

# The Design and Use of Questionnaires in Educational Research: A New (Student) Researcher Guide

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## Abstract

Final-year undergraduate and master's students often collect data for a research project through a questionnaire. However, novice researchers may have little or no experience designing and using questionnaires and struggle with both designing and operationalizing one. This paper explores and explains, from a theoretical and practical perspective, how a novice researcher may go about the process. Its intended target audience is final-year undergraduate and postgraduate students undertaking a research project, such as a dissertation. Its purpose is to provide the necessary fundamental knowledge for learners to develop their research questionnaires for qualitative data collection.

**Keywords:** questionnaire design, student research, qualitative research, research ethics, research questionnaires, higher education

## Introduction

Questionnaires are widely used in educational research to gather data about the topic under investigation. This is because they are cost-effective, relatively simple to use and can provide researchers with a large amount of data in a relatively short period (Patton, 2014). For these reasons, students who engage in qualitative research, typically for a dissertation or final-year project, will often decide to use one. However, this may often be challenging for those commencing a research journey. Furthermore, students are typically unlikely to have been required to design a questionnaire in previous assignments and may lack the knowledge, skills and confidence to design and use one effectively. This paper explores the critical considerations in questionnaires design, development, and operationalism in qualitative educational research. It aims to provide a theoretically underpinned practical guide for students considering using a questionnaire to gather data. In addition, the paper provides authentic examples of research questions to facilitate better understanding.

## What Exactly is a Questionnaire?

A straightforward questionnaire definition is "a formalized set of questions for obtaining information from respondents" (Malhotra, 2006, p. 83). While Sreejesh et al. (2014, p. 134) define it, in the context of research interviews, as "a set of questions to be asked from respondents, with appropriate instructions indicating which questions are to be asked and in what order." Dornyei (2010) suggests that defining a questionnaire is not always straightforward because many questionnaires do not contain questions ending with a question mark. That position is interesting, as it allows us to determine that a questionnaire should include actual questions. Brown's (2001, p. 6) definition is the most frequently cited in the literature; "Questionnaires are any written instruments that present respondents with a series of questions or statements to which they are to react by writing out their answers

or selecting from among existing answers." For this paper, I define a questionnaire as 'an organized sequence of written questions designed to obtain relevant information from people.'

## Why Use a Questionnaire in Research?

Questionnaires are widely used in educational research. In the social sciences, as Fife-Schaw (2020, p. 344) suggests, "the humble questionnaire is the most common research tool," similarly, Dornyei (2010) argues that they are one of the most popular research instruments used. Their popularity may be explained by the benefits they have for gathering qualitative research data compared to other qualitative methods, such as interviews or focus groups.

Briefly summarised the advantages of using a questionnaire to gather data are as follows (Note, no hierarchy of importance is implied in the numbering used).

1. Convenience questionnaires are a convenient way to collect data from many participants (Cohen et al., 2017). You can reach a sizable and potentially varied group of people fairly quickly and easily by distributing and completing them online, by mail, or in person.
2. Cost using questionnaires usually costs much less and takes much less time than using other data-gathering techniques such as interviews (Dornyei, 2010; Krosnick, 2010; Petra, 2010).
3. Standardization, questionnaires allow for standardization of the data collection process, ensuring that all participants are asked the same set of questions in precisely the same way. This makes it easier to compare and analyze the data collected from different people (Fife-Schaw, 2020).
4. They are 'self-administered,' i.e., respondents complete them in their own time and space. This may increase the honesty and accuracy of responses as participants are more likely to provide candid and thoughtful responses when they are not being directly observed by an external party or under perceived time pressure (Malhotra, 2006).
5. Reliability and accuracy, questionnaires are a long-standing

reliable means of gathering data, with any accidental bias introduced in interviews or focus groups being avoided (Bryman, 2016). However, it is essential to remember that their validity and reliability are dependent on them being well-designed with non-biased questions (Newby, 2013).

6. They allow respondent anonymity in a way that focus groups or interviews may not.
7. They are relatively quickly 'scaleable,' i.e., the number distributed. Hence, the amount of data gathered can easily be scaled up or down, depending on how much data is necessary to gather (Brace, 2013; Dornyei, 2010).

As with any method of data collection, questionnaires have their disadvantages. Assuming that the questionnaire has been carefully designed and aligned to one's central research question(s), their main disadvantages are that they do not provide the same nuanced level of detail that an interview or focus group can, nor do they allow for serendipity; the asking of a pertinent question that may arise in the researcher's mind during an interview or focus group. There are also several potential problems with their use. These are discussed later in this paper.

