing Boundaries, Emotions and Risks*. Cambridge: Cambridge University Press.

Kyriakakis, S., Waller, B. and Kagotho, N. (2015) 'Conducting safe research with at-risk populations: Design strategies from a study with unauthorized immigrant women experiencing intimate abuse', *Qualitative Social Work*, 14(2), 259–74.

Sikweyiya, Y. and Jewkes, R. (2013) 'Potential motivations for and perceived risks in research participation: Ethics in health research', *Qualitative Health Research*, 23(7), 999–1009.

Activity 88 Conducting Research with Vulnerable People

Student handout page 357

Tutor Notes

Purpose: This activity helps students to understand what is involved in conducting research with vulnerable people by asking them, in small groups, to develop research scenarios and related ethical dilemmas that can be discussed in class.
Type: Scenario development for class discussion.
Level: Beginner, intermediate and advanced (the level will be reflected in the complexity of scenario, ethical dilemma and discussion).
Duration: Several hours of group work during independent study and 1 hour of contact time in class.
Equipment/materials: None required.
Prerequisite activities: None, although this activity can be run together with Activity 76: Recognizing ethical issues or Activity 80: Understanding issues of informed consent.
Learning outcome: By the end of this activity students will have a deeper understanding of the issues involved in conducting research with vulnerable people, and will be able to relate this to their own research project.

The activity

Divide your students into three groups and give them a copy of the student handout. This asks each group, during independent study, to develop a scenario about a researcher who intends to conduct research with vulnerable people. Students can choose the research topic, type of research, methods, purpose, impact and any other relevant information they wish to include in their scenario. Once they have done this, they should produce some ethical dilemmas associated with their scenario. Ask your students to present their scenario and ethical dilemmas for discussion in your next teaching session. Allocate 20 minutes per group.

This activity works well because it enables students to choose research topics and methods that are of interest and related to their subject and level of study. It helps them to develop a fictional situation in which they can discuss the ethics of conducting research with vulnerable people, in a supportive and non-threatening environment. They are then able to relate the discussion to their own research, if relevant.

Key issues

Students tend to be creative and imaginative in this activity, developing interesting scenarios and ethical dilemmas that can lead to a constructive and informative discussion. Ethical dilemmas that can be raised and discussed during this activity include the following (depending on level and subject of study):

- How can the researcher take into account the physical, social and psychological well-being of vulnerable people? How can the researcher demonstrate that care will be taken to avoid harm for those taking part in the research and for those affected by the research?
- How can the researcher provide sufficient and detailed information about confidentiality, anonymity, data protection and data security? How can this information be provided in a way that can be understood by vulnerable groups (see Activity 79: Producing a code of ethics)?
- How is ethical conduct influenced by boundaries of professional competence? How does this impact on vulnerable groups (researchers interviewing traumatized individuals without the appropriate expertise or researchers conducting statistical analyses without the appropriate statistical training, for example). What can be done to overcome these problems?
- Is the researcher fully aware of their legal obligations (in terms of child protection issues and appropriate police check requirements, for example; see Activity 77).
- Do vulnerable people fully understand the issue of informed consent? Are they able to give informed consent? Has the researcher provided details about the research in a way that can be understood? Do people understand that they are free to decline to take part? If the researcher is in a position of authority (a practitioner researcher such as a teacher, for example), do people feel pressurized into taking part (see Activity 80)?
- Do vulnerable people fully understand issues of privacy? Has the researcher explained what is meant by respect for privacy (participants do not need to disclose information if they do not want to) and by protecting privacy (the researcher will not disclose information without their explicit consent)? Privacy issues can be pertinent to individuals and to communities.
- Has the researcher paid close attention to the venue? Will participants be comfortable (physically and emotionally) in the chosen venue? Will they feel pressurized or stressed because of the venue? Is the venue safe and familiar?
- How will taking part in the research affect vulnerable people? Will taking part cause unnecessary stress, anxiety, negative emotions or secondary traumatization? Is the research absolutely necessary? If it is necessary, have support arrangements been put in place (counsellors, supportive friends at the interview or available afterwards, for example).
- Has the researcher paid close attention to the conclusion of the research? For example, when working with vulnerable people, close and prolonged contact between researcher and participant can build relationships that are difficult to conclude.

Useful terms

‘Vulnerable’ people or groups are those that are, or have been, exposed to harm, attack or influence (physically, mentally or emotionally) and/or those that are in need of special care, support or protection because of disability, age, neglect or risk of abuse. In terms of research participants, vulnerable people can potentially include:

- children under 18 years of age;
- people who lack mental capacity (adults with learning difficulties or with Alzheimer’s disease, for example);
- people who have only a basic understanding of the language being spoken or written by the researcher;
- people who have experienced physical, mental or emotional harm, trauma, stress or abuse;
- people who find it difficult to give free and voluntary informed consent, for example, in situations where the researcher is in a position of authority; a gatekeeper holds a position of influence; a person is too ill, or disabled, to make a decision; a person feels that they will receive better treatment if they take part; or a person feels something will happen to them if they do not take part.

Related activities

- Activity 76: Recognizing ethical issues
- Activity 77: Understanding legal requirements
- Activity 79: Producing a code of ethics
- Activity 80: Understanding issues of informed consent
- Activity 81: Treating participants with respect
- Activity 87: Conducting research that involves risk
- Activity 89: Conducting research with children

Preparatory reading

Daley, K. (2015) 'The wrongs of protection: Balancing protection and participation in research with marginalised young people', *Journal of Sociology*, 51(2), 121–38.

Witham, G., Beddow, A. and Haigh, C. (2015) 'Reflections on access: Too vulnerable to research?' *Journal of Research in Nursing*, 20(1), 28–37.

Further reading

Dickson-Swift, V., James, E. and Liamputtong, P. (2008) *Undertaking Sensitive Research in the Health and Social Sciences: Managing Boundaries, Emotions and Risks*. Cambridge: Cambridge University Press.

Liamputtong, P. (2007) *Researching the Vulnerable: A Guide to Sensitive Research Methods*. London: Sage.

Activity 89 Conducting Research with Children

Student handout page 358

Tutor Notes

Purpose: This activity helps students to think about the practical and ethical issues involved in conducting research with children. It asks them to work through five examples of research projects that involve children and discuss the ethical issues, practicalities, difficulties and action that can be taken to overcome the difficulties that have been identified.
Type: Group exercise followed by tutor-led discussion.
Level: Beginner, intermediate and advanced (the complexity of discussion will reflect the level of study).
Duration: Up to 40 minutes for the group discussion and up to 20 minutes for the tutor-led discussion (if contact time is limited this activity can be run as a group or individual exercise during independent study).
Equipment/materials: None required.
Prerequisite activities: None, although this activity can be run together with Activity 80: Understanding issues of informed consent for students studying at intermediate and advanced level.
Learning outcome: By the end of this activity students will have a greater understanding of the practical and ethical issues involved in conducting research with children and will be able to apply this understanding to their own research.

The activity

Divide your students into small groups and give them a copy of the student handout. This asks them to work through five examples of research projects that involve children. They should consider each example with their group members and discuss the practical and ethical issues, the difficulties that might be encountered and strategies that can be utilized to overcome the difficulties that they identify. Allocate up to 40 minutes for this discussion. After this time, lead a discussion to clarify and develop the issues that have been raised.

If contact time is limited you can ask students to undertake this activity as a group or individual exercise during independent study. They can then post their discussion points on the relevant digital platform for peer review and feedback, or hand the work in to you for tutor feedback.

Key issues

Below are examples of discussion points for each case described in the student handout. Some of these points apply to more than one case and, therefore, have not been repeated.

Case 1

- Permission in writing will need to be obtained from the head teacher. Comprehensive information about the research will need to be provided, which could include:
  - importance, value, interest and impact;
  - safety and ethics;
  - relevant police checks;
  - disturbances to school routine and staff time.
- Teachers should not recruit the children as they could choose pupils for a particular reason (they think they will be 'good' at the tests, for example).
- Children should not feel pressurized into taking part, perhaps because a teacher has said that they should.
- Conducting research in schools may influence children to provide what they perceive to be the right answers (when they think an adult 'expert' is present, for example). Also, children will need to be made aware that this is not a test and that any answer or result is valid.
- Parental consent will be required, so parents will need details of the research. If parents and/or teachers want to sit in on the data collection process they will need to be advised of their neutrality, and should not be tempted to influence or interpret the collection process. Parental consent should be sought before the child's consent (or assent), to avoid problems with a child agreeing only to find that a parent does not agree.
- A member of the research team could be recruited to liaise with members of staff in the school and with parents. This person could be available for questions and to resolve problems as they arise.

Case 2

- Will participants feel comfortable being interviewed on this topic in a 'specialized unit'? Are they familiar with the venue? Will an alternative be offered, if they are not comfortable?
- Young people of this age will be required to give informed consent. Are they able to do so? Do they understand what the research is about, what is expected of them and what will happen to the results? In certain circumstances it may be advisable to seek parental consent, in addition to the young person's consent.
- If any of the young people are too ill or vulnerable, a practitioner or gatekeeper may need to be involved to offer advice and to work out an acceptable way to proceed. Tools, methods and venues may need to be adapted to suit individual needs.
- Young people, and possibly parents and gatekeepers, will know who has taken part in the research. Very careful reporting will be required to ensure that participants are not identifiable. If this cannot be guaranteed, it must be made clear from the outset so that participants understand possible consequences of participation.

Case 3

- Children are excluded from school for a wide variety of reasons. Some will have a problematic home life and may have poor relationships with their parents. Will parents be willing to give informed consent? Will children be willing to consent (or assent)? For 'looked-after children' on a full care order, a social worker will need to provide consent. In certain circumstances it is possible to waive the need for parental consent (where a child is using a service such as a drug referral unit without their parents' knowledge, for example).
- All interviews and focus groups must take place in a non-threatening, safe and comfortable environment.
- Do the researchers have the required experience to explore the emotional and mental health needs of these children? Do they understand how participation could affect the children?
- Will participants share sensitive and personal information in a focus group setting? Will participants understand about not sharing with third parties information that has arisen in the focus group? Is the age range too great for a focus group on this topic? Ground rules should be set from the outset and ice-breakers, creative methods and visual props can be used to encourage participation.

Case 4

- Co-researchers must be chosen carefully (by the researchers and not by a 'gatekeeper' such as a college tutor, for example, as this could bias the research).
- This research could potentially include vulnerable young people and sensitive topics. Are young co-researchers well trained and able to deal with the issues that this research could raise? Is it really necessary to use young co-researchers? Can their use be justified? If so, how are they to be trained?
- Participants will need to provide informed consent, and co-researchers will need to understand these issues thoroughly so that they can explain them to others.
- Participants could potentially be admitting to illegal behaviour (underage drinking). Co-researchers need to understand that information could be subpoenaed by the police or courts.
- A risk assessment should be conducted to identify things that could go wrong, make contingency plans and identify risks that can be avoided.

Case 5

- Child abuse tends to be hidden from view. Young people are too ashamed, frightened, confused or too young to report problems. How are researchers to obtain their data?
- If researchers are able to meet with participants, they must be trusted, well trained and able to deal with vulnerable children. They must choose a safe environment to meet and ensure that no child is put in danger when taking part in the research. There could be problems with seeking parental consent.
- It is difficult to use self-completion questionnaires with children under the age of 12 or with those who have learning difficulties, unless someone is present to offer support. This person should be a researcher, rather than a gatekeeper who could influence the data collection in some way. The researcher will need the required professional competence to carry out this role.

- If existing statistics are to be used, care must be taken to ensure that all data are anonymized and cannot be traced to their origin. Data security, data protection, confidentiality and anonymity are extremely important in this type of study, and the researcher must have professional competence in these areas.

Useful terms

The UN Convention on the Rights of the Child (1989) defines a ‘child’ as ‘every human being below the age of eighteen years unless under the law applicable to the child, majority is attained earlier’. It states that every child has the right:

- to life, survival and development;
- to a name and nationality;
- to know and be cared for by his or her parents;
- to preserve his or her identity;
- to express his or her views freely and to freedom of thought, consciousness and religion;
- to health care and to benefit from social security;
- to a decent standard of living;
- to education, rest, leisure and play;
- to protection of the law;
- to protection from economic and sexual exploitation;
- to protection from harm including drugs, sexual abuse, torture, neglect or punishment.

However, different societies and cultures categorize children and young people differently: there are different ages at which a child is required (or expected) to attend school, different ages at which a young person can get married and different ages at which a young person can have a child, for example. Also, within one country there may be different laws that specify various age limits that make the definition of ‘child’ confusing (in the UK the age of consent, age of criminal responsibility and age at which alcohol can be consumed are all different, for example). Students will need to be mindful of these issues when conducting research with children.

Related activities

- Activity 76: Recognizing ethical issues
- Activity 77: Understanding legal requirements
- Activity 79: Producing a code of ethics
- Activity 80: Understanding issues of informed consent
- Activity 81: Treating participants with respect
- Activity 87: Conducting research that involves risk
- Activity 88: Conducting research with vulnerable people

Preparatory reading

The Research Centre of the National Children's Bureau (NCB) in the UK has produced documents called *Guidelines for Research with Children and Young People* and *Involving Children and Young People in Policy, Practice and Research*. These documents, and further information about research with young people, are available on the NCB website: www.ncb.org.uk [accessed 5 October 2015].

Researchers working in Scotland who are intending to undertake research with children on a regular basis can consider joining the Protecting Vulnerable Groups (PVG) Scheme run by Disclosure Scotland. More information about this scheme can be obtained from www.disclosurescotland.co.uk/disclosureinformation/pvgscheme.htm [accessed 5 October 2015].

Further reading

Greig, A., Taylor, J. and Mackay, T. (2013) *Doing Research with Children: A Practical Guide*, 3rd edition. London: Sage.

Groundwater-Smith, S., Dockett, S. and Bottrell, D. (2015) *Participatory Research with Children and Young People*. London: Sage.

Sargeant, J. and Harcourt, D. (2012) *Doing Ethical Research with Children*. Maidenhead: Open University Press.

Section 7 Developing Deeper Research Skills

Activity 90 Knowing about Epistemology and Ontology

Student handout page 359

Tutor Notes

Purpose: This activity helps students to get to grips with epistemology and ontology by asking them, in groups, to teach a 20-minute session to their fellow students.
Type: Peer teaching.
Level: Advanced.
Duration: Several hours to plan their teaching session in their groups during independent study. Twenty minutes for each group to teach their session, with a few minutes for questions, if time is available.
Equipment/materials: Students can use any equipment, technology or props that they feel appropriate, and these should be made available for their use.
Prerequisite activities: This activity can be run together with Activity 94: Locating epistemological and methodological standpoint.
Learning outcome: By the end of this activity students will have a good understanding and knowledge of epistemology and ontology and will be able to relate this to their own research project.

The activity

Divide your students into three groups and give each group a copy of the student handout (if you only have a small number of students you can ask that they undertake this activity on an individual basis). The student handout asks them to work together in their groups to prepare and practise a 20-minute teaching session about epistemology and ontology, which they must deliver to their fellow students when you next meet. Allow a few minutes after each delivery for a question-and-answer session, if time is available.

Key issues

Asking students to teach about epistemology and ontology is a useful way to help them to get to grips with these complex issues. Each group can approach this activity in a different way: this aids understanding and enhances learning by enabling students to use and apply, to each 20-minute session, what they have learned during independent study. Conducting this activity in groups also encourages support and encouragement between group members for a task that, for some students, can be difficult and daunting (the group members can decide who and how many of them will teach the session).

This activity is a useful exercise for students who are hoping to teach in academia as it will help them to think more about how to plan and deliver their teaching sessions.

Useful terms

‘Epistemology’ is concerned with the study of the nature of human knowledge and how it is acquired. It refers to what we accept as knowledge, how we know what we know and how belief is justified. It asks what constitutes valid knowledge and how we can obtain (and build) knowledge. Epistemology is fundamental to thought, the acquisition of knowledge, the reliance on senses, the ability to reason and the development of concepts, hypotheses and social theory.

‘Ontology’ is concerned with the nature and structure of the world and how it can be articulated. It refers to the nature of being, becoming or existing and the hierarchies, categories or conceptualizations that are used for articulation. It asks what constitutes reality and how we can understand (and explain) existence. ‘Ontology’ can have slightly different meanings for students approaching from different subjects (human geography or information sciences, for example), and this will be reflected in the teaching sessions that are produced and delivered by students.

Related activities

- Activity 91: Asking epistemological questions
- Activity 94: Locating epistemological and methodological standpoint
- Activity 95: Understanding theoretical perspective

Preparatory reading

Part I of Pritchard (2014) provides useful background reading for this activity.

Academia.edu (www.academia.edu) is a platform for academics to share research papers. It can be used to search for researchers who have an interest in epistemology and ontology, and to find papers on these subjects.

Further reading

Audi, R. (2011) *Epistemology: A Contemporary Introduction to the Theory of Knowledge*, 3rd edition. New York: Routledge.

Effingham, N. (2013) *An Introduction to Ontology*. Cambridge: Polity Press.

Pritchard, D. (2014) *What is This Thing Called Knowledge?*, 3rd edition. Abingdon: Routledge.

Activity 91 Asking Epistemological Questions

Tutor Notes

Purpose: This activity encourages epistemological dialogue by asking students, in pairs, to describe the epistemological assumptions they have made in relation to their own research. They must then answer epistemological questions posed by their partner, which will help them to focus their thoughts, clarify ideas and develop further insight (using the Socratic method as a tool).
Type: Collaborative dialogue.
Level: Advanced.
Duration: Several hours during independent study and up to 1 hour in class.
Equipment/materials: Students will need access to epistemological literature and information about the Socratic method.
Prerequisite activities: Activity 90: Knowing about epistemology and ontology is useful.
Learning outcome: By the end of this activity students will have focused in on, developed and clarified the epistemological assumptions they have made in relation to their research. They will be less likely to form beliefs that lack justification and avoid claiming knowledge where it is possible only to hypothesize.

The activity

Inform your students that they are to undertake epistemological dialogue using the Socratic method (see below for a definition). They must research what is meant by ‘epistemology’ (see Activity 90 for a definition) and find out how to use the Socratic method to encourage dialogue. They will also need to think about the epistemological assumptions they have made (or will make) in relation to their own research, and think about epistemological questions that they can ask their partner. Ensure that your students have enough time during independent study to carry out these tasks before the next session.

When you reconvene, divide your students into pairs. Ask one student to describe the epistemological assumptions they have made in relation to their own research. The other student should listen to this description, asking epistemological questions when appropriate to help the first student focus in on their assumptions, clarify thoughts and develop further insights. The pairs of students are to do this for up to 25 minutes. Once they have completed this task they should reverse roles and continue with the dialogue for another 25 minutes.

Encourage your students to be thought-provoking, challenging and stimulating, but not discourteous, aggressive or offensive when they ask their questions. Follow their collaborative dialogue with a tutor-led discussion on the issues raised, if time is available.

Key issues

The following list provides examples of questions that can be asked in this activity (the nature and type of question will depend on your students, their subject of research, their background reading and the epistemological assumptions they have made about their research):

1. What do you know about your research topic and methods?
2. How do you know this information?
3. How do you know that this information is true?
4. How can you differentiate truth from falsehood?
5. Why do you believe certain claims and not others?
6. Is truth the primary goal of your research?
7. What is knowledge?
8. What are the conditions of knowledge?
9. What are the sources of knowledge?
10. How have you acquired your knowledge?
11. Is knowledge acquired or experienced?
12. What is the relationship between you and what you know?
13. Is it possible to have knowledge at all?
14. What can you know?
15. Why do you know some things and not know other things?
16. Does your knowledge represent reality as it is?
17. What is reality?
18. Is there any such thing as reality?
19. How can you justify your knowledge?
20. How can you justify your epistemological assumptions?
21. What is justification?
22. What are the sources of justification?
23. How do you understand the concept of justification?
24. What makes your justified beliefs justified?
25. Is justification internal or external to your mind?
26. Is further epistemological reflection required?
27. How are your epistemological assumptions related to the quality of your research?

Useful terms

The ‘Socratic method’ is a tool that is used to draw individual answers and encourage fundamental insight into the issue that is being discussed. It is also referred to as the ‘method of elenchus’ or ‘Socratic debate’. Using this tool, a problem (or issue) is broken down into a series of questions that are asked to help a student determine their underlying beliefs or extent of their knowledge. Contradictions or invalid arguments, beliefs or conclusions are challenged or eliminated so that ideas, thoughts, beliefs or hypotheses can be narrowed and refined.

The aim of the Socratic method is to help students process, interpret and analyse information and build a deeper understanding of the issue under discussion. This method is of particular use when discussing epistemology because it helps students to understand how beliefs have been formed, how they are justified and how knowledge can be claimed when it is possible only to hypothesize. The method is also useful for discussions about methodology (see Activity 93 for more information about the type of questions that can be asked using the Socratic method).

Related activities

- Activity 90: Knowing about epistemology and ontology
- Activity 92: Understanding methodology
- Activity 93: Asking methodological questions
- Activity 94: Locating epistemological and methodological standpoint
- Activity 95: Understanding theoretical perspective

Preparatory reading

The chapter headings in Steup et al. (2014) pose some questions that are relevant to this activity.

YouTube (www.youtube.com) contains some interesting and informative academic videos on epistemology.

Further reading

Hetherington, S. (ed.) (2012) *Epistemology: The Key Thinkers*. London: Continuum International Publishing Group.

Martin, R. (2010) *Epistemology: A Beginner's Guide*. London: Oneworld Publications.

Steup, M., Turri, J. and Sosa, E. (eds) (2014) *Contemporary Debates in Epistemology*, 2nd edition. Chichester: John Wiley & Sons.

Activity 92 Understanding Methodology

Student handout page 360

Tutor Notes

Purpose: This activity asks students, in their groups, to produce a podcast (audio or video) that will help them and fellow students to understand what is meant by methodology. All podcasts are uploaded to the relevant digital platform to provide a useful resource for students to access when they need to clarify or refine their methodological thoughts.
Type: Podcast production during independent study, followed by student-centred resource development.
Level: Intermediate and advanced.
Duration: Several hours during independent study for students to produce and upload their podcasts and a few minutes to review podcasts that are uploaded by fellow students. A few minutes will be required by the tutor to set up the resource and monitor the podcasts.
Equipment/materials: Students will need access to recording equipment and to the relevant digital platform.
Prerequisite activities: This activity works well when run together with Activity 21: Using multiple or mixed approaches (for students at intermediate level) or Activity 93: Asking methodological questions (for students at advanced level).
Learning outcome: By the end of this activity students will have a greater understanding of what is meant by methodology, and will be able to apply this understanding to their own research project. They will also have a useful resource on which they can draw for further information about methodology.

The activity

Divide your students into small groups and give each group a copy of the student handout. This asks them to produce a podcast (audio or video) that will help their fellow students to understand what is meant by ‘methodology’. This should be done during independent study and uploaded onto the relevant digital platform.

