

## 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.

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## 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.

# 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

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### Question 2

Do you go swimming?

- Never
- Rarely
- Frequently
- Sometimes

Comments

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### Question 3

What do you think can be done about global warming?

Comments

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### Question 4

Most medical professionals agree that smoking causes lung disease. Do you:

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comments

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### Question 5

Do you agree that students should not have to take an exam at the end of their course?

- Yes
- No

Comments

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### Question 6

Has your son ever stolen anything? If so, what and when?

Comments

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### Question 7

What do you think about the left-wing media's attempt to blackmail the government?

Comments

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### Question 8

How much food do you think the average family throws away in a week?

Comments

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### Question 9

How much do you earn?

Comments

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### Question 10

What is your ethnicity?

Comments

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# 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).

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# 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.

## 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 at 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?

# 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.

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|-----------------------------------|--|
| 1 What is your name?              | 6 Describe your favourite book.                |
| 2 Where were you born?            | 7 Describe your favourite place to visit.      |
| 3 Where did you go to school?     | 8 Describe your favourite food.                |
| 4 What course are you studying?   | 9 Describe your favourite animal.              |
| 5 Why did you choose this course? | 10 Describe your favourite season of the year. |

Once you have asked these questions, wait for instructions from your tutor.

## 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 ensued. 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?

# 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	Strengths
Suggested brand (if relevant)	Weaknesses
Price (or price range, if relevant)	Ethical implications
Where you can purchase, hire or obtain for free	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	Strengths
Suggested brand (if relevant)	Weaknesses
Price (or price range, if relevant)	Ethical implications
Where you can purchase, hire or obtain for free	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	Strengths
Suggested brand (if relevant)	Weaknesses
Price (or price range, if relevant)	Ethical implications
Where you can purchase, hire or obtain for free	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	Strengths
Suggested brand (if relevant)	Weaknesses
Price (or price range, if relevant)	Ethical implications
Where you can purchase, hire or obtain for free	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.

## 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.

## 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).

# 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.