### Questionnaire Used—the Overarching Research Question

Before designing a questionnaire, a decision has to be taken to use one. Whether to use one or not should be determined by the central research question(s), methodology and overarching research paradigm. A discussion of research paradigms and methodologies is outside the scope of this paper. However, novice researchers are encouraged to understand these terms before committing to research within a specific paradigm and methodology (for example, see: Bryman, 2016, Cohen et al., 2017, Grix, 2019, Newby, 2013). In my experience, novice student researchers frequently make a decision to use a questionnaire before finalizing their research question(s), sometimes before clearly identifying their methodological approach, and often without considering a research paradigm. The central research question(s) and methodology should determine whether a questionnaire is the most appropriate way to gather relevant data to answer/illuminate the research question(s). No decision to use a questionnaire should be taken until these have been finalized.

It is essential to have a straightforward central overarching research question for the project and three to four sub-questions. An example of an overarching research question is: 'In the context of the United Kingdom, what insights can be drawn about contemporary adults' eating habits and attitudes towards healthy eating.' Alongside this, three example sub-questions could be: (1) How do people perceive differences between a healthy and non-healthy diet? (2) What factors influence peoples' diets? (3) To what extent do people perceive a relationship between diet and health? These research questions would lend themselves to being investigated by either a questionnaire, focus group, interviews, or all three methods. It is up to the researcher to identify the most effective method (Bryman, 2016) within their chosen methodological approach and the pragmatic constraints of time and funding. For novice researchers, it is helpful to discuss with a research supervisor/tutor whether or not a questionnaire would be the most suitable method of gathering data or whether an alternative method would be more effective.

### Categories of Research Question

Once a decision to use a questionnaire has been taken, it is necessary to consider the different types of questions to use. Research questions, and the questions used within a questionnaire to illuminate them, may be separated into different categories. There are two main categories of the question; open-ended and closed. Closed questions restrict the respondent's answer to a pre-defined response. They are typically used when the respondent can provide a specific answer or when there are many ways to answer a question and the researcher has a pre-defined set of answers (Malhotra, 2006). The simplest closed questions are binary ones, with only two possible answers, such as a yes or a no. These are fact-gathering questions.

A simple example would be, "Do you eat bread?" – the respondent can only answer with 'yes' or 'no.' Multiple-choice closed questions provide the respondent with a range of possible answers in which more than one can be chosen. An example is "What do you believe it is important to eat for a healthy diet?" and the respondent can choose to select/tick as many of the following as they wish: carbohydrates, proteins, meats, vegetables, fruits, fruit juices, freshly-prepared food, ready-made foods, and so on. Closed questions also include ranking questions, where a rank, such as 1-10 is provided, with 1 being of least importance and 10 of most. An example of a ranking question is, "Please rate the importance of a healthy diet to you." Another type of closed question, similar to a ranking one, is the scaled question, including Likert scale questions (Likert, 1932). These take the form of a statement or question, followed by a set of options representing different levels of agreement or disagreement with that statement. Respondents are, for example, asked to indicate their degree of agreement, or disagreement, with each option on a scale, usually ranging from 1 to 5 or 1 to 7, where 1 typically represents strongly disagree or highly unlikely, and 5 or 7 represents strongly agree or highly likely. For example, "How likely are you to eat five portions of fruit or vegetables in a typical day?" – very likely/likely / neither likely nor unlikely/unlikely / very unlikely. A variation of a Likert scale question is called a 'Forced Choice' one. These are where no neutral response, such as 'undecided,' not sure,' 'neither likely nor unlikely, or 'neither agree nor disagree' is available to the respondent. In the previous example, 'neither likely nor unlikely' would not be included in a forced-choice Likert scale question.

Open research questions are typically used in qualitative research (Fife-Schaw, 2020; Krosnick & Presser, 2010). They allow participants to provide in-depth and personal responses that provide insight into their lived experience – their thoughts, beliefs, views, opinions, and experiences (Lietz, 2010, Malhotra, 2006, Patton, 2014). Open questions may be classified into the following general categories: Behavioural, Attitudinal, Factual, Descriptive, Comparative, Relationship-based, Causal, and Exploratory. Each research question will lend itself to soliciting different kinds of research data. When used within a questionnaire, each will seek to ascertain different information from the respondent. Essentially, each serves a different purpose and lends itself to different forms of information. It is up to the individual researcher to determine which questions to include to gather the most appropriate data to answer/illuminate their specific research question(s). For the novice researcher, discussion with peers and lecturers and reading examples of questionnaires researchers have used in the past is a useful parts of deciding which questions to include.