The podcasts will be developed into a useful resource that students can access when required to help increase their understanding of methodological issues. Therefore, encourage your students to be creative, imaginative, instructive and informative. It is useful to set a deadline by which time podcasts should be uploaded (the handout asks students to do this within a week), and you will need to monitor the digital resource to ensure that the information is useful and correct.

This activity works well because students must first understand what is meant by methodology before they can produce their podcast, and it provides an opportunity for students to approach the task in a variety of ways that can help to increase the understanding of fellow students.

Key issues

Students can choose the topic of their podcast, in relation to methodology. When this activity has been undertaken in the past some students have chosen to discuss the philosophy of methodology or the relationship between epistemology and methodology (this is usually done by students studying at advanced level). Other students have chosen to focus on one particular methodology, providing advice and guidance on how it is used and giving examples of previous research projects that have adopted this particular methodology. Some students use props and role-play to illustrate their methodology, whereas others concentrate on definitions and technical detail. See ‘useful terms’ below for a short description of the most popular methodologies that are discussed and described in student podcasts.

Useful terms

‘Experimental research’ is often referred to as the ‘scientific method’ and can be viewed as both a methodology and a method. This type of research seeks to add to knowledge through diligent inquiry that involves systematic and controlled testing to understand causal processes. Experiments can examine the validity of a hypothesis, demonstrate a known truth or test the correctness of an observation, for example. Students have donned white coats and portrayed ‘mad professors’ in their podcasts when this methodology has been discussed.

‘Survey research’ is used for exploratory purposes, to test theory and to understand and describe a particular phenomenon. It is used to collect data about thoughts, opinions, attitudes, behaviour and feelings, and uses samples that are representative of the larger population of interest so that generalizations can be made. Students increasingly describe and illustrate web survey methodology in their podcasts (see further reading, below).

‘Action research’ is an interactive, collective and collaborative inquiry process (between researcher and participants) that moves forward to solve problems, improve practice or methods, and develop strategies. It can be viewed as both a method and a methodology, using a process of reflection for continuous and progressive problem-solving and utilizing empirical methods to develop well-informed action. Students have visited specific organizations and used ‘guest appearances’ from participants to illustrate this methodology in their podcasts.

‘Ethnography’ is the study and systematic recording of human cultures and human societies (see Activity 36).

‘Phenomenological research’ is the study of the nature and meanings of phenomena. The aim is to understand and describe the structure of lived experience, or the ‘life-world’, rather than explain it. Researchers seek to put aside their own perceptions about the phenomena under study so that they can approach their work without preconceptions. Students describe in their podcasts how this can be achieved.

‘Heuristic inquiry’ is an adaptation of phenomenological research described above. This type of inquiry searches for essential meanings connected with everyday human experiences. Imagination, intuition and self-reflection are important aspects of heuristic inquiry (and these can be demonstrated in students’ podcasts). Instead of putting aside preconceptions, the researcher acknowledges his or her involvement, to the extent that the lived experience of the researcher becomes one of the main focuses of the research.

‘Grounded theory’ is used to study social interactions and experiences. It aims to explain processes and develop theory that is grounded in the data through both deductive and inductive reasoning (see Activity 96). It does not test existing hypotheses or theories, but instead develops concepts and theory through the use of empirical methods. Students’ podcasts tend to list and describe theory that has been developed within this methodological framework.

See Activity 93 for a definition of ‘research methodology’.

Related activities

- Activity 21: Using multiple or mixed approaches
- Activity 27: Defending methodology
- Activity 93: Asking methodological questions
- Activity 94: Locating epistemological and methodological standpoint

Preparatory reading

Kidd, W. (2012) 'Utilising podcasts for learning and teaching: A review and ways forward for e-learning cultures', *Management in Education*, 26(2), 52–7.

Further reading

Arthur, J., Waring, M., Coe, R. and Hedges, L. (eds) (2012) *Research Methods and Methodologies in Education*. Thousand Oaks, CA: Sage.

Callegar, M., Manfreda, K. and Vehovar, V. (2015) *Web Survey Methodology*. London: Sage.

Howell, K. (2013) *An Introduction to the Philosophy of Methodology*. London: Sage.

Activity 93 Asking Methodological Questions

Tutor Notes

Purpose: This activity encourages methodological dialogue by asking students, in pairs, to discuss their research methodology and answer questions posed by their partner, using the Socratic method as a tool. This will help them to focus their thoughts, clarify ideas and develop further methodological insight.
Type: Collaborative dialogue.
Level: Advanced.
Duration: Several hours during independent study and up to 1 hour in class.
Equipment/materials: Students will need access to the methodological literature and information about the Socratic method.
Prerequisite activities: If students need to know more about methodology they will find Activity 92 a useful prerequisite activity. Once they have decided on a methodology they will find Activity 27 useful as this helps them to produce a methodological defence.
Learning outcome: By the end of this activity students will have thought deeply about methodological concepts, assumptions, reasoning, rationale, implications and consequences, in relation to their research.

The activity

Inform your students that they are to undertake methodological dialogue using the Socratic method (see Activity 91 for a definition). This is a type of questioning that is used to challenge accuracy and completeness of thinking. Questions are asked, answers given and further questions asked to advance dialogue. It is a useful method to use when considering methodology as it helps students to modify, refine, tighten and defend their standpoint.

Students must research what is meant by ‘methodology’ and find out how to use the Socratic method to encourage dialogue. They will also need to think about the methodology they have adopted (or intend to adopt) for their research and develop methodological questions that they can ask their partner to encourage deeper thinking. Ensure that your students have enough time to undertake these tasks before the next teaching session.

When you reconvene, divide your students into pairs and ask one student to describe their research methodology. The other student is to listen to the description, asking questions where appropriate to help their partner define, clarify and focus in on the relevant issues. They are to do this for up to 25 minutes. Once they have completed this task they should reverse roles and continue with the dialogue for another 25 minutes.

Encourage your students to be challenging and stimulating, but not aggressive or offensive, when they ask their questions. They should try to keep the discussion focused and intellectually responsible, enabling and encouraging a deeper search for intellectual knowledge and insight. Follow their dialogue with a tutor-led discussion on the issues raised, if time is available.

Key issues

When using the Socratic method students can choose to ask questions that:

- help to clarify concepts;
- probe existing assumptions;
- probe reasoning;
- probe rationale;
- query evidence;
- test viewpoint;
- test perspective;
- probe relevance;
- ask about alternatives;
- query implications;
- query consequences;
- query the questions that are being asked.

See the student handout in Activity 27 for examples of specific methodological questions that could be asked by students in this activity.

Useful terms

‘Research methodology’ is the overall system or framework that is used to guide a research project. Methodology is influenced by epistemological standpoint and by theoretical perspective. Some standpoints emphasize the importance of objective truth, whereas others suggest that there is no such thing and that the only real truth is constructed by the individual, for example. Within each standpoint there are a variety of methodologies that can be chosen to guide a research project (see Activity 92).

Related activities

- Activity 21: Using multiple or mixed approaches
- Activity 27: Defending methodology
- Activity 91: Asking epistemological questions
- Activity 92: Understanding methodology
- Activity 94: Locating epistemological and methodological standpoint

Preparatory reading

Crotty (1998) is a useful text that has been used for many years to help students and researchers understand the complex issues surrounding epistemology, theoretical perspective and methodology.

Further reading

Clough, P. and Nutbrown, C. (2012) *A Student's Guide to Methodology*, 3rd edition. London: Sage.

Crotty, M. (1998) *The Foundations of Social Research: Meaning and Perspective in the Research Process*. London: Sage.

Howell, K. (2013) *An Introduction to the Philosophy of Methodology*. London: Sage.

Activity 94 Locating Epistemological and Methodological Standpoint

Tutor Notes

Purpose: This activity helps students to locate their epistemological and methodological standpoint through knowledge exchange with their peers. Students are encouraged to share what they already know and understand about epistemology and methodology in relation to their research project, and discuss and build on this understanding to help locate their standpoint. It is aimed at students who are planning and designing their research project at postgraduate level.
Type: Knowledge exchange.
Level: Advanced.
Duration: A one-hour session.
Equipment/materials: None required.
Prerequisite activities: Students may find Activities 90, 91, 92 and 93 useful as these help them to develop their knowledge and understanding of epistemology and methodology.
Learning outcome: By the end of this activity students will be able to locate, review, critique and/or modify their epistemological and methodological standpoint for their research project.

The activity

This activity is for students studying at advanced level who need to locate their epistemological and methodological standpoint during the planning stages of their research project. The aim is to encourage supportive and collective dialogue so that students are able to gain a deeper understanding of the issues involved. It is a useful activity for students who are struggling to locate their standpoint, and for students who need to check that they have located their standpoint correctly.

Begin the session by asking each student, in turn, to give a brief summary of their research project. Ask if anyone believes that they have adequately located their epistemological and methodological standpoint and, if so, encourage them to discuss this with their peers. Also ask students whether they are having difficulty locating their standpoint, and encourage them to discuss the problems they are facing. Other students should be encouraged to offer constructive advice or ask questions that will help their peers to focus and clarify their thoughts. You may find it useful to prepare some epistemological and methodological questions that can be asked if the discussion falters (see Activity 91 for examples of epistemological questions and the student handout in Activity 27 for examples of methodological questions).

This activity works best if you have no more than seven students. If your group is much larger than this, divide it into smaller groups and hold two or three sessions, if you have the time available. Your goal is to create an environment where students can feel relaxed, able to discuss their research (and potential problems) and offer constructive advice and encouragement to their peers.

Key issues

This activity provides the opportunity for students to engage in a stimulating and intellectual discussion that helps them to move forward with their research. Students should understand that they are not being judged or assessed: this is an opportunity to discuss the issues with their peers, share knowledge, gain deeper insight and improve understanding. It enables students to check that they are happy with their epistemological and methodological standpoint and encourages them to offer student-centred, constructive advice to their peers.

Useful terms

See Activity 90 for a definition of ‘epistemology’ and Activity 93 for a definition of ‘methodology’.

Related activities

- Activity 27: Defending methodology
- Activity 90: Knowing about epistemology and ontology
- Activity 91: Asking epistemological questions
- Activity 92: Understanding methodology
- Activity 93: Asking methodological questions

Preparatory reading

Howell (2013) provides a useful introduction to the issues that can be raised in this activity.

Further reading

Crotty, M. (1998) *The Foundations of Social Research: Meaning and Perspective in the Research Process*. London: Sage.

Howell, K. (2013) *An Introduction to the Philosophy of Methodology*. London: Sage.

Martin, R. (2010) *Epistemology: A Beginner's Guide*. London: Oneworld Publications.

Reed, I. (2011) *Interpretation and Social Knowledge: On the Use of Theory in the Human Sciences*. Chicago: University of Chicago Press.

Activity 95 Understanding Theoretical Perspective

Tutor Notes

Purpose: This activity helps students get to grips with different theoretical perspectives through a process of peer teaching. Each student is asked to draw a piece of paper (containing a different theoretical perspective on each piece) from a hat or bowl. They must then research, understand and teach about the perspective they have drawn.
Type: Peer teaching.
Level: Intermediate and advanced.
Duration: Several hours during independent study for students to undertake the research and prepare their teaching session. Ten to 15 minutes for each student to teach their session.
Equipment/materials: Students can choose the equipment and materials that they need for their teaching session, and these should be made available for their use.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will have a greater understanding of the different theoretical perspectives that are of relevance to their research project.

The activity

Write down on paper a number of relevant theoretical perspectives, place in a hat or bowl and ask your students to draw one piece of paper each (if you have a large number of students ask them to undertake this activity in pairs). The draw should take place at the end of a teaching session so that students can research their theoretical perspective and prepare for their teaching slot when you next meet.

Ask your students to provide a definition or description of their chosen perspective and illustrate how their theoretical perspective is relevant to research and/or has an influence on research practice, methodology and methods. For less experienced students studying at intermediate level you may need to provide a short introduction to this activity that includes a definition and discussion of the term 'theoretical perspective'. This can include, for example, theoretical perspective as a framework for organizing and explaining observations and evidence, and theoretical perspective as ideas, thoughts or methods that are used to explain or analyse social actions, social processes and social structures.

Some examples of theoretical perspectives are given below (there is not enough space to include all that may be relevant). You will need to add or change perspectives depending on the number of students in your group, the subject you are teaching (or the subject of your students' research) and your personal preferences:

- positivism;
- post-positivism;
- structuralism;
- post-structuralism;
- symbolic interactionism;
- phenomenology;
- postmodernism;
- feminist postmodernism.

See 'useful terms', below, for a short description of each of these perspectives.

Key issues

Teaching their peers about a particular theoretical perspective is a useful way to encourage students to get to grips with complex issues and present them in a way that can be understood by fellow students. It adds interest to a subject that can, for some students, be rather dull and/or too far removed from the practical aspects of their research (in particular, for students studying at intermediate level).

If contact time is limited an alternative way to approach this activity is to ask your students to write a section for a textbook on their particular theoretical perspective, which you can collect together to convert into an e-book or PDF. This produces a useful resource for students to access when they need further information about theoretical perspectives.

Useful terms

‘Positivism’ is a theoretical perspective that suggests that empirical sciences are the sole source of true knowledge. The purpose of science is to observe and measure so that researchers can find the truth, understand the world and make predictions. Through using scientific method (experimentation, deductive reasoning and hypothesis development and testing) researchers can search for cause-and-effect relationships, make explanations and acquire knowledge.

‘Post-positivism’ suggests that although objective truth is there to be sought, the researcher can influence what is observed. It suggests that all observation is fallible and can contain errors, and all theory can be revised and improved upon. Objectivity cannot be found in individual scientists, but is a social phenomenon that can be worked towards through careful experimentation, triangulation, academic scrutiny and theoretical criticism.

‘Structuralism’ is a social theory that suggests that human culture must be understood in terms of its association or relationship with wider structures and systems. Human activity, perceptions and thoughts are not natural, but are constructed, and everything has meaning because of the language systems under which we operate. Underlying structures and patterns shape all human activity. Writing has no origin: authors simply occupy pre-existing structures that enable them to produce sentences and stories.

‘Post-structuralism’ suggests that meanings, concepts and categories are shifting and unstable. What an author means is only secondary to what the reader perceives, and what a reader perceives varies, depending on identity (race, class, gender, etc.). Human sciences are unstable because human beings are complex and it is impossible for researchers to break free of social structures when studying them.

‘Symbolic interactionism’ is a social theory that suggests that behaviour is explained in terms of how people interact with each other through the use of symbols. Reality exists but is developed through social interaction (society and individuals cannot be separated from one another). Social life, therefore, is a product of ongoing and continually changing encounters. Symbolic interactionism is concerned with the analyses of patterns of communication, interpretation, interaction and adjustment between individuals.

‘Phenomenology’ is the study of the nature and meanings of phenomena. The aim is to understand, interpret and describe the structure of lived experience, or the ‘life-world’, rather than explain it. In phenomenological research the main data collection method is the interview, which is used to focus on a participant’s perception of lived experience. Data analysis involves a search for all possible meanings and an in-depth analysis of specific statements and themes.

‘Postmodernism’ suggests that there is no single source or origin for truth and reality beyond the individual. It is not possible to obtain one particular view of the world: instead there are numerous points of view found through the interpretation or deconstruction of existing concepts, belief systems or commonplace social values and assumptions. Postmodernism emphasizes concrete experience over abstract principles.

‘Feminist postmodernism’ suggests that there is no single truth that can be researched and reported, as women’s experiences vary according to age, race, class, culture, sexual orientation, education and other variables. It recognizes that there are multiple explanations of reality. It is important to look for the basic social processes that lead to variations in behaviour within the conditions imposed by the existing structure of society.

Related activities

- Activity 90: Knowing about epistemology and ontology
- Activity 92: Understanding methodology
- Activity 94: Locating epistemological and methodological standpoint
- Activity 100: Identifying effective theory

Preparatory reading

Ransome (2010) provides a good introduction for students who are new to social theory.

Further reading

Cuff, E., Dennis, A., Francis, D. and Sharrock, W. (2015) *Perspectives in Sociology*, 6th edition. Abingdon: Routledge.

Dillon, M. (2010) *Introduction to Sociological Theory: Theorists, Concepts, and Their Applicability to the Twenty-First Century*. Chichester: Wiley-Blackwell.

Layder, D. (2005) *Understanding Social Theory*, 2nd edition. London: Sage.

Ransome, P. (2010) *Social Theory for Beginners*. Bristol: Policy Press.

Activity 96 Reasoning Inductively and Deductively

Student handout page 361

Tutor Notes

Purpose: This activity is a worksheet that helps students to understand the different types of reasoning that can be used in research, think about their strengths and weaknesses, recognize the way that reasoning has been used in other research and work out the most appropriate reasoning for their own research.
Type: Student worksheet.
Level: Intermediate and advanced. Students will need to be thinking about, and designing, their research project.
Duration: Several hours of work on an individual basis during independent study.
Equipment/materials: Students will need access to the relevant literature and resources.
Prerequisite activities: This activity can be run together with Activity 97: Recognizing problems with reasoning.
Learning outcome: By the end of this activity students will be able to distinguish between different types of reasoning and will be able to relate this to their own research, choosing and using the most appropriate reasoning for their topic and methodology.

The activity

Give your students a copy of the student handout and ask them to work through the questions on an individual basis during independent study. Once they have done this, you can discuss their answers in your next teaching session, if contact time is available, or you can ask students to post, review and discuss their answers on the relevant digital platform. Alternatively, you can ask students to submit their work to you for review and feedback. This activity can be followed by, or combined with, Activity 97: Recognizing problems with reasoning.

Key issues

This activity can raise the following issues:

- Inductive reasoning begins with distinct observations and moves to broader generalizations, explanations or theories. It can be used to inform hypotheses and theories. Its strengths are that it is efficient and practical, open-ended and exploratory, can generate new knowledge and is useful for making predictions and providing direction. Its weaknesses are that it can be incomplete, uncertain, open to bias and lead to false conclusions.
- Deductive reasoning moves from the more general to the specific. A theory is developed and narrowed into a hypothesis that can be tested and confirmed with specific data. Its strengths are that it can provide certainty, is logically sound (provided the premise is true) and is seen to be objective. Its weaknesses are that it is limited to exploring and testing the implications of what we already know or assume to be true and, therefore, does not enable us to learn anything new. It can also lead to false conclusions.
- Abductive reasoning involves developing and testing hypotheses based on the best information available. Using this reasoning, a logical conclusion is developed from the facts and is usually the simplest or most likely explanation. Its strengths and weaknesses depend on situation and context, but can include efficiency and low costs against unreliability and bias.
- All three types of reasoning can be used in the same research project. For example, some researchers may begin using one type of reasoning, but change as their research progresses, while other researchers use all three types of reasoning at different stages of the research process. It is possible that the three approaches, when used together, can give a more complete understanding of data.

Useful terms

See ‘key issues’, above, for a definition of ‘inductive reasoning’, ‘deductive reasoning’ and ‘abductive reasoning’. See Activity 97 for a definition of ‘reasoning’ and ‘syllogism’. See Activity 99 for a discussion about ‘deductive theory generation’ and ‘inductive theory generation’.

Related activities

- Activity 97: Recognizing problems with reasoning
- Activity 98: Hypothesizing and theorizing
- Activity 99: Generating theory inductively and deductively
- Activity 100: Identifying effective theory

Preparatory reading

Chapters 9 and 10 in Hughes and Lavery (2015) contain information about inductive reasoning and deductive reasoning, which provides useful background reading for this activity.

Visconti, T. and Kunzendorf, R. (2015) 'Individual differences in deductive logic, abductive logic, and cognitive styles', *Imagination, Cognition and Personality*, 34(4), 360–77.

Further reading

Evans, J. (2014) *The Psychology of Deductive Reasoning*. Hove: Psychology Press. Originally published in 1982.

Feeney, A. and Heit, E. (eds) (2007) *Inductive Reasoning: Experimental, Developmental, and Computational Approaches*. Cambridge: Cambridge University Press.

Holyoak, K. and Morrison, R. (2013) *The Oxford Handbook of Thinking and Reasoning*. New York: Oxford University Press.

Hughes, W. and Lavery, J. (2015) *Critical Thinking: An Introduction to the Basic Skills*, 7th edition. Peterborough, Ontario: Broadview Press.

Activity 97 Recognizing Problems with Reasoning

Tutor Notes

Purpose: This activity is an entertaining way to help students recognize problems that can occur with reasoning. It asks students to produce a scenario that uses flawed reasoning. They must make this flawed reasoning as subtle as possible so that it is difficult to detect when presented to fellow students. Once flaws have been detected, students are encouraged to think about how they can overcome the problems identified.
Type: Game.
Level: Intermediate and advanced (the complexity of problem presented will reflect the level of study).
Duration: Up to 3 hours during independent study to develop the scenario and one teaching session to present scenarios and discuss the issues that have been raised.
Equipment/materials: None required.
Prerequisite activities: This activity can be run together with Activity 96: Reasoning inductively and deductively.
Learning outcome: By the end of this activity students will be able to detect problems with reasoning in the work of other researchers and recognize and overcome problems with reasoning in their own research.

The activity

Ask your students to produce a scenario (or story or description) that introduces flawed reasoning (some students who are studying at intermediate level may find it useful if you provide a definition of ‘reasoning’; see below). The scenario can be related to their research, to other types of research or to any ‘real-world’ situation that is relevant to the students. They should make the flawed reasoning as subtle and as hard to detect as possible. This activity works best if 10–15 scenarios are presented, so ask students to work on an individual basis, or divide your students into pairs or small groups, depending on the size of your class.

They are to present their scenario to their fellow students in the next teaching session. The ‘game’ element of this activity is that other students must try to detect the flawed reasoning. If you are happy to make this into a competition the winner is the student, pair or group that has made their problem the hardest to detect or that has been the most creative and inventive (students can vote on the winner, if appropriate). Once a flaw has been identified, ask students to think about how the flawed reasoning can be overcome. Follow the game with a discussion on the issues raised.

Key issues

The following issues can be raised during this activity:

- Inductive, deductive or abductive reasoning (or a combination of these) can be adopted. Inductive reasoning moves from distinct observations to broader generalizations and theories: problems can arise from flawed observation, during the process of moving from observation to generalization, or in the conclusions that are reached, for example. Deductive reasoning tends to move from the general to the specific: problems can arise in the thought processes used to develop a theory and form a hypothesis, or in the methods that are used to test the hypothesis or draw conclusions, for example. In abductive reasoning a logical conclusion is developed from the facts and is usually the simplest or most likely explanation: problems can be related to situation and context (socially, culturally, politically or historically influenced, for example). See Activity 96 for more information about these issues.
- When reasoning deductively, conclusions may seem to be correct, because they appear to be logical. However, if they are based on generalizations that are wrong (or untrue) then the logical conclusion may also be untrue. Students can make generalizations where it is not possible to do so or the reasoning is based on an untrue (or unprovable) premise, for example.
- Syllogisms are used to test deductive reasoning to make sure that the argument is valid (see below). Some students utilize invalid or false syllogisms when presenting their problem.
- Reasoning can be context-dependent (different operations and rules can be applied in different contexts). This activity can also raise the issue of whether reasoning (and flawed reasoning) is historically, culturally and socially dependent.
- Correlation is confused with causation (see Activity 54: Making use of statistics).
- Researcher bias has influenced the reasoning and led to invalid or untrue conclusions (see Activity 15).
- Students can overcome the problems identified in a variety of ways (depending on the type of problem that has been presented):
  - look for flaws and fallacies;
  - look for research(er) bias;
  - test assumptions;
  - check methods;
  - consider strengths and weaknesses;
  - look for statistical evidence;
  - check cause-and-effect relationships;
  - identify false causation;
  - consider common causes;
  - increase knowledge and experience so problems with reasoning become more visible.