### Behavioral, Attitudinal, Factual, and Descriptive Questions

Behavioral questions aim to discover the behavior of individuals or groups. They ask questions about what people do or have done in the past. For example, a question may ask about a person's exercise habits, daily routines, or how often they engage in a specific activity. Simple examples of behavioral questions include, "How often do you eat fresh vegetables?" or "When do you eat red meat?" Attitudinal questions aim to find and explore people's attitudes or beliefs about a particular subject (Brace, 2013, Patton, 2014). They ask how people feel about something, their opinions about or towards it, and what they think about it. A simple example of an attitudinal question is, "What is your opinion about tax breaks to encourage healthy eating?"

Factual questions aim to collect information about a specified topic. They require a specific, factual answer. For example, they may ask about a person's age, gender, occupation, or income. A simple example of a factual question is, "How many children under nine live in your household?" Descriptive questions aim to describe a particular phenomenon or experience (Fife-Schaw, 2020; Malhotra, 2006). They ask about what people have experienced, how they felt, and what they observed. For example, they may ask about a person's experience with a particular product or service, their satisfaction with a particular event, or their overall experience of a particular situation. An example of a descriptive question is, "Using your own words, explain how you felt when you have eaten a large carbohydrate-based meal."

### Comparative, Relationship-Based, Causal, and Exploratory

These categories of questions may be used as central research questions and questions within a questionnaire. Comparative questions aim to compare two or more groups or populations concerning a specific variable or characteristic. They are used to investigate differences and similarities between groups and then draw inferences about their relationship (Patton, 2014). Simple examples of comparative questions include: "How does the effectiveness of healthy-eating intervention A compare to healthy-eating intervention B?" and "What are the differences in attitudes towards healthy eating between people in their twenties and those in their sixties?"

Relationship-Based questions investigate the relationship between two or more variables (Rattray & Jones, 2007). They are used to identify the existence and nature of the relationship between the variables and to understand how changes in one variable may affect the other variable. For example, relationship-based research questions include: "Is there a relationship between a person's diet and their level of education?" and "What is the relationship between a person's socio-economic status and diet?" Note that the latter question assumes that there is a relationship there.

Causal questions aim to determine if there is a cause-and-effect relationship between variables. They are used to identify the factors that contribute to a particular outcome and to understand how changes in one variable result in changes in another. Examples of causal research questions include: "What specifically is the effect of a particular intervention in a specific situation?" and "What is the effect of a school's education of children about healthy eating and parent's adoption of a healthy diet?"

Finally, Exploratory research questions, used in the early stage of a research project, aim to gather preliminary information about a research topic and to develop a deeper understanding of the research problem, often before developing more refined research questions and, in the context of questionnaires, prior to developing a longer more-detailed questionnaire which is used at a later stage (Brace, 2013; Krosnick & Prosser, 2010). They are open-ended, flexible, and used to identify new and unexpected findings. A simple example of an exploratory question is, "What is your experience of dieting to lose weight?"

### Questionnaire Design-Practicalities and Considerations

Stone (1993, p. 1264) suggests, "A good questionnaire works." That is a very short, yet I believe, highly accurate description of an effective questionnaire. Designing "is one that works" does, however, require several factors to be considered. Question wording is important. The wording, or what may be called phrasing, of questions is important as it can influence the responses that are received. It is useful to remember that it is often the case that 'it's not what you ask, but how you ask it.' Almost any question can start with one of the following 'interrogative' words or phrases: how, when, where, who, what, when, what is, what are, how to do, or how often? An effective questionnaire does not, though, just comprise a list of different interrogative words/phrases. The question order/sequence is important (Brace, 2013; Brown, 2001; Patten, 2014) and may influence the received responses. It will take time to ensure that questions are correctly sequenced so that their order seems appropriate and coherent to the respondent. Similar questions should be grouped and organized logically so there is a progression from one question and group, or set, of questions to the next. The questionnaire should be easy to follow, and questions written clearly so that there is no room for ambiguity, misunderstanding, or misinterpretation by the person completing it (Oppenheim, 1992, Rattray & Jones, 2007).

It is important to use language accessible and understood by the target respondent group. When developing questions, it is essential to consider the respondents it is aimed at. For example, their: age, level of education, and awareness and (potential) understanding of the topic. It is also useful to consider carefully if any terms may be open to (mis)interpretation. For example, the question "How many meals do you eat in a typical week?" may, on initial reading, seem unambiguous. Yet, can it be assumed that each respondent will have the same understanding of what a 'meal' is?

Some respondents may eat a sandwich for lunch and may not regard a sandwich as a meal, yet other respondents will identify a sandwich lunch as a meal. In order to gain accurate data it would be necessary to provide a working definition within the questionnaire of a 'meal.' In my experience, many novice researchers assume that their understanding, use and definition of a key term, phrase, or even word is the same as that of their target respondent group. But they may not be. In order to prevent misunderstanding is generally better to start from the position of assuming that they are not, particularly so when the respondent target group is from a different or differing culture, country, or region within that country, race, religion, educational level, age-group, or employment sector to your own. Here it is important to consider your positionality (Holmes, 2020) and how it may differ from the respondents. I offer the following example of a word that is commonly understood in one part of a country and may not be in another. Within different regions of the United Kingdom, the words: breadcake, tea-cake, barm-cake, bap, barm, cob, muffin, stottie, stottie-roll, roll, oven-bottom, flat-bottom, batch, bin lid, oggie, and bread-roll, may all be used to refer to a similar, in some cases *identical*, type of bread product. Yet they may be different. A tea cake in some parts of the UK will have currants, whereas it will be plain bread in other parts. In parts of the UK, some respondents may never have come across some of these terms before, so a question asking them about their consumption of, for example, stottie or stottie-rolls would not be able to be answered by all respondents. This example highlights how a key term may be interpreted differently by different respondents; it follows that every single question used must be understandable and answerable by all respondents (Krosnick & Prosser, 2010)

Developing effective questionnaire questions takes time and effort to ensure absolute clarity to allow the respondent to provide a valid answer. Clarifying and defining key terms is essential, even if they are commonly used. Unlike an interview or focus group participant, the person completing a questionnaire cannot ask for clarification. The language frame of each question should be appropriate to the use of respondents. For example, a questionnaire designed for completion by subject experts would use different words than one designed for the general public. A questionnaire about healthy eating aimed at dietitians would use different words to one aimed at members of the general public. One designed for children should be written in age-appropriate words that would be different from a questionnaire designed for adults to complete. The words used should be inclusive to avoid discrimination and ensure that it is accessible to all respondents. Where appropriate, it may be necessary to consider making the questionnaire available in a different language. For example, one using the English language may need translating for respondents for whom English is not their first language.

Each question should only ask the respondent about one thing and one thing (Patten, 2014). What is called 'double-barreled' or compound questions, those which contain more than one question within the same question, need to be avoided, as the respondent can not provide an accurate answer. An example of a double-barreled question is "How often and how much time do you spend in a café or restaurant each month?" Some respondents will eat at a café/restaurant often yet not spend much time there, while others will go less frequently yet spend a long time there. Therefore, this question would be better as two questions, such as, "How often do you go to a café/restaurant in a typical month?" and "How much time do you spend in cafes/restaurants in a typical week/month?"

### Avoiding Bias: Ethics, Leading, and Loaded Questions

Questions should be worded in a non-leading and non-biased manner to ensure that the responses received are representative of the participant's thoughts and experiences (Brace, 2013; Wilson & McLean, 1994). Therefore, ensuring that a questionnaire contains no leading or biased questions is vital. 'Leading questions' encourage sometimes force the respondent to provide a particular answer without room for them to express their true thoughts, feelings, or values. An example of leading question is, "Our ready-meals are the best ones available, aren't they?" – this leads the

respondent to agree when they may not. Similarly, 'loaded questions' aim to trick the respondent by making assumptions about them in advance. An example of a loaded question is "Where do you enjoy shopping for food?" – this is loaded as it assumes the respondent enjoys shopping for food. Another example is "Which public houses do you enjoy drinking in?" – this is what I would term a 'multi-loaded' question as it is loaded in many ways; it assumes the respondent drinks alcohol and that they enjoy drinking, it assumes that they visit public houses.