Useful terms

‘Reasoning’ is the ability to think analytically about an issue and arrive at a conclusion, opinion, inference or judgement. ‘Inductive reasoning’ involves a process of arriving at a conclusion based on observation or experience, whereas ‘deductive reasoning’ is a process of arriving at a conclusion based on previously known facts (deductive reasoning can only be sound if the premise on which it is based is true). ‘Abductive reasoning’, on the other hand, begins with well-known facts and seeks the simplest, or most obvious, explanation. All types of reasoning can go wrong, and an awareness of the problems that can occur will help students to think more about the development of their own thoughts, hypotheses and theories, and about what they are reading and critiquing.

A ‘syllogism’ is a form of deductive reasoning (or logical argument) that consists of a major premise (or proposition), a minor premise (or proposition) and a conclusion. It is considered to be a useful way to test deductive reasoning and decide whether an argument is valid.

Related activities

- Activity 15: Recognizing research(er) bias
- Activity 54: Making use of statistics
- Activity 96: Reasoning inductively and deductively
- Activity 98: Hypothesizing and theorizing
- Activity 99: Generating theory inductively and deductively
- Activity 100: Identifying effective theory

Preparatory reading

Wilcox, G. and Schroeder, M. (2015) ‘What comes before report writing? Attending to clinical reasoning and thinking errors in school psychology’, *Journal of Psychoeducational Assessment*, 33(7), pp. 652–61.

Further reading

Feeney, A. and Heit, E. (eds) (2007) *Inductive Reasoning: Experimental, Developmental, and Computational Approaches*. Cambridge: Cambridge University Press.

Girod, R. (2015) *Logical Investigative Methods: Critical Thinking and Reasoning for Successful Investigations*, Boca Raton, FL: CRC Press. Although this book is aimed at investigators, detectives, special agents and prosecutors, it provides some interesting material for those interested in avoiding assumptions and false premises by using logic, reasoning, critical thinking and scientific method.

Activity 98 Hypothesizing and Theorizing

Student handout page 362

Tutor Notes

Purpose: This activity helps students to understand more about hypothesizing and theorizing (relevant to their discipline and/or research topic and methodology) by asking them to teach a session on the topic, in their groups, to college students aged 16–18 (their peers will play the role of college students).
Type: Teaching session aimed at college students.
Level: Intermediate and advanced.
Duration: Several hours of preparation time during independent study and 20 minutes of teaching time for each group (1 hour in total).
Equipment/materials: Students can choose the equipment and materials they need for their teaching session, and these should be made available for their use.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will understand what is meant by hypothesizing and theorizing and will be able to relate this understanding to their own research project.

The activity

At the end of a teaching session, divide your students into three groups and give them a copy of the student handout. This asks them to prepare, during independent study, a 20-minute teaching session on the topic of ‘hypothesizing and theorizing’. Their audience is a group of college students aged 16–18, so they must teach their session in a way that can be understood by this group, keeping them interested and engaged. They must present their 20-minute teaching session to their fellow students when you next meet (their fellow students are to play the role of college students). If time permits, encourage students to ask questions in their role.

This activity works best if there are no more than five students in each group. If you have a larger number of students you can run this exercise over a longer teaching session (or over two sessions) or reduce the amount of time available for each presentation. Alternatively, you can ask students to make a video/podcast of their teaching session and post it on the relevant digital platform for peer review and feedback.

Key issues

One of the most effective ways to encourage students to learn about, and understand, a topic that may appear daunting and complex is to ask them to teach it to others. In this activity they are asked to teach about hypothesizing and theorizing to students who are younger than themselves. This requires them not only to get to grips with the topic, but also to explain it in a way that can be understood, and found interesting, by that particular age group.

Students tend to be very creative in this exercise, teaching about hypothesizing and theorizing using visual props, latest technology and software, role-play and acting, audience participation, case studies, scenarios and practical examples. Students get to see two alternative presentations that can raise additional issues and, therefore, enhance their learning.

The generic nature of this activity enables students from a variety of disciplines and types of research to undertake the activity, as they are able to teach about hypothesizing and theorizing in a way that is relevant to their subject and/or research topic and methodology (deductive testing or inductive construction, for example).

Useful terms

A ‘hypothesis’ is an idea, belief, supposition or observation that is put forward for testing or for further investigation. At this stage there is no assumption of truth: it is tentative and not proven. However, once it has been tested repeatedly, or investigated comprehensively, and the probability of error has been reduced significantly, the hypothesis can be developed, constructed or refined into a ‘theory’ (a set of statements or principles constructed or created to explain a group of facts, observations or phenomena). See Activity 100 for a more comprehensive definition of ‘theory’.

Related activities

- Activity 33: Understanding the process of science
- Activity 34: Knowing about real-world scientific research
- Activity 95: Understanding theoretical perspective
- Activity 96: Reasoning inductively and deductively
- Activity 97: Recognizing problems with reasoning
- Activity 99: Generating theory inductively and deductively
- Activity 100: Identifying effective theory

Preparatory reading

Chapters 1 and 2 of Gilbert et al. (2011) have some interesting material on ‘doing science’ and ‘asking questions’. Although this book is aimed at biology students, it has some useful information about asking questions and hypothesis testing for students who are studying other sciences.

Further reading

Gilbert, F., McGregor, P. and Barnard, C. (2011) *Asking Questions in Biology: A Guide to Hypothesis Testing, Experimental Design and Presentation in Practical Work and Research Projects*, 4th edition. Harlow: Pearson Education.

Gimbel, S. (ed.) (2011) *Exploring the Scientific Method: Cases and Questions*. Chicago: University of Chicago Press. This book contains interesting material on scientific reasoning and the structure of theories, covering a variety of disciplines.

Swanson, R. and Chermack, T. (2013) *Theory Building in Applied Disciplines*. San Francisco: Berrett-Koehler.

Activity 99 Generating Theory Inductively and Deductively

Student handout page 363

Tutor Notes

Purpose: This activity helps students to understand the arguments for and against inductive and deductive theory generation by asking students to prepare for, and hold, a class debate.
Type: Group debate.
Level: Intermediate and advanced.
Duration: Several hours of independent study in their groups, followed by 1 hour in class.
Equipment/materials: None required.
Prerequisite activities: None.
Learning outcome: By the end of this activity students will understand what is meant by inductive and deductive theory generation and understand the different scientific viewpoints that are used to argue for and against the two different methods.

The activity

This activity is a group debate in which your students speak for and against inductive and deductive theory generation. Divide your students into two groups. One group is to argue for inductive theory generation and the other is to argue for deductive theory generation. They are then given the chance to refute each other's arguments. Ask your students to discuss the issues and prepare points for the debate with their group members during independent study. If your students are new to debating you may find it useful to give them the student handout: they can use this for guidance when preparing for the debate.

The debate is to be held when you next meet. You will need to introduce the debate, explain procedures, set ground rules and act as chairperson and timekeeper, ensuring that the debate remains on track, is constructive and takes place within the allotted time. You will also need to ensure that students listen to, and respect, the views of their fellow students and that arguments remain academic, rather than personal. Encourage your students to present their arguments in a confident and persuasive way, and pay attention to speed, tone, volume and clarity. The debate should last for 40 minutes (in four 10-minute slots, with each group speaking twice), with a 20-minute debrief on the issues that have been raised.

Key issues

This activity can raise the following issues:

- Methods of theory generation are influenced by epistemology, theoretical perspective and methodology. Arguments that can be put forward include:
  - Reality exists independently of consciousness: objective knowledge can be obtained through deductive reasoning and the truth found through replicable observation. Human knowledge and values are objective: they exist and can be discovered.
  - There is no underlying truth, and reality is only what we perceive it to be. All knowledge is limited to experiences by the self, and transcendent knowledge is impossible. Therefore, knowledge cannot be discovered as it is acquired subjectively and everything is relative.
  - Knowledge is constructed by scientists and not discovered from the world. The only reality we know is that which is expressed by human thought. Meaning and knowledge are human constructions.
- Arguments put forward for debate and rebuttal include:
  - Inductive theory generation is open-ended and exploratory; it does not seek to provide specific answers to a problem, and causal explanations are avoided. It does not attempt to find the truth but instead develops concepts and theory through the use of empirical methods.
  - Deductive theory generation is ‘scientific’ and testable. It pays close attention to correlation, causality, reliability and validity. It seeks to add to knowledge through diligent inquiry that involves systematic and controlled testing to understand causal processes. Researchers examine data, reports and observations in the search for facts or principles. Generalizations can be made.
  - The debrief can include a discussion about whether the topic that has been put forward for debate has presented a false dichotomy. The two approaches to theory generation can be considered to be complementary, rather than opposite. For example, some researchers may begin using one type of theory generation, but change as their research progresses, while other researchers use both methods at different stages of the research process. The two approaches, when used together, can give a more complete understanding of data.

Useful terms

A ‘debate’ is a structured argument in which two sides speak for and against a particular contention. In this activity students may be required to argue for a type of theory generation with which they do not agree. This enables them to come to terms with and understand alternative scientific viewpoints. Students also have to know how to argue as part of a team and ensure that they do not contradict the arguments of their team members. They need to pay close attention to the content: their introduction, their argument (and the evidence that is used to back up their argument), their rebuttal of the arguments used by the other team, and their conclusion.

‘Deductive theory generation’ involves putting forward a hypothesis for testing. In the traditional science view, a hypothesis is an idea about a phenomenon or observation that is tentative and not proven. However, once it has been tested repeatedly and the probability of error has been greatly reduced, the hypothesis can be developed into a theory. For a theory to stand up to scientific scrutiny, evidence for its development must be shown clearly and it must be able to explain existing phenomena and make predictions about the future.

In ‘inductive theory generation’ observation leads to the discovery, or recognition, of certain patterns, themes, categories, world views or empirical generalizations that are then explored further, with the ultimate aim of generating theory. It moves from data to theory, from the specific to general. Inductive theory generation begins with an observation of phenomena or behaviour around which the research question is developed. Questions are answered through more in-depth observation or questioning, and theory is developed based on these in-depth observations and analyses. Theories are tested and modified with further observation and analysis (or through deductive methods if a combination of approaches is used).

The term ‘theory’ is discussed in more depth in Activity 100.

Related activities

- Activity 95: Understanding theoretical perspective
- Activity 96: Reasoning inductively and deductively
- Activity 97: Recognizing problems with reasoning
- Activity 98: Hypothesizing and theorizing
- Activity 100: Identifying effective theory

Preparatory reading

Chapter 2 of Bryman (2012) contains a useful introduction to deductive and inductive theory generation.

Further reading

Bryman, A. (2012) *Social Research Methods*, 4th edition. Oxford: Oxford University Press.

Letherby, G., Scott, J. and Williams, M. (2013) *Objectivity and Subjectivity in Social Research*. London: Sage.

Swanson, R. and Chermack, T. (2013) *Theory Building in Applied Disciplines*. San Francisco: Berrett-Koehler.

Activity 100 Identifying Effective Theory

Tutor Notes

Purpose: This activity helps students to identify effective theory by asking them to choose one ‘strong’ theory and one ‘weak’ theory (see below for a discussion about semantics). They must share their choices with their fellow students, and discuss why the theory, in their opinion, is ‘strong’ or ‘weak’. This can be done in class or by using the relevant digital platform.
Type: Individual exercise followed by individual presentation and group discussion.
Level: Intermediate and advanced. You may find it useful to begin this activity with a brainstorm for students studying at intermediate level (see below).
Duration: Up to 3 hours of independent study, followed by a one-hour teaching session. If you choose instead to post the information on the relevant digital platform you will need up to 15 minutes to set up the resource, followed by periodic monitoring. Students can take up to 15 minutes to post their information, with periodic visits.
Equipment/materials: Access to the relevant literature, and access to the chosen digital platform if this option is chosen.
Prerequisite activities: Students may find it useful to have undertaken Activity 98: Hypothesizing and theorizing, although this is not a prerequisite activity.
Learning outcome: By the end of this activity students will be able to identify and critique ‘strong’ and ‘weak’ theory.

The activity

Ask your students to search for and find one example of ‘strong’ theory and one example of ‘weak’ theory (see ‘key issues’, below, for a discussion about semantics). Encourage them to choose theory that relates to their subject of study or research. They are to do this during independent study, ready for the next teaching session. If you are teaching students at intermediate level you can introduce this activity and help to encourage understanding by holding a brainstorm about what they perceive to be ‘strong’ theory and ‘weak’ theory. You may also need to provide, and discuss, a definition of ‘theory’ (see below). Students studying at advanced level should know, or can discover, this information individually.

In the next teaching session students will need to present their examples to the rest of the group and discuss why they believe their examples illustrate strong and weak theory. If contact time is limited you can ask your students instead to post their examples and critique on the relevant digital platform. You will need to set up a suitable resource and monitor posts to ensure that the information is relevant and correct.

Key issues

When designing this activity some thought went into the terms that should be used to describe ‘strong’ and ‘weak’ theory. Different terms have different connotations and can be judged differently: ‘good’ and ‘bad’ could involve value-laden or moral judgements, whereas ‘right’ and ‘wrong’ could involve factual judgements that imply truth, reality and objective knowledge are possible and desirable. Other terms, such as ‘successful’ or ‘unsuccessful’ and ‘effective’ or ‘ineffective’, could involve other types of personal judgement that are influenced by culture, politics, educational background or point in time, for example. Also, an ‘effective theory’ is a specific theory used in scientific research to model a certain effect, without modelling (or implying that it models) the causes that contribute to the effect. This could cause confusion for some students. (Strong theory and weak theory are specific theories that have been developed in the field of advertising but, to date, have not caused confusion when this activity has been undertaken.)

When working with advanced students I find it useful to discuss these semantic issues when the activity is introduced, perhaps choosing the terms with which they are most comfortable. For students studying at intermediate level, I use the terms ‘strong’ and ‘weak’ as they seem to accept these terms without critique.

This activity can raise the following issues (depending on theoretical perspective, subject and level of study).

- ‘Strong’ theories:
  - are plausible, feasible, testable, predictable and verifiable;
  - are short, well described and easily understood;
  - connect information from different and disparate areas and bring out the relationships between them;
  - are valid as long as there is no evidence to dispute them;
  - can invite disagreement, alternatives and better explanations;
  - can be modified and adapted;
  - are general, parsimonious and falsifiable (that is, no theory can ever be considered certain);
  - become stronger the longer they stand without falsification of their core principles.
- ‘Weak’ theories:
  - are incomplete;
  - are untestable;
  - are unfalsifiable;
  - display a personal agenda (whether deliberate or by accident);
  - are clichéd and trade in the commonplace;
  - are full of meaningless jargon;
  - use unexplained and/or taken-for-granted concepts or theoretical terms;
  - proclaim the truth;
  - are built from bad science.

Useful terms

A ‘theory’ is a coherent group of general propositions (or a set of principles or statements) used as an explanation of a class of phenomena on which action can be based. Theories are analytical tools that help researchers understand, explain and make predictions about a given subject matter. Researchers can work top-down (grand theory to local) or bottom-up from the data. See Pederse (2007) for a discussion of the ‘multiple definition of theories’ and the functions and purposes of theories.

Related activities

- Activity 95: Understanding theoretical perspective
- Activity 96: Reasoning inductively and deductively
- Activity 97: Recognizing problems with reasoning
- Activity 98: Hypothesizing and theorizing
- Activity 99: Generating theory inductively and deductively

Preparatory reading

Part Three of Swanson and Chermack (2013) provides some useful case studies on what the authors perceive to be successful theory in applied disciplines.

Pederse, E. (2007) ‘Theory is everywhere: A discourse on theory’, *Clothing and Textiles Research Journal*, 25(1), 106–28. Although this article is about clothing and textiles, it presents an interesting general discussion on theory, along with some useful definitions.

Further reading

Inglis, D. and Thorpe, C. (2012) *An Invitation to Social Theory*. Cambridge: Polity Press.

Layder, D. (2005) *Understanding Social Theory*, 2nd edition. London: Sage.

Swanson, R. and Chermack, T. (2013) *Theory Building in Applied Disciplines*. San Francisco, CA: Berrett-Koehler.

Part 2 Student Handouts

Student Handouts

Activity 1 Distinguishing Between Primary and Secondary Sources

Student Handout (1)

‘Primary sources’ are first-hand narratives, original documents/objects or factual accounts that were written or made during or close to the event or period of time. They have a direct connection to a person, time, event or place. Primary sources have not been subject to processing, manipulation, analysis or interpretation. The following are examples of primary sources:

- historical records, texts and original manuscripts;
- government records (if they have not been processed, interpreted or analysed);
- company/organization records (if they have not been processed, interpreted or analysed);
- personal documents (diaries, journals and memoirs, for example);
- recorded or transcribed speeches or interviews;
- raw statistical data (if they have not been processed, interpreted or analysed);
- works of literature;
- works of art;
- theatrical works;
- film/video;
- published results of laboratory experiments;
- published results of clinical trials;
- published results of research studies;
- conference and seminar proceedings that report up-to-date, original and ongoing research;
- patents;
- technical reports.

‘Secondary sources’ interpret, analyse and critique primary sources. They can provide a second-hand version of events or an interpretation of first-hand accounts. They can tell a story one or more steps removed from the original person, time, place or event. The following are examples of secondary sources:

- scientific debates;
- analyses of clinical trials;
- analyses/interpretations/critiques of previous research;
- datasets and databases that have been processed, analysed or interpreted;
- texts and books that use a variety of primary sources as evidence to back up arguments and/or conclusions;
- book and article reviews;
- biographies;
- critiques of literary works;
- critiques of art;
- television documentaries or science programmes;
- analyses of historical events.

Student Handout (2)

Consider the following sources and decide whether they are a primary source, a secondary source or a combination of both. Refer to the attached handout, if required.

Source 1

A newspaper article that describes an air disaster that has taken place the previous evening.

Primary ○
Secondary ○
Combination ○

Source 2

A present-day documentary that describes the experiences of female factory workers during the Second World War.

Primary ○
Secondary ○
Combination ○

Source 3

A conference paper that describes the interim findings of an ongoing study into antisocial behaviour in schools.

Primary ○
Secondary ○
Combination ○

Source 4

A manuscript of Lewis Carroll's *Alice's Adventures Under Ground* (the original version of *Alice's Adventures in Wonderland*).

Primary ○
Secondary ○
Combination ○

Source 5

Audio recordings (oral history interviews) that have been undertaken with people working as divers

in the North Sea, off the east coast of the UK.

Primary ○
Secondary ○
Combination ○

Source 6

A journal article describing how datasets can be used to help inform social policy.

Primary ○
Secondary ○
Combination ○

Source 7

The diary of a woman who was in domestic service between 1938 and 1942.

Primary ○
Secondary ○
Combination ○

Source 8

The *Communist Manifesto* (originally the *Manifesto of the Communist Party*) published in 1848 by German philosophers Karl Marx and Friedrich Engels.

Primary ○
Secondary ○
Combination ○

Source 9

A journal paper that reviews existing research into alcohol and cancer of the liver before it reports the findings of a new study, carried out by the author of the paper.

Primary ○
Secondary ○
Combination ○

Source 10

An online legal encyclopaedia containing brief, broad summaries of legal topics.

Primary ○

Secondary ○
Combination ○

Source 11

A research methods textbook.

Primary ○
Secondary ○
Combination ○

Source 12

A gold torque (or torc, to be worn around the neck) thought to date from the seventh century bc, found in a field in Somerset, England.

Primary ○
Secondary ○
Combination ○

Source 13

An article that reviews current research into the development of drugs for treating Alzheimer's disease.

Primary ○
Secondary ○
Combination ○

Source 14

Field notes from an ethnographic study of a community in Papua New Guinea.

Primary ○
Secondary ○
Combination ○

Source 15

Raw data from a clinical trial (or clinical study) into a new type of vaccine.

Primary ○
Secondary ○
Combination ○

Activity 2 Finding and Using Primary Sources

Student Handout

Primary sources are first-hand narratives, original documents/objects or factual (not interpretative) accounts that were written or made during or close to the event or period of time. Primary sources that you can use for your research include:

- historical records/texts;
- government records (if they have not been processed, interpreted or analysed);
- company/organization records (if they have not been processed, interpreted or analysed);
- personal documents (diaries, notes or memoires, for example);
- recorded or transcribed speeches or interviews;
- raw statistical data (if they have not been processed, interpreted or analysed);
- works of literature;
- works of art;
- theatrical works;
- film/video;
- published results of laboratory experiments;
- published results of clinical trials;
- published results of research studies;
- conference and seminar proceedings that report up-to-date, original and ongoing research;
- patents;
- technical reports.

Choose three of the primary source categories listed above. For each category you have chosen, identify and find one specific primary source that is relevant to your subject and/or research. This could be a subject-relevant research report, raw statistics pertaining to your subject/area of research, a conference paper on a relevant, ongoing piece of research, or an original manuscript, for example.

Once you have identified and found three specific sources, answer the following questions for each of the three sources:

1. Where did you access this source? Give specific information/locations (library addresses, websites, company/organization, archive, etc.).
2. Did you encounter any difficulties accessing this source? If yes, what action did you take to overcome these difficulties?
3. When critiquing, reviewing and/or evaluating this primary source, what type of information do you need to gather? Work through each source and be as detailed as possible.
4. What information do you need to collect so that you can reference the source in your writing/research report? Refer to the referencing system used at your institution to help you collect this information.
5. How do you intend to store and record the information that you have gathered from this source? How are you going to ensure that you can find this source again, if you need to?

Activity 4 Assessing Prior Experience and Learning

Student Handout

Consult the list that we have just developed from our brainstorm and answer the following questions, on an individual basis. We will then discuss your answers in a group discussion.

1. Identify the skills and knowledge that you will need for your proposed research project, using the brainstorm list as a guide.
2. Do you think that you already have any of the skills and/or knowledge that you have identified? If so, think about when and how they were developed. Include both formal and informal learning situations, and relevant experiences from everyday life.
3. Do you need to develop any of the skills and/or knowledge that you have identified in relation to your proposed research? If yes, how will you develop them? Provide specific examples, where possible. This could include research methods modules, training sessions or reading specific publications, for example.

Activity 5 Reflecting on Your Inquiry Skills

Student Handout

Start to write a learning journal. It should include notes, observations, thoughts and other relevant materials in relation to inquiry skills. It should not be a descriptive account of your course, but should indicate an active process of thought, reflection, recognition, analysis and understanding. Your journal can be paper or digital, according to your preference. Keep the journal for the duration of the course. It is a personal endeavour that will help to enhance your learning and personal development, and it will be a useful point of reference for assignments and revision.

A useful way to begin your learning journal is by reflecting on your inquiry skills. Start this process of reflection at the beginning of your course and continue with your learning journal entries as your course progresses. This will help you to understand more about how your previous experiences and learning are relevant to your course.

There are two ways that you can approach the task of reflecting on your inquiry skills. The first is to think about significant personal experiences and work out whether they have any relevance to inquiry skills. These experiences could have been gained from employment, previous study, as a volunteer, as a member of a sports team, from hobbies, from parenting or during social activities, for example.

The second way to approach this task is to think about the inquiry skills that you need to develop on your course and then work out whether you already have experience that has helped you to develop this type of skill. Examples of such skills can include written and oral communication skills, listening skills, questioning skills, observation skills and numerical skills.

When you reflect on an experience ask:

- What happened?
- How and why?
- How did I feel at the time?
- What about now?
- What went well/badly?

Try to identify where significant learning occurred and ask:

- What could I have done differently?
- What can I learn from the experience?

Think about how you would give evidence for that learning and ask:

- How can I demonstrate my learning?
- How can I provide evidence?

Enter your reflections into your learning journal and then continue to write in your journal as your course progresses. Remember to include any relevant experiences (from your course, from fieldwork, after discussions with other students or tutors, from independent study or from social experiences, for example). As you do so, pay attention to the following:

- Are there parts of your coursework that you don’t understand? What action can you take to rectify this?
- Have you had any flashes of inspiration? Why and how did they occur?
- What resources have been of particular use to you? How and why?
- Have you noticed that your opinions and values have changed? If so, in what way?
- Can you identify ways in which you can improve your reflection, learning and thinking in the future? What action can you take to make these improvements?
- Has writing in your learning journal aided understanding and helped with personal development? If so, in what way?
- What further action can you take to help with your personal development?

Activity 6 Using the Internet for Background Research

Student Handout

Consider each of the online tools listed below and choose three that you would like to explore further. Search the internet using your three chosen tools to find three sources (one from each of your chosen tools) that are relevant to your research topic and/or methodology. Analyse each of the three sources and provide a short written review and critique.

Note down all the information that you require to reference the sources correctly (following your institutional guidelines for referencing). This information will be required if you decide to access the source at a later date, as your research progresses, or if you decide to use the source as a reference when you come to write up your research.

- **Online journal databases**. These enable you to search journal abstracts and full-length articles using keywords that match your research topic and methodology. You can search for related works, citations, authors and publications. If the article is not freely available you will be directed to a library or website where the article can be found. Search for databases specific to your subject/methodology, or try Google Scholar (http://scholar.google.com).
- **Online repositories**. Academic papers, peer-reviewed articles, monographs and book chapters are freely available from online repositories. Details of these repositories can be obtained from The Registry of Open Access Repositories (ROAR), which is hosted by the University of Southampton (http://roar.eprints.org). You can also access scientific and scholarly journals from the Directory of Open Access Journals (www.doaj.org) and social science abstracts and papers from the Social Science Research Network (www.ssrn.com).
- **Datasets**. These provide data, usually in tabular form, that have been published by a single source and are made available for others to access and manipulate. For example, the Economic and Social Research Council has published details of over 900 datasets generated by ESRC-funded grants (www.esrc.ac.uk). The data are free to access and use. These datasets can provide useful information, even if your work is qualitative in nature.
- **Academic blogs**. Today there are many leading academics who actively blog and provide trustworthy sources of current opinion and information for students and researchers. These can be a useful source of information as you begin your research project, especially when they provide links to current thinking in your field. Search for academic blogs related to your research topic.
- **Podcasts**. Many leading academics produce digital media files (audio or video) that can be downloaded by the target audience. Many are presented as a series and are made available as specific episodes over a period of time. Podcasts can be useful to you if they cover your topic of research and/or methodology and, again, can alert you to current thinking in your field. Search for academic podcasts related to your research topic.
- **Newspaper databases**. These are a useful source of up-to-date and/or historical information about events and issues. For example, you can access the British Newspaper Archive at the British Library. This contains over 10 million searchable pages, from more than 200 newspaper titles from the UK and Ireland (it is a priced service online, but it is free to search). The British Newspaper Archive is made up of newspapers that pre-date 1900, but other newspaper databases contain up-to-date newspapers.
- **Image databases**. Digital images available online include images of art, history and culture from global museums, galleries, contemporary artists and private collections. They can also

include scientific and medical images, photographs and illustrations. Some students may not perceive digital images to be of importance to their research, but accessing this type of database can help your creativity and lead to new insights. Search for image databases by keyword related to your research topic and/or subject area. Be aware of issues of copyright if you intend to use any images in your work.

Activity 8 Recognizing Statistics, Facts, Arguments and Opinions

Student Handout

Read the definitions below and become familiar with the difference between statistics, facts, arguments and opinions. Over the next week keep a log in which you can record any of these when you see or hear them. For example, you could hear some statistics reported on the radio or see graphs or tables presented on television. Or you could notice an opinion given on social media, an argument made in a book or facts presented in an online journal.

When you record any statistics, facts, arguments and opinions that you have seen or heard, note down the time, date, where the information was published and what was said (or written). When you do this, consider the following questions:

1. Is it a statistic, fact, argument or opinion? How can you tell that this is the case?
2. Is the information that is presented disguised as something it is not? For example, is something being presented as fact when there is no evidence to back up this fact (perhaps an opinion disguised as a fact)?
3. Are you, personally, convinced by what has been said or written?
    1. If you are convinced, what has convinced you?
    2. If you are not convinced, what could the reporter/author have done differently to convince you?

Can you identify any problems/difficulties with what has been said or written? If you can, how would you correct the information?

Statistics

'Statistics' is a numerical discipline that involves collecting, organizing, analysing, interpreting and presenting data. The data that are presented are also referred to as 'statistics'. Statistics are only as good as the methods used to create them and the skill of the statistician/researcher who collects the data. Figures can be misleading, incorrect (whether deliberate or by mistake) and open to misinterpretation. It is important to analyse carefully all statistics presented in the media and in academic publications, and use statistics correctly in your own work.

Facts

'Facts' are things that can be investigated or observed and are found to be true (they can be proved or confirmed). They tend to be exact and specific. However, not everything presented as a 'fact' is correct and true: a careful analysis needs to take place to ensure that information presented as fact is valid and reliable. This is the case when you critique the work of others and if and when you use facts in your own work.

Arguments

'Arguments' are reasons or explanations given to support or reject a view. Arguments are used to

prove something through using reason and supporting evidence, which can be facts, statistics and the arguments of experts in the field (these must be acknowledged so that plagiarism is avoided). Researchers, reporters and students must demonstrate that the arguments they are using can be backed up by evidence. Weak arguments are those that are not backed up adequately or those that focus only on supporting evidence.

Opinions

'Opinions' are personal thoughts, beliefs or judgements that are not based on proof or certainty. They are used in a wide variety of everyday situations (we all have our own personal opinions on particular issues). However, problems arise when opinions are disguised as facts or arguments, especially when they are expressed with confidence. You must be wary of opinions disguised as arguments in the work of others and must ensure that you do not mistake opinions for arguments in your own work.

Activity 9 Discovering Questionable Statistics Published Online

Student Handout

Search the internet for a website, webpage, blog or other online publication that uses unreliable statistics to back up a questionable line of thought and/or ideology. At first this can be done on an individual basis so that you can explore a wider variety of online publications.

Once you have found some suitable sites/publications, choose one that you would like to work with as a group. Review and critique your chosen site/publication, using the following questions as a guide:

1. What makes you think the statistics are unreliable?
2. Why do you think the line of thought and/or ideology presented is questionable?
3. How have statistics been used to back up this questionable line of thought/ideology?
4. What flaws can you identify in the statistics or the way they have been presented?

Once you have done this, draw up a checklist that can be used to help you and your peers recognize and evaluate unreliable statistics presented online, based on what you have identified in this activity.

You will need to present your findings in a 10-minute presentation to your fellow students. You should discuss the example you have found, illustrate why you think the statistics are questionable and present your checklist. You can present your findings in any way you wish, using any software, materials or props that you deem appropriate. Try to make you presentation interesting and entertaining: you may find it useful to practise your presentation with your group members before we reconvene.

Tip

When undertaking this activity, be aware of making subjective judgements that are influenced by personal bias. This is an inclination or preference that influences your judgement, often in a subtle way that is difficult to detect. This is of particular importance when critiquing a line of thought or argument that goes against your own ideas. You can work together as a group to reduce personal bias.

Activity 10 Managing Critiques and Reviews

Student Handout

Design a tool that will help you to record, store, organize and manage your critiques and reviews of academic papers and scientific material. This could be a spreadsheet, table, database or tool of your own design. If you decide to use an existing online tool, adapt it to your personal needs. The list below provides examples of the types of categories that you could include when you design your tool:

- author;
- date;
- publication;
- publication medium (website, journal, blog, for example);
- URL and date of access, if relevant;
- research topic/subject
- research question;*
- epistemology and theoretical perspective;*
- methodology;*
- sampling method;*
- sample size;
- data collection tools/methods;
- analysis;
- findings;
- strengths;
- limitations;
- your opinions and/or conclusions;
- relevance to your own research;
- whether to reread at a later date (a simple yes/no will suffice here).

Find two research papers, journal articles or scientific reports that relate to your course, your research or your proposed research methods or methodology. Review and critique the papers, filling in your personally designed tool, as appropriate. If you find that categories are missing, need changing or need deleting, make the relevant changes to your tool, where necessary.

Activity 11 Critiquing Quantitative Research Papers

Student Handout (1)

Read the paper given to you. As you read, answer the following questions. Be prepared to discuss your critique in our next session.

1. Who is the author of the paper?
2. Why do you think the author has decided to publish this paper?
3. Is there a good, clear description of how the research was carried out? Can you understand how the research was carried out, from the description given?
4. Has the author included everything you need to know about how the research was carried out? Do you think any information is missing?
5. Can you understand the findings presented in the paper? Has the author(s) explained the results in a clear and succinct way?
6. Is there anything in the paper that you don't understand? If so, what do you think the author(s) should have done to make it clearer?
7. Are all conclusions backed up by evidence? Has the author jumped to conclusions about anything, or made assumptions that are not backed up by evidence?
8. Are all sources acknowledged and referenced properly?
9. Is the paper well written? Can you make any suggestions for improvement?
10. Is the paper useful to other researchers and/or the general public? Does it tell us something important? If so, what does it tell us?

Student Handout (2)

Read the paper given to you. As you read, answer the following questions. Be prepared to discuss your critique in our next session.

1. Who is the author of the paper and what are their credentials?
2. What is the reason for making the data/research results public?
3. Have the research topic and purpose of the research been well justified?
4. Has the researcher provided a detailed description of the quantitative methodology? Is it clear why this methodology was chosen and how it is the best way to answer the research question?
5. Are the methods well documented?
6. Do you think the correct procedures have been followed (this could include, for example, when forming hypotheses, generating samples, conducting experiments, analysing data and reaching conclusions)?*
7. Is it possible to ascertain whether the measurements are consistent (through repetition and retest by other scientists, for example)?*
8. Have all data been reported (including those that weaken or contradict the results presented)?
9. Is the source you are looking at the original source of the data (is the study reporting primary or secondary data)?
10. Have the data been interpreted correctly?
11. Do statistics apply to the point/argument that is being made? Have the figures been manipulated to fit the argument?
12. Are visual data presented in a way that enables researchers to draw their own conclusions and verify the assertions that have been made (if relevant)?
13. Have the conclusions been investigated, tested and verified by other scientists? If not, would it be possible for others to do so?*
14. Are the assumptions and conclusions valid and backed up by evidence?
15. Have generalizations been made that are not based on careful experimentation and analysis?
16. Has bias been introduced into any of the information presented?
17. Is there a comprehensive literature review, and have all other researchers/arguments been well referenced?
18. Have all sources been acknowledged?
19. Is the report well written and presented, following the established rules for scientific reports, with all diagrams, charts, figures and graphs well presented, complete and referenced in the text?
20. Has the importance/impact of the research been demonstrated?

Activity 12 Critiquing Qualitative Research Papers

Student Handout (1)

Read the paper given to you. As you read, answer the following questions. Be prepared to discuss your critique in our next session.

1. Who is the author of the paper?
2. Why do you think the author has decided to publish this paper?
3. Has the author included a relevant background literature review? Is this adequate?
4. Is there a good, clear description of how the research was carried out? Can you understand how the research was carried out, from the description given?
5. Can you understand the interpretations/findings presented in the paper? Has the author explained the results in a clear and succinct way?
6. Is there anything in the paper that you don't understand? If so, what do you think the author should have done to make it clearer?
7. Are all interpretations/conclusions backed up by evidence? Has the author jumped to conclusions about anything, or made assumptions that are not backed up by evidence?
8. Are all sources acknowledged and referenced properly?
9. Is the paper well written? Can you make any suggestions for improvement?
10. Is the paper useful to other researchers and/or the general public? Does it tell us something important? If so, what does it tell us?

Student Handout (2)

Read the paper given to you. As you read, answer the following questions. Be prepared to discuss your critique in our next session.

1. Who is the author of the paper and what are their credentials? What reason have they for making sure that their information is available?
2. Have the research topic and purpose of the research been well justified?
3. Has the researcher provided a detailed description of the qualitative methodology? Is it clear why this methodology was chosen and how it is the best way to answer the research question?
4. Has a conceptual or theoretical framework been described? Is it adequate and appropriate?*
5. Has a philosophical/epistemological discussion been included? Is it adequate and appropriate?*
6. Have the research methods been well-described? Is there a description of sampling procedures, the method(s) of data collection and the method(s) of data analysis? Are these methods and descriptions appropriate and adequate?
7. Have ethical considerations been taken into account and been well described? Are they adequate and appropriate? For example, has it been made clear that informed consent was obtained? Has the researcher described if and how participants might have chosen not to take part in the research?
8. Has the researcher highlighted and acknowledged any bias that might be present in the research process?
9. Are the results credible, dependable, authentic and trustworthy?*
10. Are the results rigorous and accurate? Can the researcher demonstrate that saturation or redundancy in data has been achieved (that is, no new results will emerge from the data analysis)?*
11. Has a comprehensive literature review been undertaken (if relevant)? Have all sources been acknowledged and are they well referenced?
12. Have the findings been presented well? Have they been placed in context? Have they been related to other work on this research topic?
13. Has the importance/impact of the research been demonstrated?

Activity 13 Evaluating Science in the Media

Student Handout

Monitor various forms of media over the next week. This can include television news programmes, online newspapers, social media, radio stations and direct mailings, for example. Your task is to take note of science reports when they appear in any media that you are monitoring. When you do this, consider the following questions:

1. Can you tell whether the media is reporting reputable or flawed science? Your brainstorm list will help you to think about these issues.
2. What clues can you identify that help you to decide whether the research is reputable or flawed? Are these similar to the list developed during the brainstorm, or can you identify other clues that were not listed?
3. How is the science reported? For example, is the tone positive or negative, supportive or critical? Does this have an influence on whether the research is seen to be reputable or flawed?
4. Can you identify flawed statements or assertions in the media report? Why are they flawed?
5. Is it actually possible to decide whether science is reputable or flawed by how it is reported in the media? What further information should be reported to help you decide? If this information has not been included in the report, why do you think this is the case?

Activity 14 Recognizing Media and Political Bias

Student Handout

‘Bias’ is a term that is used to describe a tendency towards or a preference for a particular line of thought, idea, perspective or result. Media bias occurs where a media outlet reports a story in a partial or prejudice manner. In terms of reporting research studies, this may take the form of omitting findings that don’t support their headline, or misreporting research conclusions, for example. Media bias can also be present in cases where large, influential companies persuade certain media outlets to report their conclusions in a favourable way.

Political bias is where an individual, researcher, politician or media outlet is influenced by their political view, stance or personal belief. In terms of reporting research, again, this influences what is reported or used as evidence, and how this is reported or used as evidence. Political bias can be present in other ways and can, for example, have an influence on the types of research that are funded, the design and methods used, the conclusions and the dissemination of results.

Think about all the different ways that media and political bias can influence research. This could be during the design stage, during the data collection stage or during the reporting stage, for example. Discuss these issues with your group members and come up with a list of the different ways that political and media bias can influence research and the reporting of research.

You will need to share your list with the rest of the class during a class ‘brainwave’. This is a variation on the brainstorm technique and will require a member from each group to stand up, in turn, and give an example of how political and/or media bias can influence research. This method enables you to share information, while listening to others, thinking quickly and memorizing what has come before. Each answer is given quickly, without judgement or criticism, even if you disagree with what has been said.

Activity 15 Recognizing Research(er) Bias

Student Handout

Read the definition of ‘bias’ and ‘researcher(er) bias’ given below. Once you have done this, work together, in your group, to develop an idea for a research project. You can choose any topic, methodology and methods that you wish. Produce a short summary of your proposed research: you will need to present this summary to the rest of your class in the next teaching session.

However, within your summary you must purposely incorporate some form of research(er) bias. This can be incorporated into any stage of the research, for example in the choice of topic, choice and type of methods, sampling procedure, data collection methods, data analysis or reporting of results. You can choose to introduce only one type of bias, or you may prefer to introduce several types of bias within your summary. The choice is yours.

When you present your research summary to the rest of your class, the other students must try to detect what type of bias has been incorporated into your summary. They can ask questions at the end of your presentation to try to obtain more information if they have not detected the bias. The winning group is the one that has made the bias the hardest to detect. Therefore, you must try to ensure that your research(er) bias is obscure, hidden, subtle or undetectable.

Definition

‘Bias’ is a term that is used to describe a tendency or a preference for a particular line of thought, idea, perspective or result. ‘Research(er) bias’ (or experimenter bias) is used to describe a problem with how the research has been chosen, conducted, analysed and/or reported. The extent to which bias is seen to be introduced into the research process depends on methodology and theoretical perspective. For example, researchers who pay close attention to objectivity (perhaps in quantitative research) will follow set rules and procedures to get rid of bias in the research process (eliminate bias). On the other hand, researchers approaching from a more subjective standpoint (perhaps in qualitative research) will recognize, define and discuss the types of bias that could be introduced because they believe that is it impossible to eliminate bias completely (acknowledge bias).

Activity 16 Choosing a Research Topic

Student Handout

Choose a topic for your research. Once you have done this, try to sum up your research in one sentence only. If you are unable to do this your research topic may be too broad, ill-thought out, too obscure or too complicated, so you will need to modify, adapt or refine your topic until you are able to sum it up in one sentence.

Once you have thought of a topic and summarized your research, you will need to present your sentence to the rest of your group so that you can receive peer and tutor feedback. You should also be prepared to offer feedback on the sentences of your fellow students. Modify and refine your one-sentence summary, if required, after having received feedback.

There are many interesting and creative methods that you can use to stimulate thought and focus in on your research topic. Here are some suggestions:

- Observing. Using this method, you observe phenomena or behaviour that, in your opinion, needs further investigation to explain patterns, behaviour or processes. Asking questions such as ‘what’ and ‘why’ about your observations will help to stimulate your thoughts.
- Reflecting on your experiences. This method enables you to consider past and present experiences in relation to possible research topics. For example, you might have experienced phenomena or behaviour in the workplace or during a social encounter that, in your opinion, requires further investigation. Asking in-depth questions about, and reflecting on, these experiences will help to stimulate your thoughts and further develop your research topic.
- Questioning. This is a useful technique for all students starting a research project. There are different types of question that you can ask to stimulate your thoughts and help you to choose and focus in on a suitable topic. This includes questions that:
    - stimulate reflection;
    - introduce a problem;
    - lead to deep and critical thought;
    - test existing assumptions and/or knowledge.
- Visualizing. You can create a picture to help you to think about your research. Or you may decide to draw a graph, diagram or mind map that helps you to clarify your thoughts and pull together your research topic.
- Discussing. Take every opportunity to discuss your thoughts with friends and family. This helps to stimulate thought, and receiving feedback from interested, knowledgeable parties enables you to test, modify and refine your ideas.
- Reading. If you have a general idea for a topic, read around the subject. This will deepen your understanding of current research in the field, help you to decide whether there is scope to advance this research and, if so, help to stimulate ideas.
- Brainstorming. Think about an issue and write down any thoughts that come to mind, without judgement, analysis or reflection. This is a useful technique if you have a general idea of a topic for your research, but need to focus in on important issues.
- Lateral thinking. This involves approaching an issue through an indirect route that does not follow logical ways of thought. Examples of this type of thinking include choosing an idea completely at random (opening a page in a dictionary, for example) or going against the obvious (questioning something that is taken for granted, for example). This method of thinking

is useful if you want to create new ideas, perhaps for a unique research project on a topic that has not been covered before.

- Logical thinking. This way of thinking follows a logical, sequential order in which you move from one related thought to another. It involves taking important ideas and working through them in a series of stages or steps. This method helps you to organize your thoughts and focus in on your research topic.

Activity 17 Producing Aims and Objectives

Student Handout

Produce your aims and objectives for your research, using the information given below as guidance. Once you have done this, swap them with the student that you have been paired with. Review each other's aims and objectives, again following the guidance given below. If relevant, make suggestions for improvements. Modify your aims and objectives accordingly.

An aim is the overall driving force of your research. It is a simple and broad statement of intent that describes exactly what you want to achieve from your research. It should emphasize what is to be accomplished and address the outcomes of your project. Most research projects only have one aim, although it is possible to have more than one aim for certain types of research.

The objectives are the means by which you intend to achieve the aim. They are detailed and more specific statements that describe specifically how you are going to address your research question, building on the main issue that has been introduced in the aim. Five to ten objectives is usually a good number, but this can be flexible, depending on the type of research. The main point is to make sure that your objectives show how you intend to meet your aim.

Take note of the following points when producing your aims and objectives:

- Your aims and objectives should give a clear indication of the five Ws of your research (what, who, why, when, where). These should not be stated explicitly, but should be implicit within your aims and objectives.
- Your aims and objectives should provide an indication of how your project will proceed: this is not a specific statement of methods, but will give an indication through the terms used, for example 'identify', 'describe', 'explain' and 'observe'. This will also give an indication of your epistemological and methodological preferences.
- Your aims and objectives should support your methodology (for example, you should only mention the intention to generalize when this is your methodological goal).
- Your aims and objectives should be clear, succinct and unambiguous, defining any technical terms used. They should also be brief and concise.
- Your aims and objectives should provide an indication of the long-term outcome, such as 'produce an analysis' and 'develop associated theory'.
- Your aims and objectives must be realistic in terms of what you can achieve during your research (available resources, time, access to participants, for example). Don't attempt too much or make your aims and objectives too ambitious.
- Your objectives should relate to your aim and you should ensure that each objective is distinct and that they do not merely repeat another using different terms. Number your objectives so that they are clear and distinct.
- Take care not to produce a list of issues that are merely related to your research topic and/or methods. Also, ensure that you do not mistake research objectives for project objectives (the latter is a list of practical steps involved in the day-to-day running of your research project).

If you are struggling to produce your aims and objectives, read around your subject, find other research that deals with similar issues and find out how the researchers have produced their aims and objectives. Also, discuss the issues with the student that you have been paired with. If this student has

already produced their aims and objectives, review their work as it might help you to develop your own ideas.

Once you have produced, modified and refined your aims and objectives, you should refer to them throughout the research process to ensure that your research remains on track. This is of particular importance during the design of your methods, the data collection and the data analysis stages. For example, if you intend to design a questionnaire for a large survey, each component or each question must be linked back to your aims and objectives. This will stop you asking irrelevant questions and will help to ensure that your questionnaire produces the type of information required to answer your research question.

You will need to assess whether you have met your aims and objectives during the data analysis and writing-up stage of your project. If you have not met them, analyse why and state this in your thesis/dissertation. There could be a number of reasons, such as variables that could not be considered during the planning stages, or new insights that are essential to your research question but had not been identified in your aims and objectives. A thorough critical analysis can help to improve your thesis or dissertation, even if you find that you have not been able to meet all your aims and objectives.

Activity 18 Developing a Research Question

Student Handout

Develop your research question using the guidance given below. Once you have done this, you will need to present your research question to the rest of your group for peer and tutor feedback. You should also be prepared to offer feedback on the research questions of your fellow students. Once you have received feedback, modify and refine your research question accordingly.

A research question is a clear, concise and complex question around which your research is focused. It helps you to focus in on your study, determines your methodology and guides and structures your choice of data collection and analysis methods. Research questions tend to be easier to generate when much is known about a topic and there are clear and well-developed theoretical frameworks in place. They can be harder to generate in cases where little is known about a subject or where the emphasis is on knowledge discovery or theoretical development.

Your research question should:

- be relevant, clear and simple;
- be workable and allow for the collection of the required data over time and within budget (if relevant);
- be well formulated, credible and easy to understand;
- be specific and defendable;
- lead to research that extends or adds to existing knowledge;
- lead to interesting, significant and influential research;
- lead to a research design and analysis that holds scientific credibility (if it is stated in hypothetical form, for example);
- allow for more than one outcome and the possibility that the working hypothesis (if relevant) can be refuted;
- allow for variability and different results under a variety of conditions;
- allow for adaption and change (within certain qualitative methodologies, for example);
- be consistent with the requirements of your course and assessment (enable your research to be produced at the right standard and level of study, for example).

If you are struggling to develop your research question, you can try working through the following stages:

1. Choose a topic for your research.
2. Undertake some preliminary background research to find out about other research on this topic. Are you able to add to existing knowledge or develop new knowledge on the topic?
3. Think about your audience. Does your chosen topic provide enough scope to work at the right intellectual level?
4. Think about your goal(s). This could be to build on existing knowledge or encourage change in practice, for example.
5. Start to ask relevant questions and pick the one that is most suitable.
6. Develop this question into your research question. Make sure that it is focused and complex (that is, it cannot be answered with a simple yes or no based on existing knowledge).
7. Reflect, analyse and/or hypothesize. Is your question suitable and workable?

8. Rewrite as appropriate.
9. Once you are happy with your research question, present it for peer and tutor feedback.
10. Modify and refine as appropriate.

Developing the right research question is crucial to the success of your research project. However, it can take a long time to develop a good, workable question so try not to become frustrated or impatient. Speak to fellow students and read more about the subject if you are struggling. The following books may be useful:

Alvesson, M. and Sandberg, J. (2013) *Constructing Research Questions: Doing Interesting Research*. London: Sage.

White, P. (2009) *Developing Research Questions: A Guide for Social Scientists*. London: Palgrave Macmillan.

Activity 20 Choosing Research Methods

Student Handout

Work through the examples given below, in your group, and answer the following questions for each example:

1. What data collection method(s) would you use?
2. What sampling method(s) would you use?
3. What recording method(s) would you use?
4. How would you store the data that you have collected?
5. How would you analyse the data that you have collected?

Example 1

This research seeks to identify, describe and produce an analysis of the interacting factors that influence the learning choices of final-year undergraduate students who intend to go on to postgraduate study in the year that they graduate, and develop associated theory.

Example 2

This research seeks to evaluate the integration, effectiveness and costs of different models that deliver primary healthcare to homeless people.

Example 3

This research will explore the role of women in the gothic novel.

Example 4

This research will seek to provide new social scientific explanations and theories of alternative cultural movements and activities in selected European cities. It will consider the development, use and closure of alternative cultural venues and sites after anti-squatting and anti-rave legislation.

Example 5

This research will test the assumption that taste is the primary reason for buying a new type of chocolate product.

Example 6

This research seeks to identify the causes, and reduce the risk, of language and literacy disorders in preschool children who come from disadvantaged backgrounds.

Example 7

This research seeks to understand the prevalence of Chalara dieback of ash trees (also known as

Chalara or ash dieback) in northern Europe and chart its movement.

Example 8

This research aims to develop new research tools for the study and manipulation of the parasitic flatworm species that is responsible for bilharzia disease.

Example 9

This research seeks to examine the impact of political radicalism on Scottish workers before, during and after the Great War.

Example 10

This research seeks to increase cheese manufacturing efficiency and sustainability through changing farming practice.

Tips

When you work through each example, consider the following points:

- Decide whether the research is exploratory, descriptive or causal (or a combination of these) and match the methods accordingly.
- Decide whether the research is to generate theory, test theory or explore theory and match methods accordingly.
- Ensure that the chosen methods are appropriate to the methodology. It is important to note that for some qualitative research it may be difficult to state specific methods at the beginning of the project as these might be developed, refined or changed in light of emerging themes. If this is the case, highlight these issues in the relevant example(s).
- Choose a combination of methods if appropriate, desirable and feasible (if the methodology enables this).
- Ensure that the methods are ethically sound.

Activity 22 Knowing about Probability Samples

Student Handout

This worksheet helps you to recognize, analyse and apply probability sampling methods in research. In probability samples, all people within the study population have a specifiable chance of being selected. These types of sample are used if the researcher wishes to explain, predict or generalize to the whole research population. Since the sample serves as a model for the whole research population, it must be an accurate representation of this population.

There are several probability sampling methods that are used in research and examples of these are given below. Work through these examples and, for each one:

- name the sampling technique;
- highlight possible strengths and weaknesses;
- give another example of a research project that could utilize this particular sampling technique.

Example 1

A researcher wants to find out how many children are absent from school in a given month. It is important to ensure that every school in the country has an equal chance of being chosen so that generalizations can be made. He obtains a list of every school, assigns each a number and, using an online random number generator, creates a list of schools to which he can send his questionnaire.

Example 2

A researcher wants to understand more about the coping strategies of nurses working in busy hospitals at night. It is not possible, financially or practically, to visit every hospital in the country. However, precision is important as the researcher wants to be able to give an explanation of coping strategies and make predictions about how nurses will cope in a given situation. The researcher decides to choose several specific geographical locations and then obtain a list of all hospitals within each location. Each hospital is assigned a number and a list of hospitals, within each geographical location, is chosen using an online random number generator.

Example 3

A researcher wants to find out about the lunchtime eating habits of workers in a particular car factory. She obtains a list of all employees, chooses a starting number, chooses an interval number and then works though the list, developing her sample list from the employees that appear at the correct interval on the list.

Example 4

A researcher wants to find out about participation in sport among undergraduate students from different subject areas studying at a particular university. It is important to the researcher that he is able to interview students from all subject areas as he wants to find out whether there is a connection between subject studied and participation in sport. He decides to arrange his sample by undergraduate

subject and then, within each subject, choose students on a random basis.

Example 5

The researcher described in Example 4 finds that there are many more arts students than science students. So he decides to increase the sample size of his science students to make sure that his data are meaningful.

Activity 23 Knowing about Non-Probability (Purposive) Sampling

Student Handout

This worksheet helps you to recognize, analyse and apply non-probability sampling methods in research. Non-probability samples (also referred to as purposive samples) are used if description rather than generalization is the goal. In this type of sample it is not possible to specify the possibility of one person being included in the sample. Instead, the sample is selected on the basis of knowledge of the research problem.

There are several non-probability sampling methods that are used in research and examples of these are given below. Work through these examples and, for each one:

- name the sampling technique;
- highlight possible strengths and weaknesses;
- give another example of a research project that could utilize this particular sampling technique.

Example 1

A market researcher wants to find out what members of the public think about a new chocolate bar that has just been produced. He wants to make sure that all sections of the population are represented in the sample, so he works out what major characteristics are important (gender, age and ethnicity, for example) and then how many people from each of these categories should be sampled. He stands on a street corner and chooses people that fit into each category, until the target number within each category is reached.

Example 2

A researcher is interested in finding out about graffiti in her local city. One aspect of this research is to speak to those who produce graffiti. She realizes that she has to be trusted and establish rapport with these people before they will talk to her. Through personal contacts she comes across a person who admits to producing graffiti at a site in the vicinity. The researcher is able to talk to this person, establish a good relationship and gain some useful information. This person then recommends a friend who is also willing to talk to the researcher. This continues, with one person recommending another and so on, until the researcher has spoken to 15 different people.

Example 3

A researcher is interested in finding out about the learning choices of adults who decide to return to education later in life. She wants to find out the issues that are important to the adults, rather than make assumptions or develop a hypothesis. Therefore, she decides to interview three participants, analyse the results and decide whom to interview next depending on the emerging themes. As these themes develop, she chooses further people to interview, and consults the background literature to help explain what she is finding. She continues with this process until no new themes are emerging and all themes are fully explained.

Example 4

A researcher wants to find out what students think of the entertainment facilities on a university campus. He stands by the entrance to the university library and stops students as they pass by, asking a series of questions about the university entertainment facilities. He does this until he has asked the opinion of 100 students.

Example 5

A researcher is interested in finding out how family bereavement can impact on research activities. Having personally experienced family bereavement, and having come across others in a similar position, the researcher chooses whom to interview based on his existing knowledge of who would be suitable.

Activity 24 Choosing Sample Size

Student Handout

Choose a tool or a method that helps students and researchers to work out, or decide on, an appropriate sample size. This could be:

- an online sample size calculator;
- specialist software;
- a published sample size table;
- sample size formulae;
- a statistics textbook or journal article;
- a methods book or journal article describing a particular sampling method that does not define sample size at the beginning of a project (such as those used in certain types of qualitative research);
- a methods book or journal article about using a census for small populations (sampling is not required because everyone in the population can be contacted).

Once you have chosen a suitable tool or method, post and share it with other students, using the suggested digital platform. You will need to post specific information about the tool or method so that it can be found by other students, such as URL, book reference, journal title, blog title and so on. When you post these details, include the following information:

- the strengths of the tool or method;
- the weaknesses of the tool or method;
- advice and guidance for students who might be thinking of using this particular tool or method.

Provide as much detail and useful information as possible so that you and your fellow students can assess the merits of the different tools and methods that are posted and shared. You can use this resource to help you choose an appropriate sample size tool or method for your research.

Activity 25 Avoiding Sampling Problems

Student Handout

Read the examples given below. For each of these examples:

- Identify the sampling problem or the difficulties that could be encountered with the chosen sampling method.
- Discuss ways in which the problem and/or difficulties could be overcome or rectified.

Example 1

A business student decides to interview 30 executives from manufacturing companies in the UK. He chooses a simple random sample (where each member of the population has an equal and known chance of being chosen). He draws up a list of what he thinks are all the manufacturing companies in the UK, assigns a number to each and uses an online random number generator to produce his sample. His intention is to make generalizations and predict behaviour.

Example 2

A medical student wants to find out about the gaming habits of fellow medical students to ascertain whether the manual dexterity required for certain games will be of use in their medical careers. He intends to generalize his results to all students training to be doctors and devise gaming training that would help in medical careers. He decides to invite all the students studying in his medical school to complete an online questionnaire.

Example 3

A geography student wants to find out whether bad behaviour in schools is affected by school location. She is interested in whether there is a difference between rural and inner-city schools. She chooses two areas: one where she studies at university and the other her home town. Using the personal contacts of her tutor and her parents, she contacts head teachers in four schools: one urban school and one rural school near her home town, and one urban school and one rural school near her university. Within each school she asks if she can speak to school pupils who ‘display bad behaviour’. These pupils are chosen by teachers in each school, according to their own criteria.

Example 4

A student wants to find out about levels of alcohol consumption among his fellow students. He is interested in finding out whether this varies between gender and subject studied. He decides to draw up a quota of students that includes an equal representation of male and female students, and students studying humanities, social sciences, engineering and sciences. He stands at the entrance to the university library, stopping students and asking filter questions to find out if they fit into any of his categories. If they do, he asks them a few short questions about how much alcohol they drink.

Example 5

A student wants to find out about drug taking at music festivals. She decides to attend three different music festivals during the summer months of one academic year. She intends to approach people at each festival, introduce herself, explain what she is doing and then ask about drug habits. She hopes that people will introduce her to other people and so on, perhaps by using a type of snowball sampling technique.

Activity 26 Justifying your Research Topic

Student Handout

Produce a justification for your research topic. In doing so, consider the following questions:

1. What is your reason for choosing this topic? Is this reason valid, reliable and justifiable?
2. Does the topic provide enough scope to work at the right intellectual level?
3. What is exciting about your topic?
4. Why is research on this topic needed?
5. How can you add to existing knowledge, or develop new knowledge, on this topic?
6. What is original about this topic or your approach to the topic?
7. What is the likelihood of success in your research, when compared with other work in this field and in its own right?
8. Why is your research useful and worthwhile?
9. Who benefits from your research, and how? This could be individuals, groups, specific organizations or the wider public, for example.
10. What is the expected impact of your research? ‘Impact’ includes the societal and economic benefits to be gained from your research.

Once you have produced a justification for your research topic, prepare a 10-minute oral presentation to give to your fellow students. They can ask questions about your topic justification, so be prepared to answer these and defend your chosen topic. You can also put questions to other students, so think of some questions that you might ask after they have made their presentation.

Activity 27 Defending Methodology

Student Handout

Prepare a defence of your chosen research methodology. You will need to make a short verbal presentation to the rest of the group in which you defend your methodology. Other students will be able to ask questions at the end of your presentation, so think about what they might ask and prepare some answers. You will also be able to ask questions about the methodologies of other students, so prepare some questions that you can ask. Each student will be allocated a total of 10 minutes for their presentation and for questions from other students.

Consider the following questions when you prepare your defence:

1. Why have you chosen this particular methodology?
2. Why is your chosen methodology the most appropriate for your research topic?
3. What other methodologies could have been chosen and why were they rejected?
4. How does your methodology help you to work towards answering your research question?
5. How does your chosen methodology fit with your epistemological standpoint and theoretical perspective?
6. Is it possible to refine, combine or alter your methodology (if required) yet still retain a coherent epistemological position?

When you prepare your defence, take care to avoid methodological fundamentalism. This implies that your methodology is the one true approach and that all other methodologies are flawed and/or inferior. Be prepared to critique your methodology and change, adapt or combine it with others where necessary. You may find that some alterations are required after you have completed this activity and received feedback from other students.

Activity 28 Costing a Research Project

Student Handout

Using the costing method guidelines produced by your institution (or funding body), discuss the following issues with your group members:

1. How are costs categorized?
2. For each category, think of specific examples of costs that would be included in that category.
3. What are allowable costs? Draw up a list of these allowable costs.
4. What are unallowable costs? Draw up a list of these unallowable costs.
5. Can you identify any caps or limitations on funding (this could be salary caps and stipends, or limits on equipment purchase, for example)?
6. Identify specific people or offices at your institution (or funding body) that will be able to help if you encounter any difficulties when working out costs.

Activity 29 Producing and Justifying your Budget

Student Handout

This activity requires you to produce and justify your budget. Budget justification is one of the most important parts of a grant application. You must be able to demonstrate that you are only applying for appropriate funds, that all funds are realistic, specific to the proposed research and necessary for the success of your project. You must also be able to prove value for money in terms of economy, efficiency and effectiveness. All sections of your budget justification must adhere to funding body and institutional policy.

When you produce and justify your budget, contact your chosen funding body to find out what should be included. Large funding bodies have very specific criteria, whereas smaller funding organizations may leave structure, style and content decisions to individual researchers. As a general guide, you will need to include the following when producing and justifying your budget:

- Personnel. This includes a detailed list of, and justification for, each member of staff intending to work on the project. When working out costs you need to take into account the cost of hiring any new members of staff required for the project, salary levels for their grade/expertise and the cost of fringe/employee benefits (holiday entitlement, sick leave and health insurance, for example). Salary costs should also include any increments, promotion or regrading, where appropriate. You will need to demonstrate that staffing levels are sufficient and appropriate to the needs of the project.
- Staff development. This includes training, seminars or workshops. These will need to be justified in terms of their importance and relevance to the research project.
- Travel. This includes a description of, and justification for, the travel expenses of project personnel. The cheapest prices should be quoted. Taxi fares, accommodation, tips (if relevant) and parking may need to be included.
- Equipment. This will include items that need to be purchased (or rented) for the success of the project. You will need to include methods of procurement and a justification for using a particular model and supplier.
- Supplies. This includes a description of, and justification for, items such as office supplies, phone and internet services. All items should be listed separately with costs based on current market prices.
- Consumables. This includes items such as laptops, software and charges for access to research data. Each item should be listed separately, with costs based on current market prices.
- Professional services and consultants. This section provides a detailed list of costs (fees and expenses) associated with outside professional services and consultants. The use of outside services and the methods of procurement used will need to be explained and justified. It is important to check that your chosen funding body will provide funds for professional services and consultants before you include this category.
- Data preservation, data sharing and dissemination costs. This will include detailed information about costs associated with sharing and making public the results of your research. Careful justification of these costs will help you to produce your impact statement.
- Exceptional items. This could include equipment costs over a specified amount of money, studentships and survey costs, for example. You must be able to demonstrate the importance of exceptional items and justify their inclusion in relation to the success of your project.
- Indirect costs. These include library facilities and estates, for example, and can be listed and

justified if a funding body agrees to pay all or a proportion of these costs. A standard estimate is used to generate these costs.
- Other costs. This includes other costs that are not listed in the above categories (often because they are costs unique to a particular project). These will need to be listed and justified in relation to your research.

TIPS

The following tips will help you to produce your budget justification:

- Your budget justification should follow funding body instructions as closely as possible, providing as much detail and justification as necessary, while working within any page length or word count limits.
- Be as specific as possible.
- Write your justification in the same order as the budget line items so that reviewers can compare them easily.
- Your budget justification should answer questions rather than generate new questions.
- Sample budget justifications (or examples of best practice) can be downloaded from the websites of many university research offices and provide good examples of how you should work through this process. Some research offices also provide templates that you can use to generate your budget justification for certain types of funding (such as federal funding in the USA).
- Consider the five Ws when justifying costs: who, what, when, where, why? For example, when justifying staff costs, ask the following questions: who are the members of staff? What is their role on the research project and what skills and experience can they bring to the role? When and for how long will they be working on the project? Where will they be working? Why are they required for the project?
- All funding bodies will want to see value for money. This is discussed in terms of the three Es, economy, efficiency and effectiveness, and these provide a useful way for you to work out whether your research provides value for money:
    - Economy. Are you using resources in the best way possible? For example, how will requested equipment save time and effort? Is it possible to show how you will do more for less money?
    - Efficiency. Will your research be carried out in the most efficient way? For example, do members of the team have the necessary skills and experience to carry out the required work with minimal disruption? Do you have examples of good practice that encourage efficiency?
    - Effectiveness. Is your research going to be effective? What is the intended impact and benefit to society? Can you demonstrate how your study will provide a good return on the investment from the funding body?

When justifying your budget, you must ensure (and illustrate) that your figures are appropriate in terms of funding body policy and your organization’s policy. Funding bodies will not provide more than their stated cap, however persuasive your argument. They will also want to see that all requests are consistent with your university/employer policies in terms of salary levels, benefits and so on (in most cases your budget will need to receive internal verification that it is appropriate, complete and accurate before you submit).

Activity 30 Producing a Research Proposal

Student Handout

Produce a research proposal following the guidance given below. Once you have done this, swap proposals with your selected fellow student so that you can review each other's proposals. Once you have received peer review on your proposal, modify and refine accordingly.

A research proposal is an important document that provides a detailed description of your research project. Proposals can vary in terms of structure and style, depending on the purpose, methodology and audience. A good proposal should be clear, well written, well justified in terms of topic and method, and have a clear timetable and well-developed budget (if you are applying for funding). Although proposals can vary, in general they should include the following sections:

- Title. This should be short and explanatory. It can hint at your research question, your methodology and your research population. If you are struggling to choose a title, brainstorm possible titles and choose the best, or discuss possible titles with your peers.
- Background. This section should contain a rationale for your research. Why are you undertaking the project? Why is the research needed? This discussion should be placed within the context of existing research and/or within your own experience or observation. If you are unable to find any other research that deals specifically with your proposed project, point this out, illustrating how your proposed research will fill this gap and create new knowledge.
- Aims and objectives. The aim is the overall driving force of the research and the objectives are the means by which you intend to achieve the aim. You will need to provide one clear and succinct aim (perhaps with one or two subsidiary aims) and several objectives that relate to your aim(s). Your aims and objectives must relate to your research question and demonstrate how this will be answered.
- Methodology. This section describes your proposed research methodology and provides a justification for its use. Why have you decided on this particular methodology and rejected others? How does your proposed methodology relate to epistemological standpoint and theoretical perspective? Can you foresee any problems with this methodology, and, if so, how do you intend to overcome them? If you have chosen a less well-known methodology (or a multiple or mixed approach), you may need to spend more time justifying your choice than if you had chosen a more traditional methodology.
- Research methods. These are the tools that are used to collect your data and answer your research question (samples, numbers of people to be contacted, methods of data collection and methods of data analysis, for example). You need to illustrate how these methods relate to your methodology and discuss why they are the most appropriate to answer your research question.
- Timetable. This should include tasks such as time taken to conduct background research, questionnaire or interview schedule development and piloting, data collection, data analysis and report writing, for example.
- Budget and resources. This section is required for researchers who intend to apply for funding for their project. Obtain the most up-to-date guidelines about producing a budget and costing your project from the relevant funding body or institution. All funding organizations will only meet acceptable costs and will want to see value for money, in terms of strategic importance and research impact.
- Research impact. Funding organizations and universities are interested in research impact (defined by Research Councils UK as 'the demonstrable contribution that excellent research

makes to society and the economy'). For some researchers this is both difficult and controversial. However, for most funding organizations it is a necessity. Your university research office will be able to offer further advice if you struggle with this section.

- Dissemination. This section demonstrates how you intend to let others know about the results of your research. This can be through producing a thesis and providing a copy for the university library, journal papers (including deposits in open access repositories), conference papers, internal and external seminars, blogs, lectures, monographs, chapters for books and entire books, for example.
- References and bibliography. The reference section contains all the literature to which you have referred in your proposal, and the bibliography contains all other relevant literature. Ensure that you use the correct referencing procedure required by your institution.

When writing your research proposal, and reviewing the proposal of your peer, make sure that the following questions can be answered:

1. Is the research question of sufficient importance?
2. Has the originality of the topic been clearly demonstrated?
3. Has it been made clear that the research will add to existing knowledge or generate new knowledge on this topic?
4. Does the proposal illustrate comprehensive knowledge of the background literature and/or the topic to be researched?
5. Are the aims and objectives clear, succinct and unambiguous?
6. Are the aims and objectives realistic in terms of what can be achieved during the research (available resources, time, access to participants, for example)?
7. Do the aims and objectives support the methodology?
8. Is the connection between epistemological standpoint, theoretical perspective and methodological position clearly stated and well defined?
9. Has the chosen methodology been well justified, and have reasons given why other methodologies were not chosen?
10. Have methodological limitations been highlighted?
11. Does the adopted approach match the issues to be addressed?
12. Is the proposed timescale appropriate and realistic? Is the overall plan achievable in the time available?
13. Is information about the data collection method(s) sufficiently detailed?
14. Is information about the data analysis method(s) sufficiently detailed?
15. Is there enough information about required resources and budget? Are all costs relevant and justified?
16. Is it clear how the results are to be disseminated?
17. Has the expected impact of the research been demonstrated?

Activity 34 Knowing about Real-World Scientific Research

Student Handout (1)

Group role 1

You are a group of researchers working for a pharmaceutical company. You have been invited into a local school to talk to a group of pupils who are beginning to plan their future careers. You must explain what it is that you do in your role as a researcher for the pharmaceutical company. You can decide what type of research you are undertaking, but make sure that you explain how the research is conducted and, in particular, how you undertake experiments. You must convince the pupils that this would be an interesting and worthwhile career move for them. You must also convince them of the value, benefits and impact of your work.

You can use any presentation hardware, software or props that you think appropriate. Make the talk as interesting and entertaining as possible and be prepared to receive questions.

Group role 2

You are the members of an editorial board of a highly regarded scientific journal. You have been invited to give a talk to postgraduate science students who need to submit journal articles to further their scientific careers. You must offer advice about what constitutes a good journal article. What information should be included in the article? How should research/experiments be described and reported? Why are journal articles (and particular types of research) rejected? What can postgraduate students do to increase their chances of success?

You can use any presentation hardware, software or props that you think appropriate. Make the talk as interesting and entertaining as possible and be prepared to receive questions.

Group role 3

You are a group of researchers working in collaboration on a scientific research project (you can choose the topic and type of research). You need to apply for funding for your research and have been invited to put your case before members of a funding body. You must describe your research, say why it is important and provide information about benefits and impact. You must be as persuasive as possible, but you must remember that you are talking to a lay audience. They will need to understand, exactly, what it is that you propose to do and they will want to know that the research will provide value for money and be worthwhile.

You can use any presentation hardware, software or props that you think appropriate. Make the talk as interesting and entertaining as possible and be prepared to receive questions.

Group role 4

You are a group of university recruitment staff looking to recruit suitable staff for research positions within the science department. You are to give a talk to potential applicants. You must ‘sell’ the jobs to these high-flying potential applicants, describing what the job entails, the type of research that is

undertaken and the benefits and impact of this research. You must make the work sound very appealing as you are trying to recruit the best applicants.

You can use any presentation hardware, software or props that you think appropriate. Make the talk as interesting and entertaining as possible and be prepared to receive questions.

Student Handout (2)

Role for the rest of the group 1

You are a group of school pupils who are starting to think about your future careers. Some researchers from a local pharmaceutical company have been invited to give a talk to you about what they do and the benefits of their work. Listen to their presentation and be prepared to ask questions, relevant to your role as school pupils thinking about your careers.

Role for the rest of the group 2

You are a group of postgraduate science students. The editorial board of a highly regarded scientific journal has been invited to talk to you about submitting a good journal article. You are hoping to make a career in academia, so it is important that you increase your publication record. Listen to their presentation and be prepared to ask questions, relevant to your role as postgraduate science students.

Role for the rest of the group 3

You are members of a funding body who have the power to accept or reject funding applications. A group of collaborating researchers are to pitch their project to you so that they can ask for funding. You must listen to their pitch and ask further questions, relevant to your role as members of the funding body. If you wish, you can decide whether or not to accept the application, but you must give reasons for your decision.

Role for the rest of the group 4

You are high-flying potential researchers looking for a good research job in a university science department. You are to attend a talk given by some university recruitment staff. They will explain more about the jobs on offer and the type of research that is involved and you should ask questions, in your role as potential applicants. You can decide whether to apply for the jobs at the end of this role-play if you wish, but you must give reasons for your decision.

Activity 35 Avoiding Mistakes in Experiments

Student Handout

You have 20 minutes to discuss the following questions with your group members:

1. What mistakes can occur when you are conducting experiments?
2. What can you do to overcome or avoid these mistakes?

Draw up a list of all these mistakes, along with a list of solutions that would help to overcome or avoid the mistakes. When you have done this you will be required to compete with the other group to see who can identify the most mistakes and come up with the best solutions.

Activity 38 Constructing Questions

Student Handout

Read the following questions and decide what is wrong with them, if anything. Think about how you might rectify the problems you have identified.

Question 1

What is wrong with the young people of today and what can we do about it?

Comments

_____

_____

_____

_____

Question 2

Do you go swimming?

- Never ○
- Rarely ○
- Frequently ○
- Sometimes ○

Comments

_____

_____

_____

_____

Question 3

What do you think can be done about global warming?

Comments

_____

_____

_____

_____

Question 4

Most medical professionals agree that smoking causes lung disease. Do you:

- Strongly agree ○
- Agree ○
- Neither agree nor disagree ○
- Disagree ○
- Strongly disagree ○

Comments

_____

_____

_____

_____

Question 5

Do you agree that students should not have to take an exam at the end of their course?

- Yes ○
- No ○

Comments

_____

_____

_____

_____

Question 6

Has your son ever stolen anything? If so, what and when?

Comments

_____

_____

_____

_____

Question 7

What do you think about the left-wing media’s attempt to blackmail the government?

Comments

_____

_____

_____

_____

Question 8

How much food do you think the average family throws away in a week?

Comments

_____

_____

_____

_____

Question 9

How much do you earn?

Comments

_____

_____

Question 10

What is your ethnicity?

Comments

Activity 39 Producing an Interview Schedule

Student Handout

Produce an interview schedule for your research. This can be an interview schedule for a one-to-one interview or for a group interview, such as a focus group. An interview schedule is a list of topics and/or questions that are to be discussed or asked in the interview. It can also include introductory information such as who you are, what your research is about, and issues of anonymity and confidentiality. This information will act as a prompt if you are new to interviewing.

Whether you choose to use a list of topics or a list of questions depends on your methodology (and your personal preference). For example, if you are intending to conduct structured interviews, the same questions are asked in each interview and questions are grouped into predetermined categories that will help to answer your research question or confirm/disconfirm your hypothesis. Therefore, you will need to produce a list of specific questions to be asked (and answered) rather than topics for discussion.

If, however, you intend to conduct a life history interview or an unstructured interview, your goal is a free-flowing discussion in which interviewees are able to discuss issues that are important to them and where you can probe for more detail. In this case you may prefer to develop a list of general topics that are to be discussed. If you are new to this type of unstructured interviewing you may find it beneficial to develop a few ‘warm-up’ questions. You can start the interview with these questions: they will help both you and the interviewee to relax and help the interview to flow smoothly.

Semi-structured interviews ask standard questions of each respondent but also allow for additional questions and probing for detail, if required. In this case you could develop both questions and a list of topics, again asking specific ‘warm-up’ questions at the beginning of the interview to help you and the interviewee relax. Developing good questions in advance is a useful tactic for students new to interviewing as it helps to ensure that you don’t ask poorly worded, leading or double-barrelled questions.

Once you have developed your schedule, undertake several pilot interviews with a small sample of your research population to make sure that the questions can be understood, are relevant and can be answered easily by the interviewee (the actual number of pilot interviews required depends on the type of interview, your topic and your personal preference). Once you have piloted your schedule to your satisfaction, modify your questions and/or topics accordingly.

The following guidance will help you to produce your interview schedule:

- Brainstorm your research subject. Write down every topic that you can think of, within your subject, without analysis or judgement.
- Read around, and discuss, your subject. Expand your brainstorm list with anything else that you deem to be important.
- Work through your list carefully, discarding irrelevant topics and grouping together similar suggestions. Ensure that all topics are relevant to your aims, objectives and research question.
- Order topics into a logical sequence, leaving sensitive or controversial issues until the end. Move from the general to the specific.
- Think of questions relating to each of these topics. Ask about experience and behaviour before

asking about opinion and feelings (if this is relevant to your research methodology). When thinking of questions, consider the following:
    - If you are developing questions for an unstructured interview, make sure they are open rather than closed. This enables the interviewee to speak freely without constraining responses (the best questions are those that elicit a long response). If you are undertaking structured interviews, close-ended questions should be used. A combination of both types of question can be used in semi-structured interviews.
    - Keep questions short and to the point. Use language that will be understood by your interviewees. Avoid jargon and double-barrelled questions (two questions in one).
    - Ensure that every question is relevant to your research question and will help you to meet your aims and objectives.
    - Think of some general 'probe' questions. These help you to clarify issues that have been raised or to obtain more information on a topic, for example.
- Once you have thought of your questions, write them down on your schedule (or write your list of topics, perhaps with a couple of questions under each topic, depending on your preference).
- Take time to read through, and become familiar with, your interview schedule so that when you begin your interviews they will flow smoothly (some researchers find it useful to memorize their schedule, if feasible, so that they can focus on the interviewee, rather than their schedule).

Activity 40 Running a Focus Group

Student Handout

Student role 1: Digression

You are to try to digress away from the topic under discussion when the opportunity arises. You can use any method you wish, but please ensure that you do not cause offence.

Student role 2: Disruption

You are to disrupt the discussion, when the opportunity arises. You can use any method you wish, but please ensure that you do not cause offence.

Student role 3: Breakaway conversation

You are to hold a ‘breakaway conversation’ with a fellow student, when the opportunity arises. Do this when someone else is talking, but please try not to be offensive when you do this.

Student role 4: Dominance

You are to try to dominate the discussion. Use any method that you wish to do this, but try not to cause upset or offence.

Activity 41 Establishing Rapport

Student Handout

This activity is about establishing rapport. This involves the building of a harmonious and trusting relationship between researcher and participant(s) so that they feel comfortable and can communicate well with each other. Researchers can find it difficult to establish rapport if, for example, they are communicating with people who have very different political views, ways of life or cultural beliefs. However, the establishment of good rapport is a key element in gaining cooperation and completing an interview, focus group or fieldwork.

The following scenarios provide real-world examples of situations in which difficulties have been encountered. Work through each example and discuss the issues raised with your fellow group members. Once you have done this, be prepared to discuss your ideas in a tutor-led discussion.

Scenario 1

A researcher is to interview a local landlord about his experiences of being a landlord and his decision not to let his property to students. When the researcher arrives at the landlord's house she notices a British National Party (BNP) poster in the window (this is a far-right political party in the United Kingdom that has been criticized for fascist, racist and homophobic views). During initial discussions the landlord expresses surprise that the researcher is 'young, pretty and female'. He asks if she is married and whether she has any children. This leads him into a rant about how local working-class women are breeding only to 'jump the housing queue' followed by a tirade on immigration and problems with local housing.

Discussion

How do you think the researcher should handle this situation? How can she establish rapport (indeed, should she establish rapport)?

Scenario 2

A researcher is to interview a man about his reasons for returning to education later in life. The interview is to take place at the man's home, which is on the 24th floor of a high-rise apartment block. The researcher suffers from claustrophobia and asks if it would be possible to take the stairs, rather than the lift. He is told that this is not advisable as he is likely to find drug addicts or 'a dead body' in the stairwell. The researcher is very flustered by the time he arrives as the apartment, which has a steel door covered in graffiti. He is invited in to the apartment where he finds the interviewee with two friends, smoking cannabis. The researcher is invited to smoke with them before the interview begins.

Discussion

How do you think the researcher should handle this situation? Do you think the interview can go ahead and, if so, how can the researcher establish rapport? Is there anything that the researcher could have done to prevent these problems from occurring?

Scenario 3

A researcher is to conduct a focus group with prisoners who are enrolled on a basic skills course. Arrangements have been made with the education department in a maximum-security prison and the researcher turns up at the allotted time. She is searched and has her audio device taken off her, despite assurances from the education department that she would be able to record the focus group. She is escorted to the room where 15 prisoners are waiting. She introduces herself and notices that the prisoners are sitting with arms crossed, looking defensive, angry and rather intimidating.

Discussion

How do you think the researcher should handle this situation? Why do you think the prisoners are being defensive and intimidating? What can the researcher do to gain trust and establish rapport?

Scenario 4

A researcher is to meet with the director of a large finance company to discuss attitudes towards economic growth. It has been made clear that time is limited and the interview will have to take place between important business meetings.

Discussion

How should the researcher prepare for this interview? What can he do to ensure that rapport is established as quickly as possible so that the interview runs smoothly and within the allotted time?

Scenario 5

A researcher is meeting with a group of 15-year-old students to find out what they think about going to university. This particular group of students have no experience of university: no one in their family has ever gone to university and none of their friends are thinking about going to university. When the researcher introduces herself and explains what her research is about, the students start to laugh.

Discussion

How should the researcher handle this situation? What can she do to establish rapport and encourage the students to talk to her and take the discussion seriously?

Activity 42 Listening to Interviewees

Student Handout

Ask the interviewee the following questions. However, you must try your hardest not to listen to the answers. You can use any means possible, apart from walking away or covering your ears. Be as inventive as possible. Try not to hear *any* answers. Don't disclose this role to the interviewee or observers, until asked to do so during the discussion at the end of the role-play.

1. What is your name?
2. Where were you born?
3. Where did you go to school?
4. What course are you studying?
5. Why did you choose this course?
6. Describe your favourite book.
7. Describe your favourite place to visit.
8. Describe your favourite food.
9. Describe your favourite animal.
10. Describe your favourite season of the year.

Once you have asked these questions, wait for instructions from your tutor.

Activity 43 Understanding Group Dynamics

Student Handout

Work through the following scenarios in your group, answering the questions given after each scenario.

Scenario 1

In an action research project a researcher has been working together with a group of teenagers to think about, develop and implement ideas for improving their local youth centre. So far the researcher has held two meetings with the group of eight teenagers, and the group has been successful in putting forward various ideas for consideration and possible development.

However, at the third meeting the researcher notices that two of the teenagers are sitting with arms folded, looking bored and not contributing to the discussion. Three teenagers, in particular, have a lot to say, offering comments on what to do and how it should be done. When the researcher asks for input from other members of the group, none is given. The researcher also notes that glances are being exchanged between the two bored-looking teenagers, in particular when one of the enthusiastic teenagers is speaking. After 10 minutes, one of the bored-looking teenagers, stands up and says 'I'm not listening to this rubbish anymore,' and leaves the room, followed closely by the other bored-looking teenager.

1. What group dynamic issues are pertinent to this scenario?
2. How do group members communicate these issues?
3. Is it possible for the researcher to record and analyse these different methods of communication?
4. What do you think has happened to create these group dynamic issues?
5. What do you think the researcher can do to overcome the issues you have identified?

Scenario 2

A researcher is to hold a focus group with people working on the production line in a children's toy factory. He has already made contact with a supervisor who has chosen nine people to take part in the focus group, along with the supervisor herself. As the focus group progresses the researcher notices that the supervisor is doing most of the talking and that the rest of the group are not offering any opinions, but are merely agreeing with the supervisor. All opinions are extremely positive. The factory management seem to be very well liked, and cannot put a foot wrong. The work is easy, the pay is good. The researcher is rather surprised by these comments as a focus group in a similar factory, in a different city, produced very different data.

1. What group dynamic issues are pertinent to this scenario?
2. What do you think has caused the issues that you have identified?
3. What can the researcher do to avoid these issues in the future?
4. Is the information gained in this focus group of any use to the researcher?

Scenario 3

A researcher lived with an all-male biker gang while undertaking an ethnographic study. Tension with a rival biker gang had been escalating over the months, and the leader of the gang decided that it was about time that they sorted out their differences. Other members of the gang did not want a fight, which they knew could be brutal and leave many of them injured or even worse. They argued with their leader, asking that he backed down. The leader appeared to back down but, two days later, managed to orchestrate a chance meeting with members of the rival gang. An argument ensured. This rapidly developed into a fight, and then into a full-blown gang war. As feared, many gang members were injured and two were killed.

The researcher didn't take part in the fight, but was present as it happened. He was arrested, along with 30 gang members. Although the researcher was cleared of all charges, he was subpoenaed and had to testify in court. The gang would not let him continue with his research.

1. What group dynamic issues can you identify?
2. What role do you think the researcher held within the group?
3. Could and should the researcher have done anything to prevent the gang war?
4. Should the researcher try to renegotiate entry into the group? If so, how could he do this?

Activity 44 Recording Techniques

Student Handout

Group 1

In your group during independent study, think about the different types of recording equipment and/or recording methods that you could use in a qualitative study that uses methods such as one-to-one interviews, open-ended questionnaires and focus groups. Find some specific examples of the type of equipment and/or methods that you have identified and research the following information:

Type of equipment
Suggested brand (if relevant)
Price (or price range, if relevant)
Where you can purchase, hire or obtain for free
Strengths
Weaknesses
Ethical implications
Advice for potential users

You must present your findings in a 10-minute presentation to your fellow students in the next teaching session. Therefore, ensure that the information is as useful, up-to-date and relevant as possible. Be prepared to answer questions put to you by fellow students.

Group 2

In your group during independent study, think about the different types of recording equipment and/or recording methods that you could use in a quantitative study that uses methods such as postal surveys, telephone surveys and structured, face-to-face interviews. Find some specific examples of the type of equipment and/or methods that you have identified and research the following information:

Type of equipment/method
Suggested brand (if relevant)
Price (or price range, if relevant)
Where you can purchase, hire or obtain for free
Strengths
Weaknesses
Ethical implications
Advice for potential users

You must present your findings in a 10-minute presentation to your fellow students in the next teaching session. Therefore, ensure that the information is as useful, up-to-date and relevant as possible. Be prepared to answer questions put to you by fellow students.

Group 3

In your group during independent study, think about the different types of recording equipment and/or recording methods that you could use in an ethnographic study, during fieldwork. Find some specific examples of the type of equipment and/or methods that you have identified and research the following information:

Type of equipment/method
Suggested brand (if relevant)
Price (or price range, if relevant)
Where you can purchase, hire or obtain for free
Strengths
Weaknesses
Ethical implications
Advice for potential users

You must present your findings in a 10-minute presentation to your fellow students in the next teaching session. Therefore, ensure that the information is as useful, up-to-date and relevant as possible. Be prepared to answer questions put to you by fellow students.

Group 4

In your group during independent study, think about the different types of recording equipment and/or recording methods that you could use in a research project that uses online technology, including online surveys, discussion forums, and voice and video communication. Find some specific examples of the type of equipment and/or methods that you have identified and research the following information:

Type of equipment/method
Suggested brand (if relevant)
Price (or price range, if relevant)
Where you can purchase, hire or obtain for free
Strengths
Weaknesses
Ethical implications
Advice for potential users

You must present your findings in a 10-minute presentation to your fellow students in the next teaching session. Therefore, ensure that the information is as useful, up-to-date and relevant as possible. Be prepared to answer questions put to you by fellow students.

Activity 46 Using Visual Methods

Student Handout

This activity is about visual methods. There are four ways that visual methods are used in research:

1. Studying phenomena or society through the production of images by the researcher (the researcher produces images such as graphs, mind maps, mathematical representations and diagrams to help explain or describe results, themes or hypotheses, for example).
2. Studying visual images created by others to help understand and explain phenomena, human interaction, behaviour and social life (sculpture, paintings, cartoons, comics, film and photography, for example). These images have not been created for the purpose of research, but can be used for research.
3. Studying visual images that have been created by research participants for the purpose of research (a child can be asked by the researcher to draw a picture on a particular subject, for example). The researcher provides instructions on what to produce.
4. Enabling others to produce visual images (by providing video-recording equipment, for example) so that stories can be told from the perspective of individuals and communities. The participants make decisions about what to produce, rather than the researcher telling them what to produce.

Find a research project, report or study that has used one of the visual methods described above. You will need to provide a link, reference or uploaded image (taking care not to breach copyright) for your chosen example, so make sure that you take a note of this information.

Produce a short review and critique of your chosen study, paying particular attention to visual methods. This can include, for example, information about how and why the visual methods have been used, strengths, weaknesses and ethical implications. Post your chosen example on the relevant digital platform, along with your review and critique. Ensure that you provide a link, reference or uploaded (non-copyrighted) image of the example you have identified.

Take time to review the posts of fellow students, and offer comments and feedback where relevant. You can also pose questions that will help your peers to think more about how visual methods are used in research. This will be a useful resource to access if you choose to use visual methods in your own research project.

Activity 47 Designing Questionnaires

Student Handout

Design a questionnaire for your research project, taking note of the following advice:

- Make sure that your questionnaire follows a logical, ordered sequence, with topics grouped into sections. Start with an introduction (explaining what the research is, who is conducting it, what will happen to the results and how long the questionnaire will take to complete). Finish with a conclusion (a short sentence thanking respondents for taking part).
- Your questionnaire should be as short as possible. Don't ask unnecessary questions or any that are not relevant to your research topic. Ensure that every question helps to answer your research question and helps you to achieve your aims and objectives. Delete those that don't.
- Produce straightforward, clear and short questions. Start with easy-to-answer questions and, if you have to ask more complex questions, do so towards the end of your questionnaire.
- Include filter questions that enable respondents to skip sections that are not relevant to them.
- Make sure that your questions are free of prestige bias (questions that could embarrass or force respondents into giving a false answer).
- Don't assume knowledge or make it seem that you expect a certain level of knowledge by the way that your questions are worded.
- Don't create opinions artificially by asking someone a question they know nothing about or they don't care about.
- Pay close attention to vocabulary: avoid technical words and jargon and don't use words that have multiple meanings.
- Avoid double-barrelled questions (two questions in one), negative questions and leading questions.
- Try to avoid causing upset, offence, frustration or anger by the way that your questions are worded or asked.
- If you are dealing with sensitive topics that could lead to embarrassment or sadness, for example, it might be better to ask an indirect question rather than a direct question. This could include asking the respondent to think about how other people might behave in or react to a given situation, rather than asking them to think about how they personally would behave or react. Asking participants to understand another person's perspective, or asking them how they see (or position) other people, can be a useful way to ask about sensitive topics.
- Avoid vague words such as 'often' and 'sometimes'. Use specific time-frames when asking about behaviour. Also use specific place-frames, where relevant.
- Provide all possible responses in a closed question and consider all alternatives. Make sure that all frequencies and/or time-frames are supplied, if you are using them. Include a 'don't know/not applicable' response so that respondents are not forced into an answer when they do not, or cannot, have an answer.
- Ensure that your questionnaire is suitable for the mode of administration. For example, if it is to be a self-administered questionnaire, ensure that clear instructions are given to respondents. If it is to be administered by telephone, ensure that questions sound right and can be easily understood.
- Make sure that your questionnaire looks professional (choose your font type and size wisely, avoid clutter and include plenty of white space, for example).

Activity 48 Administering Questionnaires

Student Handout

Work with your group members to identify the different methods that can be used to administer (distribute, deliver, dispense or issue) questionnaires. For each of the methods that you identify:

- highlight the strengths of the administration method;
- highlight the weaknesses of the administration method;
- provide advice and guidance for students who might be thinking about using this particular administration method for their research.

Once you have done this, post and share your ideas using the suggested digital platform. Provide as much detail and useful information as possible so that you and your fellow students can assess the merits of the different methods. You can use this resource to help you choose an appropriate administration method for your questionnaire in your research. Remember that the administration method that you choose will have an influence on the design of your questionnaire.

Activity 50 Using the Internet as a Tool for Research

Student Handout

Discuss, with your group members, the different ways that the internet can be used as a tool for research. Think about the strengths, weaknesses and ethical implications of the different tools, methods and uses that you have identified.

Produce a podcast (audio or video) that can be uploaded and shared with fellow students for peer review and feedback. Discuss and/or illustrate the tools that you have identified, highlight strengths and weaknesses, discuss ethical implications and offer any other advice that you deem useful and relevant. Ensure that the podcast/video is as useful as possible to fellow students. Be creative and make the podcast interesting and entertaining.

Activity 51 Reading Scientific Material

Student Handout

Consider the following real-life statements made by students who are new to reading scientific material at university. Discuss each statement with your group members and identify solutions to the stated problems and/or come up with practical methods that can be used to overcome the problems that the students have articulated.

1. I hated science at school. I always did really badly in exams and now I'm really worried about having to read all this scientific stuff at university 'cos I know I will do badly again.
2. It might sound weird, but I'm actually scared of maths. I get really nervous when I see all those figures in a report or book.
3. I go blank when I see tables and charts and graphs and equations and things. I don't understand them. It's like I'm maths and science dyslexic or something.
4. I can't get to grips with all the scientific jargon: they just seem to write in a way that nobody can understand.
5. I really don't know how to go about reading a scientific paper. It seems so complicated and I seem to switch off.
6. There's so much scientific material available related to our course. How on earth do you go about reading it all? Where do you get the time?
7. I can't critique a scientific paper. I don't know what I'm talking about. They are the experts, not me. It makes me feel like I'm a fraud or a young upstart or something.

Activity 53 Storing and Using Data

Student Handout

You have been successful in obtaining a new job as a data steward. You are responsible for planning, implementing and managing the sourcing, use and maintenance of data elements (both content and metadata) within your organization. This is a new post: previously there was no single employee responsible for data management and the system was in disarray. You have been given the task of tidying up and organizing the system of data management within your organization.

Your first task is to produce a policy statement about storing and using data. This is an organization-wide document that prescribes acceptable behaviours, methods and procedures relating to the storage and use of data, including data governance, control, security, privacy and compliance policy. Produce your document for discussion in the next teaching session. The type of organization for which you work, and the style and content of your policy statement, are your choice. However, you must ensure that all relevant data storage and usage issues are covered.

Activity 54 Making Use of Statistics

Student Handout

The British Academy has produced a report called *Count Us In: Quantitative Skills for a New Generation* (available for download from www.britac.ac.uk). Concern is raised in this report that universities 'often struggle to equip students with the quantitative skills they need: for democratic participation; for producing, procuring and interpreting research; and in the workplace'.

Imagine that you are a university course director and your remit is to improve the quantitative skills of your students. What would you do? How can you improve their quantitative skills? Think about the sort of information that you would find useful to improve your quantitative skills. What would help you to understand more about statistics and know how to find and use quantitative sources efficiently and effectively?

We are going to build a digital resource called 'Making Use of Statistics' that will provide all the information, advice, guidance, tips and support required by students to help them to make use of statistics during their research, on their course and in everyday life.

We will build this resource early in your course so that you can access it at any time during your studies and when you are carrying out your research. If you encounter problems with statistics, maths or data analysis techniques, or you need information and guidance, you can post a question and receive help and advice from other students and tutors. You can also offer advice yourself, either by providing tips and guidance or by answering the questions that are asked by your peers. Remember to monitor the resource as your course progresses. The intention is to provide practical, creative, useful and instructive advice for you and your fellow students that can be accessed at any time.

Activity 57 Analysing Quantitative Data

Student Handout

A book editor has asked you to contribute to a new textbook on data analysis techniques. She would like you to write a section for this textbook on your chosen data analysis method(s). The book is aimed at students studying at the same level as you, but you should presume that the readership knows nothing about your chosen method(s).

The style and content are a personal choice, but you must ensure that you write about your data analysis method(s) in a way that will be understood by other students. You will need to explain what your method(s) is, how it is used and any other relevant information, such as strengths and weaknesses and advice to students who are thinking about using this method(s). You may also need to point out other relevant issues, such as sampling techniques and drawing conclusions from your data.

Write your piece from a position of knowledge and understanding. This will require you to focus in on, and get to grips with, your chosen method(s) of analysis. You may need to practise using your analysis method(s), undertake further background reading, attend a training session and/or work through an online tutorial before you write your piece for the textbook.

Activity 59 Ensuring Validity and Reliability in Quantitative Research

Student Handout

Find a research paper, related to your research topic, which reports the results of a quantitative study. As you read through the paper, decide whether the researcher has addressed the validity and reliability issues discussed in this handout. If you think any of this information is missing, or there is not enough evidence for you to make a decision, think about how the researcher could improve their study and/or the type and amount of information provided in the paper.

Look first for 'validity'. This refers to the accuracy of the measurement, asking whether the tests that have been used by the researcher are measuring what they are supposed to measure. There are different types of validity in quantitative research:

- 'Face validity' refers to whether the tests that have been performed, or the questions that have been asked, are effective in terms of the stated aims. Are they a reasonable way to obtain the information required? Do they appear to be right?
- 'Content validity' refers to the extent to which an instrument measures what it purports to measure. Do the questions or tests reflect the research subject, are all issues included and has anything been left out? Is a particular question or test essential, useful or irrelevant?
- 'Construct validity' refers to how well an instrument measures the intended construct. Are the inferences (made on the basis of this measurement) appropriate? How well does the test or experiment measure up to its claims? Two subtypes of construct validity are:
    - 'convergent validity', which refers to the extent to which measures that should be (or are expected to be) related are, in reality, related; and
    - 'discriminant validity', which refers to the extent to which measures that should be (or are expected to be) unrelated are, in reality, unrelated.
- 'Internal validity' refers to how well a test or experiment is performed (including the elimination of bias) and to what extent a causal conclusion is warranted. Are the inferences regarding cause and effect or causal relationships correct and backed up with evidence? Have all confounding variables been eliminated? Are alternative explanations possible?
- 'External validity' refers to the extent to which the results of a study can be generalized to other situations, settings, populations or over time. Has the study been replicated, perhaps with different subject populations or in different settings? If not, has enough information been provided for others to replicate the study?
- 'Predictive validity' refers to the extent to which the measure being used can make predictions about something that the measure should be able to predict theoretically (behaviour, performance or outcomes of an experiment, for example). Have predictions been made that are found to be true? Are the research results a useful predictor of the outcome of future experiments or tests?
- 'Concurrent validity' refers to how well the results of a particular test or measurement correspond to those of a previously established measurement for the same construct. Does the test or measure correlate well with a measure that has been validated previously?

Look next for 'reliability'. This refers to the way that the research instrument is able to yield the same results in repeated trials. It refers to consistency of measurement and asks whether other researchers would get the same results under the same conditions. The following methods can be used to determine the reliability of measurements. As you read through the paper, identify whether any of

these tests have taken place. If not, think about what the researcher could do to help you further determine the reliability of their work.

- ‘Inter-rater reliability’ (or ‘inter-observer reliability’) is used to show the degree of agreement, or consensus, between different raters or observers. It gives a score on how much homogeny or consensus there is and is used to check that scales are not defective, ensure that raters are well trained and/or eliminate experimenter bias.
- ‘Test–retest reliability’ assesses the consistency of a measure from one time to another. The same test is administered to the same people at two points in time. Results are compared: the closer the scores the more reliable the results.
- ‘Inter-method reliability’ assesses the degree to which test scores are consistent when there are variations in methods or instruments. For example, ‘parallel form reliability’ requires two sets of different questions on the same construct to be administered to the same sample of people. The correlation between these two sets of questions provides an estimate of reliability.
- ‘Internal consistency reliability’ is used to assess the consistency of results across items within a test (on one occasion). It is based on the correlation between different items that propose to measure the same general construct. High scores suggest good internal consistency. ‘Split-half reliability’ is an internal consistency measure. The test is split into two halves, the whole instrument is administered to a sample of people, and the score for each half calculated. The split-half reliability estimate is a correlation between the two scores.

If you are intending to produce your own quantitative research, ensure that you address the relevant issues discussed above so that other researchers (and your tutor and examiners) can assess the validity and reliability of your research.

Activity 61 Analysing Qualitative Data

Student Handout

A book editor has asked you to contribute to a new textbook on data analysis techniques. She would like you to write a section for this textbook on your chosen data analysis method(s). The book is aimed at students studying at the same level as you, but you should presume that the readership knows nothing about your chosen method(s).

The style and content are a personal choice, but you must ensure that you write about your data analysis method(s) in a way that will be understood by other students. You will need to explain what your method(s) is, how it is used and any other relevant information, such as strengths and weaknesses and advice to students who are thinking about using this method(s). You may also need to point out other relevant issues, such as sampling techniques and drawing conclusions from your data.

Write your piece from a position of knowledge and understanding. This will require you to focus in on, and get to grips with, your chosen method(s) of analysis. You may need to practise using your analysis method(s), undertake further background reading, attend a training session and/or work through an online tutorial before you write your piece for the textbook.

Activity 63 Coding and Categorizing Qualitative Data

Student Handout

Below is a section of transcript from an interview with an apprentice. Work through the transcript, in your group, coding and categorizing themes, issues, topics and/or concepts that you deem important. The method(s) that you use to undertake this task is a group choice.

Once you have done this, prepare a 10-minute presentation to explain how you have coded and categorized the transcript. You will give this presentation to your fellow students in the next teaching session. A few minutes will be available for questions, so think about what other students might ask and prepare some suitable answers.

Apprenticeship transcript

INT: When did you leave school?

So I left sixth form in 2009 and the whole time I was there they kind of said to me, you know, university is the only way forward, you're not going to get anywhere in your life if you don't go to university, you've got to do your statement just as a back-up and I said no, I'm not going to do a statement and they got really angry with me. They were like no you've got to do it and so I would just sit there in lessons and just like look up apprenticeships and they were like why are you looking up apprenticeships and I was like 'cos that's what I want to do and they were like OK give [the local training centre] a ring and that was it, that was the only thing that was mentioned about apprenticeships and I think their view is quite backwards about it.

What A levels were you studying?

I did English Literature, History, German and Photography.

And you said staff at your school expected you to go to university?

Well yes, I think that's one of the kind of sticklers with apprenticeships, it's kind of seen as if you don't do very well with your GCSEs then apprenticeships are the only option.

How did you know about apprenticeships in the first place?

It had kind of been mentioned to us when we started sixth form like they kind of gave us guidance, so you know, the next step is you can go to university which we encourage you to do, you can go straight into work or you can do an apprenticeship. But nothing was touched upon with apprenticeships or work, it was all go to university. My dad was an apprentice anyway, he's a welder, so he was an apprentice since he was seventeen, so I kind of asked him about the whole apprenticeship scheme, so like, although it's changed it gave me an insight. So I got more information from him than anyone else so I was determined that I was going to do an apprenticeship. So I left sixth form in 2009 and I was working at [a local clothes store] part-time and they said we can give you more hours so I was doing about 35 hours a week and I was searching for an apprenticeship. I Googled apprenticeships and it came up with the National Apprenticeship website so I signed onto that and I had a look at the vacancies in the area. I applied for a couple and didn't hear anything back, they were

for like basic admin assistant and then it got to December time and I was still at [the local clothes shop] and I hadn't heard back from any apprenticeships and I hadn't had any feedback so I was kind of panicking.

Did you have any guidance?

So I had no guidance, I didn't know who to talk to about it so I decided to apply to university, but I only applied to [a local university] because I didn't want to be away from home that much.

What course did you apply for?

So I applied for Arts and Events Management and Marketing and Advertising. And I sent off my UCAS a week before it was due and I heard back from them within about a month and they offered me an interview, but at the same time I'd also applied for an apprenticeship with [a local marketing company] and I went for an interview at the university on the Monday and I got the apprenticeship on the Friday, so I had two interviews and I got both of them. It's obviously two different routes, so I really had to decide because I couldn't say oh this was further, this was more money, so I chose the apprenticeship route because they'd taken a chance on me and I thought I could just do it and get the experience, which I think is the most valuable thing. You can have all the qualifications in the world and have no experience at all.

So you started as an apprentice?

Well I met with [the company director] and she said, you know, you're over eighteen so we have a problem, the government doesn't supply funding for over eighteens as easily so I said, OK I'll do it for free because I really wanted the experience, I wanted to do it, I'd never done anything in marketing before and I really wanted to go out there. It was kind of like a challenge for me because it was taking me out of my comfort zone, I was travelling to [a city 30 miles away] every day on the train and it was a completely new position. I could be who I wanted to be, I could invent myself in a kind of way. So it was nice so I did that and became really good friends with them all, but after a while, because I was still working at [the local clothes shop], so I was doing six days a week and five were unpaid so it really took its toll on me and I was really exhausted and I just couldn't do it anymore. So although I had a great experience there and I'm still friends with the girls I worked with, although I really loved working there I just couldn't do it so I decided to hand in my notice.

What did you do then?

I met [a woman] from [a local marketing company] and I've known her a couple of years because my mum used to work with her, so I gave her a call and she said she was looking for an apprentice. So I said yes, I've done marketing unpaid for six months and she said do you want to come around and I had an informal interview with her.

Would you recommend others do what you did?

I think if your heart's in it then do it, if you're committed to doing it then go for it. But I mean there comes a point when somebody will probably take advantage of that, which I was kind of getting the sense of that, because they were asking more of me and they were asking me to take work home and it just got a bit too much, but I mean you've got to start somewhere. And I built up the experience in that

six months, you know, it was definitely worth doing, it was a tough six months and it just completely physically and emotionally drained me, but yes, I think it was important.

You said your dad did an apprenticeship. Were your parents supportive?

Yes, definitely, you know, I said to them I've applied to university and they were like oh that's brilliant, and I was like I've also applied for an apprenticeship and they were like oh that's brilliant. So they were both like whatever you want to do, whatever makes you happy and obviously they are really supportive of me now because I'm still living at home and I only get my apprenticeship wage, but yes, they really supported me and encouraged me to do well.

Do you feel members of staff at your school were supportive?

I think really like, when we were at school we had like, I think it was PSE, or PHSE, I can't remember what it was called, but it was all like sex education and things, but I think I do remember vaguely touching upon interviews, but I do think they really need to improve on that 'cos a lot of people don't have the support from home and some people, you know their parents may never have had a job, you know, no fault to their own it could be, but some people might not know how to do that and I think as part of growing up and learning and in our culture that is an essential thing that the government should try and incorporate in lessons with young people because it's a basic skill isn't it, you know, some people just don't know how to behave. I think I did some interview training when I was at sixth form, my school was quite good, but that's more for university so it was kind of like when you go to university this is how you should dress. But you know they should have it for all places of work, whether it's going out for a job, an apprenticeship or university or a standard interview, anything like that there should be a procedure in place I think.

What would you say to someone who was thinking about going for an apprenticeship?

Go for it. Definitely, I mean like I said before with the whole experience thing, you can't beat it. I've learned so much from being with [my employer]. From an apprentices point of view probably don't give up. Have the confidence to go out and do it because it is all changing at the moment and I think it probably is a bit all up in the air because there's lots of different things coming through and more funding is going to be available for over-eighteen-year-olds.

(Permission has been granted to use the transcript)

Activity 64 Evaluating Qualitative Analyses

Student Handout

Find a research paper, related to your research topic, which reports the results of a qualitative study. As you read through the paper, decide whether the researcher has addressed the following issues. If you think any of this information is missing, or there is not enough evidence for you to make a decision, think about how the researcher could improve their study and/or the type and amount of information provided in the paper.

- Authenticity. Is the research real, genuine and of undisputable origin?
- Integrity. Does the researcher display honesty, sincerity and truthfulness?
- Reflexivity. Have positionality and biases been discussed and acknowledged?
- Dependability. Can the researcher account for the constantly changing circumstances in which research occurs? Have these changes been acknowledged and discussed?
- Sensitivity to context. Do interpretations take the context (structures, settings and frameworks, for example) into account? Is the researcher attuned to the social context?
- Consonance. Are the methods, interpretations and conclusions appropriate to the theoretical perspective and epistemological and methodological stance?
- Rigour. Are interpretations rigorous and accurate? Has the researcher continued with the analysis until their theory is complete?
- Persuasiveness. Are all claims established convincingly and backed up with evidence?
- Validation. Have the participants had chance to see the results and can they validate the findings, if this is possible?
- Credibility. Are the results credible and believable from the perspective of the participants and other researchers?
- Trustworthiness. Can research participants and other researchers trust the results?
- Transparency. Are all the issues clear and transparent? Is it easy for other researchers and members of the public to understand how the research has been carried out?
- Confirmation. Can all results be confirmed or corroborated? Have the methods been well described, and can they be followed by other researchers?
- Transferability. Is it possible to transfer the results to other settings or contexts?
- Generalizability. This does not refer to statistical generalization, but instead to theoretical generalization. Does the theory provide insights that may be useful in similar contexts?
- Impact. What is the impact of the research? What are the societal and economic benefits? Who benefits from the research and in what way? Are these issues explained clearly?
- Importance. How important are the findings to policy and practice, industry, wider society or the scientific and/or medical community?

If you are intending to produce your own qualitative analysis, ensure that you address all the issues discussed above so that other researchers (and your tutor and examiners) can undertake a thorough evaluation of your analysis.

Activity 65 Drawing Conclusions from Qualitative Data

Student Handout

Produce a description of the process or procedure that you intend to use to draw conclusions from your qualitative data, and be prepared to present this description to your fellow students when we next meet. You will be allocated up to 10 minutes for your presentation, with an additional 5 minutes for feedback and discussion.

The type of description that you produce is a personal choice: you might decide to produce a description of a mechanical process in linear form, identifying the different stages that you intend to move through to draw your conclusions. Or you might decide to draw a diagram illustrating a creative procedure that moves backwards and forwards between data sources, for example. You can be as creative or as imaginative as you wish, but ensure that the process or procedure that you describe is workable and possible within your methodological framework (for example, your conclusions can't lead to generalizations when your methodology doesn't enable generalizations to be made).

It is important that you understand these issues when you are thinking about how you are going to draw conclusions from your research. This is because some of the mechanical or technical processes that are prescribed in the literature to help you to draw conclusions from your data may not be suitable for your particular methodology and theoretical perspective. Also, this activity will help you to think about whether the process or procedures that you intend to use will help you to meet your aims and objectives and to answer your research question.

Below are examples of different qualitative methodologies and the types of conclusion that can be drawn (in alphabetical order). This will help you to think more about the type of conclusion that you can draw from your own research.

- Action research. Produces recommendations for improving practice and develops strategies for solving existing problems and improving services. Uses reflexivity and progressive problem-solving to increase understanding and improve practice.
- Discourse analysis. Identifies shared patterns of talking and develops an understanding of how people construct their own identity and their own version of events. Uses different approaches to analyse text, the spoken word or sign language. Provides an interpretative and deconstructive reading but does not provide definitive answers.
- Ethnography. Interprets and describes cultural behaviour. Tells stories through the eyes of the people under study and enables people to speak in their own voices. Produces a holistic cultural description, while avoiding causal explanations.
- Ethnomethodology. Describes the procedures, practices and methods by which social order is produced and shared. Describes the accounts that people (and scientists) produce and the methods that are used to convey these accounts, without evaluating their validity.
- Feminist research. Incorporates the lived experiences, emotions and feelings of marginalized groups into the knowledge building process. Acknowledges and reports the diversity of experience. Conducts research, generates theory and draws conclusions from a feminist standpoint.
- Grounded theory. Draws theoretical insights from a cyclical process of analysis and reanalysis. Provides an explanation about how people resolve their central concerns, regardless of time and

place. Interprets human interaction, which occurs through the use of symbols (description is avoided).

- Heuristic inquiry. Produces a creative synthesis of the meaning and essence of experience. Includes participant validation and researcher reflexivity in the final product.
- Phenomenological research. Seeks to understand and describe lived experience, including people's perceptions, perspectives and understanding of a particular situation or phenomenon. Emphasizes personal perspective and interpretation.

Activity 66 Knowing about Data Protection

Student Handout

Consider the following real-world cases. In your group, identify the type of data protection breach that has taken place and decide what action should have been taken to prevent the breach.

Case 1

An employee of a national retail chain took home a laptop that contained the unencrypted pension details of 26,000 employees. The laptop was stolen from the employee's home.

Case 2

A university published screenshots in an online training manual to demonstrate the use of particular university systems. The screenshots contained details such as names, addresses and dates of birth of 177 former students and staff.

Case 3

A postgraduate student wrote down the name, address, gender and date of interview of all his research participants. He stored them in a communal, unlocked filing cabinet in a room used by seven other postgraduate students. Some of the information had gone missing when he next accessed the filing cabinet.

Case 4

A member of staff working for a healthcare trust lost two memory sticks containing the unencrypted personal details of patients.

Case 5

A researcher accidentally emailed a spreadsheet containing the personal details of research participants to every colleague in the university department.

Activity 67 Presenting to a Lay Audience

Student Handout

Imagine that you are to present your research topic, purpose and methods to the following three lay audiences. Think about how you can discuss, describe and present your research in a way that will be understood by each audience, and in a way that is interesting, entertaining and relevant to each audience.

1. A class of 25 school children aged 12–13. You are to present your research to these children in their class and must keep them interested and motivated for half an hour. The teacher is also present and available to offer help with your presentation, if necessary.
2. Five non-university friends at a social gathering. Your friends are interested in finding out more about what you actually do at university, but they themselves have not been to university and have never carried out their own research. You are all at an enjoyable social gathering where the conversation is flowing freely. Friends want to know what you do, but don't want to be overwhelmed or find the conversation boring. They can easily move on if you don't keep them engaged.
3. Four members of a funding body who are not experts in your field of study, but who know about the research process. They want a short description of your research so that they can decide whether or not to invite you to apply for funding from their organization. You need to be very persuasive as the funding would be useful for your research project.

Produce a description of how you would present to each of these audiences (or produce an actual presentation for some or all of these audiences, if it works better for your research topic). Be prepared to present your descriptions and/or presentations to fellow students when we next meet. You can decide on the style of description/presentation and on how much detail about research topic, purpose and methods you wish to provide. Think about how you would pitch your presentations at the right level for each audience, and try to be as creative, imaginative and entertaining as possible.

Activity 70 Writing Journal Papers

Student Handout

Consider the following advice when writing and submitting a journal article:

- Follow all journal house style guidelines, making sure that your paper is of the correct style and length and that it is pitched at the right level for the journal readers.
- Produce a good title. This should be clear and concise and include all the essential words in the right order. It should not trivialize your research, nor oversell it. Ambiguous, misleading or unnecessary words should be avoided.
- Pay close attention to the abstract (or lead). Make sure that it grabs attention and points to your methodology and the original contribution to knowledge. Abstracts are copyright free and can be made available online. Journal editors will be keen for other researchers to read your article, based on your abstract. Ensure that it makes sense when read in isolation.
- Ensure that your article is robust, plausible and based on sound and credible methodology.
- Think about why papers are rejected and ensure that you avoid these mistakes. There are various reasons for rejection:
    - The content and/or style of the paper are not suitable for the journal.
    - The author has not followed journal guidelines about house style, length and content.
    - The paper is presented poorly and contains too many errors.
    - The title, abstract and introduction are poorly constructed and uninformative. They do not grab attention.
    - The research does not add to existing knowledge. The study replicates existing work and does not provide anything new.
    - The research question is not specified or is not answered.
    - The conceptual framework is badly developed.
    - The methodology is flawed.
    - There is not enough information about the methodology and/or research methods. It is unclear how the researcher has obtained the results that are being reported. It is impossible for others to check or verify the results.
    - References are out of date, cannot be accessed or are not relevant to the research question.
- Ask a fellow student to peer review your paper. Ask for honest feedback. Take on board all criticism and modify your paper accordingly. You can ask for opinions from other students, if you think it would be helpful.
- Submit your paper when you are happy. Follow all submission guidelines (most journals now accept email submissions). Make sure that all material (such as images, captions, keywords and abstract) is included when you submit. Also, you will need to ensure that you have the necessary permissions (to use images, poetry and prose, for example) before you submit.
- Once you have submitted your paper it will be sent for peer review. After this process there tend to be four outcomes: accept, accept with minor revisions, accept with major revisions or reject. The editor will provide a summary of the comments made by the reviewer(s) and you will need to make changes accordingly, if relevant. If your paper is accepted you will be asked to sign an ‘assignment of copyright’, a ‘licence to publish’ or a ‘publishing licence’. You should read this carefully to find out what you can and cannot do with your paper when it is published. Your paper will be copyedited and you will be required to proofread the final copy before it is published.

Activity 73 Writing an Impact Statement

Student Handout (1)

Produce an impact summary and an impact statement for your research, following your funding body or institutional guidelines. Ensure that you produce your summary and statement in the required format. Once you have done this, swap your work with a fellow student for peer review and feedback. Modify your impact statement accordingly.

When you review the work of your fellow student, take note of the advice offered below and make sure that they have addressed all the relevant issues (in particular, look for strengths, weaknesses and areas for improvement). Offer your peer honest and constructive feedback in a timely manner.

Most funding bodies request that you produce both an impact summary and an impact statement. An 'impact summary' requires you to answer two questions: who benefits from your research and how do they benefit? This does not include other researchers, but could be individuals, groups, specific organizations or the wider public, for example (take care not to include commercially sensitive information in your summary).

An 'impact statement' expands on your impact summary. Funding bodies will require an impact statement that demonstrates clearly the societal and economic benefits to be gained from your research (how your research will be of benefit to people, communities, industry, the economy and/or the environment, for example). Your impact statement should describe the issue or problem, provide an action statement, describe the potential benefits and provide a list of researchers, collaborators and contributors, along with their impact activities, if relevant.

When writing an impact statement, keep your audience in mind and pitch your statement accordingly. Audience members can include funding body panels, external reviewers, peers, government, industry representatives and alumni, for example. Make sure that your impact statement is clear, concise and specific. State obvious impacts and don't waffle or pad your statement with irrelevant material. When requesting resources for impact activities, you must be able to demonstrate that all activities are project-specific and justified.

Student Handout (2)

Produce an impact summary and a ‘pathways to impact’ attachment for your research, following your institutional or funding body guidelines. Ensure that you produce your summary and attachment in the required format. Once you have done this, swap your work with a fellow student for peer review and feedback. Modify your summary and attachment accordingly.

When you review the work of your fellow student, take note of the advice offered below and make sure that they have addressed all the relevant issues (in particular, look for strengths, weaknesses and areas for improvement). Offer your peer honest and constructive feedback in a timely manner.

An ‘impact summary’ requires you to answer two questions: who benefits from your research and how do they benefit? This does not include other researchers, but could be individuals, groups, specific organizations or the wider public, for example (take care not to include commercially sensitive information in your summary).

A pathways to impact attachment is required by researchers in the UK who are applying for research council funding and describes the potential impact of your research beyond academia. It expands on the two questions answered in your impact summary by addressing the question ‘what will be done to ensure that potential beneficiaries have the opportunity to engage with this research?’ Your pathways to impact attachment will need to include the following:

- Types of impact activities:
  - potential exploitation (commercial and non-commercial);
  - the shaping of policy and practice;
  - application of intellectual assets and outputs;
  - communication activities (e.g. workshops, publications, websites, media relations);
  - public engagement activities (past, present and future);
  - collaboration relationships, roles and responsibilities in terms of impact activities;
  - members of the research team, involvement, roles and responsibilities in terms of impact activities.
- Impact activity ‘deliverables and milestones’:
  - time-scales for delivering impact activities;
  - key milestones for impact activities;
  - methods used to measure success of impact activities (i.e. monitoring and evaluation methods).
- A summary of resources for the impact activity (the bulk of this resource listing and justification will be in the ‘financial resources’ and ‘justification of resources’ sections of the main application form).

Make sure that your pathways to impact attachment is clear, concise and specific. State obvious impacts and don’t waffle or pad your work with irrelevant material. When requesting resources for impact activities, you must be able to demonstrate that all activities are project-specific and justified.

Activity 79 Producing a Code of Ethics

Student Handout

Produce a ‘code of ethics’ that can be given to people who have agreed to take part in your research. This is a document that outlines the ethical standards that you will adopt, under which you will work and that will help to guide the research forward. It lays out how you intend to behave as a researcher, how you will conduct yourself and how you will treat your participants. This document is usually produced in written form, but if you have participants who cannot read, or if there are language difficulties, you may need to think about producing your code of ethics in an alternative format.

You will need to think about who will be given a copy of your code of ethics, especially if you intend to conduct research with children or vulnerable people (a gatekeeper or proxy, for example). The type of recipient will have an influence on the code of ethics that you produce: some people will not want to read (and perhaps will not understand) a detailed and complex list of ethical standards, whereas others may want as much information as they can get, and review it in minute detail. If you have very different people taking part in your research (perhaps with very different educational backgrounds) you may find that you need to produce two codes of ethics: one detailed and one in summary, for example.

The specific issues that you choose to include in your code of ethics will depend on the type of research that you intend to conduct, your research topic, the level at which you are studying and the type of people who are to be involved in your research. The following list gives an example of information that you could include:

- acting ethically within research aims;
- acting ethically within moral and social values;
- acting ethically with participants, treating them with respect, ensuring anonymity and confidentiality, and ensuring protection of data;
- acting ethically with the wider public;
- conducting research that involves risk;
- collaborating and cooperating ethically;
- publishing and disseminating results ethically;
- addressing conflict of interest;
- avoiding biased financial relationships;
- working with ethical funding bodies;
- obtaining ethical approval.

Once you have produced your code of ethics, test it by asking a member of the public to read it and give you honest feedback about style, structure and content. If possible, try to choose a member of the public who is similar to the people who will take part in your research. Once you have received feedback, modify your code of ethics accordingly.

Activity 80 Understanding Issues of Informed Consent

Student Handout

Produce an information sheet that can be given to your research participants. It should contain all the information they need about your research so that they can decide whether or not to give their informed consent to take part. This sheet would be given to participants before they take part in the research and should be retained by them throughout the research process.

'Informed consent' in research is an agreement that is made by a participant to take part in the research, based on an understanding of what is involved. For this consent to be valid it must be informed, voluntary, free and given by a person who has the capacity to make the decision. A person must understand the purpose, benefits and potential risks of taking part in your research and must be given time to make their decision.

The following points will help you to produce your information sheet:

- Think carefully about how much information and the type of information that is required to help participants make an informed decision about whether or not to take part in your research. This could include, for example, information about the goals of the research, the length and degree of commitment required, opt-in and opt-out clauses, and issues of anonymity and confidentiality. When doing this, ensure that you address the whole research process, including data collection, analysis and dissemination of results.
- Make sure that you do not mislead your participants or try to persuade them to take part when it might not be the best course of action (perhaps because participation may induce harm or lead to problems with existing relationships, for example). However, in some studies it may be necessary to try a little persuasion to overcome issues with volunteer bias; if this is the case with your research, be aware that there is a fine line between tactical persuasion and duress. Participants should not be coerced, whether implicitly or explicitly, into taking part in your research.
- Use terms that are easily understood by the people who will take part in your research. Pay attention to clarity and comprehension.
- Don't overwhelm your participants with unnecessary and/or incomprehensible detail about the subject of the research, the nature of social inquiry, methodology or social theory, for example.
- If your research is with 'vulnerable' groups (those with a disability, children, or those in a dependent relationship with the researcher, for example) you must pay particular attention to the issue of informed consent. Take care not to use persuasion (whether explicit or implicit) and ensure that your information sheet can be understood (in some cases you may need to present this information orally, rather than in written form). If you are dealing with a proxy, you will need to provide appropriate information to help them make an informed choice on behalf of the participant.

Once you have produced your information sheet, hand it in for tutor review and feedback. Modify as necessary, once you have received feedback.

Activity 81 Treating Participants with Respect

Student Handout

This activity is about treating research participants with respect. Over the next week monitor local and national newspapers, television, social media, micro-blogging sites, blogs, websites and any other relevant channel or platform. Look out for cases where researchers have not treated participants with respect (or where researchers have been disrespectful to participants). You can also look into historical cases where researchers have not treated their participants with respect. Take note of your findings and be prepared to discuss them when we next meet.

When you undertake this activity think about the following questions:

1. In what way have the participants not been treated with respect?
2. How has the research been reported? Have the problems with respect been highlighted in the report?
3. Have the participants themselves highlighted respect issues? If so, what have they said? Has this influenced their behaviour in any way?
4. What could or should the researcher have done differently, in your opinion?
5. How can these issues be resolved, if at all?
6. How can you ensure that you do not make similar mistakes when you carry out your research?

Activity 82 Avoiding Conflict of Interest

Student Handout

Find an example of a research study in which there is, or has been, conflict(s) of interest. This could be a current or ongoing research study, or it could be a study that was carried out in the past. Once you have identified a suitable study, undertake the following tasks:

1. Describe the research project.
2. Discuss the conflict of interest.
3. Analyse how this conflict of interest has influenced (or could potentially influence) the research process and/or outcomes.
4. Discuss how conflict of interest could or should have been avoided.
5. Discuss ways in which conflict of interest can be avoided in your own research.

Post your answers on the digital platform that has been set up. Read the posts from other students, as this will provide a useful resource that will help you to think more about how to recognize conflict(s) of interest in the work of other researchers and avoid conflict of interest in your own work.

Activity 83 Understanding Biased Financial Relationships

Student Handout

Consider the scenarios given below, in your group, and answer the following questions (answer questions 1–5 for each scenario and finish with question 6). Be prepared to discuss your answers in a class discussion.

1. What is the nature of the financial relationship?
2. Do you think this financial relationship will have an influence on the design of the research project? If so, in what way?
3. Do you think this financial relationship will have an influence on the research results? If so, in what way?
4. Do you think this financial relationship will have an influence on how the results of the research are published? If so, in what way?
5. What (if anything) can be done to manage, reduce or eliminate the problems you have highlighted?
6. When analysing the work of other researchers, how can you check that their work has not been influenced by biased financial relationships?

Scenario 1

A self-employed researcher is commissioned by the principal of a local college to undertake some research into students' experiences of their course. The college is to go through an inspection and the researcher is told that the results of the research must reflect well on the college. Indeed, it is made clear that payment for the research is dependent on a positive outcome.

Scenario 2

A senior researcher at a university in the UK sits on the advisory panel of a national research council. He surprises his colleagues by putting in a bid for funding in a subject outside his area of expertise and on a theme that is not normally funded by the research council. When the research council publishes its themes for the next round of funding, this particular theme is included in the list and his bid is successful.

Scenario 3

A trustee of a neighbourhood community group is married to a local authority (government) employee who finds out that funds are available to support the work of the community group. However, the community group must provide evidence to prove that the local community benefits from the service. The trustee is passionate about her community group and decides to undertake the research herself so that she can prove that the group serves the local community well.

Scenario 4

In a clinical trial one team member is responsible for patient selection. However, that team member owns stocks in the company that is supporting the trial (a share in the company that enables him to profit from company growth and earnings). He decides not to mention this to the principal investigator in charge of the research project.

Scenario 5

Researchers working for a technology company have developed a new material that, they believe, will revolutionize production in their particular field. However, their employers are fearful of competition and also feel that the market is not quite ready for this new product. A board meeting is held to consider their strategy.

Activity 84 Recognizing and Managing the Funding Effect

Student Handout

This activity is a role-play that will highlight the influence of the ‘funding effect’ on research. This is a term that has been coined by social scientists to explain why research outcomes are sometimes significantly different in publicly funded research and in privately funded research. You will each be assigned a role to play and you will be given 10 minutes of preparation time to think about and prepare your role. The role-play will last for around 20 minutes and will be followed by a class discussion.

The background to the role-play

The management of a breakfast cereal manufacturer commission and fund some research to find out how eating their breakfast cereal can benefit the academic performance of school children. The research team finds that eating the breakfast cereal does improve school academic performance but, in a control study, finds that eating *any* type of breakfast improves school academic performance.

The role-play

The role-play is a committee meeting to discuss when and how the results of the research described above should be disseminated. The meeting is attended by members of the research team, the director of the cereal company and some company shareholders.

The director and shareholders of the company want to maximize market exposure, and do not understand, nor see the need for, ethical behaviour concerning how and when results are published (or supressed). They are perfectly happy to make bold claims about the results that ‘prove’ that their cereals are the best for school pupils (and their competitors’ brands are the worst). The researchers want to publish because it is the right thing to do and it will help with their research careers, but are they willing to stand their ground and maintain research integrity when reputations, careers and funding are at stake?

Roles

Role 1

You are to play the role of principal investigator. This is the person who has been in charge of the research project from the start. You are an experienced researcher, passionate about research and keen to publish as much as possible to raise your research profile and obtain further funding.

Role 2

You are to play the role of co-investigator. You are an early-career researcher and gradually building up your research portfolio. You are passionate about research and very keen to further your research career. Research ethics are important to you.

Role 3

You are to play the role of research student. You are fairly new to research, have very high ethical standards and are unwilling to compromise on these standards.

Role 4

You are the director of the cereal manufacturer that has funded the research. You are a high-flying individual and want to maintain your company's position as market leader in cereal sales. You have big ambitions for your cereal company and will do what it takes to maximize profit and put your competitors out of business.

Role 5

You are to play the role of a shareholder of the cereal manufacturer. You want to make as much money as you can from your shares in the company. To do this the company should make as much profit as possible. You will do anything to ensure that this happens.

Role 6

You are to play the role of a shareholder of the cereal manufacturer. You have high moral standards, but you also want to make money from your shares.

Role 7

You are to play the role of a shareholder of the cereal manufacturer. Although you want to make money from your shares, you also understand the importance of not misleading the public (and parents, as you have children at school).

Activity 88 Conducting Research with Vulnerable People

Student Handout

Develop a scenario, in your group, about a researcher who intends to conduct research with vulnerable people. Think about the research topic and the type of people who are to participate in the research (and why these people are considered ‘vulnerable’). Think also about the research methods that are to be used. You may also want to say a little more about the researcher: who the researcher works for, their position within the organization, how much experience they have in conducting research and working with vulnerable people, for example. You can include any additional information that you wish, such as who is funding the research or the intended purpose and impact of the research.

Once you have developed your scenario, think about potential ethical dilemmas concerning research with vulnerable people that could be faced by the researcher in your scenario. Develop these into a series of bullet points or questions that you can discuss with your classmates when we next meet. You will be allocated 20 minutes to present your scenario and discuss your ethical dilemmas.

Activity 89 Conducting Research with Children

Student Handout

Consider the five cases given below and for each case discuss the following issues with your group members:

- the practical issues that are involved (access, venue, data collection methods and recording and storing data, for example);
- the ethical issues that are involved (informed consent, working with vulnerable groups, potential risks and harm, for example);
- the difficulties that could, potentially, be encountered by the researchers (when accessing participants, seeking informed consent, collecting data and storing data, for example);
- action that researchers can take to overcome, avoid or reduce the difficulties that have been identified.

Case 1

This research seeks to explore whether learning to read text on a tablet involves different skills from learning to read traditional print books. The research will be conducted with children under the age of 10 in their school environment.

Case 2

This research explores the experiences and perspectives of young people living with HIV and their transition into adult life and adult-orientated services. Researchers intend to contact young people aged 16–18 and interview them in a specialized unit.

Case 3

This research seeks to understand the emotional and mental health needs of children who are excluded from school. The project will involve interviews and focus groups with children aged 12–16, to take place at various locations and venues.

Case 4

This research will invite college students (aged 16–18) to be co-researchers on a project about students and their attitude towards underage drinking. It will explore the influences of underage drinking on social and family relationships.

Case 5

This research seeks to produce national statistics on child abuse and neglect, including online abuse, sexual abuse and physical abuse. The research will involve children under the age of 18.

Activity 90 Knowing about Epistemology and Ontology

Student Handout

When we next meet you will be asked to teach your fellow students about ‘epistemology’ and ‘ontology’. You will be given 20 minutes for your teaching session, with a few minutes available for questions, if time permits. The focus of your teaching session is your choice and you can use any teaching methods, materials, software or props that you deem appropriate. You can decide, as a group, who and how many of you will teach the session.

Make your session as informative and interesting as possible. Epistemology and ontology are complex issues that can be difficult to grasp. Work hard to ensure that your fellow students understand what you are teaching them. This can be done by illustrating how epistemology and ontology are related to research design and methodology or how they have an influence on what you are being taught and what you know, for example.

Over the next week, work together in your group to plan your session and practise your delivery. Also, think about the questions that might be asked by fellow students and prepare some suitable answers.

Activity 92 Understanding Methodology

Student Handout

Over the next week produce a podcast (audio or video) with your group members that will help you and your fellow students understand what is meant by ‘methodology’. You will need to upload your podcast so that we can build a useful resource that you and your fellow students can access when you need to develop or clarify your methodological thoughts. Therefore, try to produce a creative, imaginative and interesting podcast that is of educational value to your peers.

The focus of your podcast is a group choice. For example, you could decide to discuss the philosophy of methodology, the relationship between epistemology and methodology, a description of different methodologies or the influence of methodology on research methods. Alternatively, you could focus in on one particular methodology and describe in detail how this methodology guides the research process.

When you produce your podcast, be careful not to confuse methodology and methods: methodology is the overall framework that will guide your research, whereas methods are the actual tools that you will use to carry out your research.

Once you have produced your podcast, upload it using the digital platform that has been set up. Remember to review the podcasts that have been uploaded by your fellow students as this will help you to develop a greater understanding about methodological issues.

Activity 96 Reasoning Inductively and Deductively

Student Handout

This worksheet is on the topic of reasoning. Work through the following questions, providing a full and descriptive answer for each one.

1. Provide a definition of:
    1. inductive reasoning;
    2. deductive reasoning;
    3. abductive reasoning.
2. Discuss the strengths and weaknesses of each type of reasoning.
3. Find two research project reports (journal papers, monographs or theses, for example): one that uses inductive reasoning and one that uses deductive reasoning. Describe how reasoning has been used in each research project. You can choose any projects that you wish, but you might find it useful to choose studies that are related to your subject or area of research.
4. Describe the type(s) of reasoning that you intend to use in your own research project and explain why this is the best way to reason, given your research topic, design and methodology.

Activity 98 Hypothesizing and Theorizing

Student Handout

You have been invited by the principal (head teacher) of your local college to talk to a group of 16–18-year-old students about what is meant by ‘hypothesizing’ and ‘theorizing’. All the students are hoping to go to university and some are thinking about careers as scientists or researchers. The principal thinks that it will be useful to invite in a group of students who are not too far removed in age, who can explain the issues in an interesting, creative and imaginative way that will inspire her students to think more about their future learning and careers.

Prepare a 20-minute teaching session, in your group, on the topic of ‘hypothesizing and theorizing’ that is suitable for college students aged 16–18. Try to be as creative and imaginative as possible. You must engage the students for 20 minutes, and you can do this in any way that you wish.

When we next meet you will be required to present your 20-minute teaching session to the rest of your classmates, who will be playing the role of college students. If time permits, there may be questions from the students, so think about what could be asked and prepare some suitable answers.

Activity 99 Generating Theory Inductively and Deductively

Student Handout

A ‘debate’ is a structured argument in which two sides speak for and against a particular contention. In this case one group is to argue for inductive theory generation and the other is to argue for deductive theory generation. You must prepare, in your group, your arguments ready for a debate in the next teaching session. Your group will be given two 10-minute slots in which to debate (alternating with your opponents). You will also need to prepare a rebuttal of the arguments presented by your opponents.

The following tips will help you to prepare for your debate:

- Use your time wisely: you will be given two 10-minute slots. Ensure that you have enough material to fill these slots and practise presenting your material within the allotted time. Divide your material and time between team mates so that you know who is speaking at what time and what they are going to say.
- Pay close attention to your introduction, main argument (and evidence to back up your argument) and conclusion. Define your topic.
- Take care to avoid factually, morally or logically flawed arguments.
- Think about and understand the key arguments that will be put forward by your opponents and prepare a suitable rebuttal. Ensure that you offer evidence for your rebuttal.
- Think about how your opponents will refute your arguments and prepare a defence. Don’t use rhetorical questions as this will help your opponents to attack your arguments.
- During the debate, ensure that you argue as part of a team and take care not to contradict the arguments of your team members.
- Make good eye contact with team mates and with your opponents.
- Present your arguments in a confident and persuasive manner. Ensure that other students can understand what you are saying and vary your tone for interest. Don’t shout or get annoyed. Keep all arguments on an academic level and avoid personal comments: attack the arguments, not the person.
- Use notes to help you to present your argument and take notes during the debate to help with your rebuttal.