Underpinning the avoidance of bias is the necessity for the researcher to consider their unique positionality and adopt a reflexive research approach when developing their questionnaire's research questions (Bahari, 2010; Bourke, 2014; May & Perry, 201; Holmes, 2020) and to act ethically and honestly throughout the design and implementation process (BERA, 2018; Malterud, 2001; Ormston et al., 2014; Savin-Baden & Major, 2022; Scotland, 2012). I recommend that all educational researchers read and follow the BERA (2018) ethical guidelines for educational research. A student research project will require ethical approval from their university before a questionnaire is distributed to respondents, yet the actual questions used within it may not. Institutional ethical approval does not guarantee that a questionnaire and its use are 'ethically sound.' Although guidelines and institutional ethical approval processes are important, Hammersley (2014) argues that whilst the principles identified in codes and frameworks: "operate as proper *external* constraints upon how researchers should carry out their work," they do not fully answer the question of how values should guide it. It is, therefore the individual researcher's responsibility to consider their positionality (Holmes, 2020) and to act ethically at all times during the design, operationalization and later, analysis of data derived from a questionnaire (Grix, 2019; Sikes, 2004).

### Problems in the Use of Questionnaires

There are several common problems associated with the use of questionnaires in research. These primarily relate to the completion of it by the respondents. The majority may be prevented through a careful design process. If problems are anticipated during the design stage and 'designed-out,' their effect may be minimized.

One common problem is Respondent Fatigue. This refers to the tendency of respondents to become tired, bored, or disinterested when completing a questionnaire (Patton, 2014). Respondent fatigue can result in incomplete or inaccurate responses as respondents may rush through the questionnaire, skip questions, or fail to complete the full questionnaire. The simple way to prevent this problem is to design a short questionnaire and indicate at the start that it should take the participant no more than X minutes. A general guideline is that X should be no more than ten minutes.

Another common problem is that of Simplicity/Jargon bias. This can occur when the language used in a questionnaire is either too simple or has too much technical jargon, making it difficult for respondents to understand the questions. Using jargon or overly technical terms can lead to confusion or misunderstandings while using overly simplistic language can lead to oversimplification or inaccurate responses. As previously discussed, it is important to use language that is accessible and understood by the target respondent group.

Social Desirability bias (Edwards, 1957; Edwards & Horst, 1953) is another common problem. This refers to the tendency of respondents to answer questions in a way that they feel is socially acceptable or desirable rather than answering truthfully (Dornyei, 2010, Krosnick & Presser, 2010). This can result in very inaccurate or unreliable data, as respondents may not want to admit to behaviors or attitudes that are considered socially undesirable. Even when respondents know that the questionnaire is being completed anonymously, they may still provide socially desirable answers. A simple example here is as follows. A question aimed at parents of young children asks, 'In a typical week, how many days do you read to your child (ren)? and offers the choice of answers of '0 days, 1-2 days, 3-4 days, 5-6 days, and 7 days' (Note that the question may not be well-designed as it does not ask for how long, nor whether reading

takes place on more than one occasion during a day). Many parents may answer in a socially desirable way, feeling that they *should* read to their children either every day or at least 5-6 days per week, so will answer 5-6 days or 7 days, regardless of how many days they actually do read to their child (ren). The phenomenon of 'Acquiescence bias' may have a similar effect. It occurs when respondents agree with questions or statements, regardless of their true beliefs or attitudes. Keeping questions as neutral, unbiased, and non-threatening as possible may help prevent social desirability and acquiescence bias, yet not always including 'forced choice questions (i.e., ones where a respondent has to choose between two or more different answers) may be useful here (Nederhof, 1985) as does including questions that may, in some way, be independently verified as being true (Larson, 2019). Yet, in practice, both these techniques may be difficult to implement for novice researchers. One way that may be easier is to include fictitious questions containing socially desirable answers and see if respondents provide the desired answers (Kam et al., 2015). For those that do, then treat that data with caution. However, it may not be ethically sound to do so.

Another common problem with questionnaire completion is the Halo Effect. This is the phenomenon of respondents providing consistently positive or negative responses throughout the questionnaire, regardless of the actual question being asked. This results in inaccurate or unreliable data. The halo effect (Thorndike, 1920) refers to where one aspect of something, or a person's trait, is used to make an overall positive or negative judgment of that person or thing. An example here would be where a respondent does not like some particular aspect of the questionnaire, such as its design layout or the phrasing of questions, and so answers every question negatively. Similarly, a respondent may admire the person who designed the questionnaire and so answers every question positively. Unfortunately, preventing the halo effect in respondent questionnaire completion is difficult. If, at the data analysis stage of the research, some questionnaires seem to have been affected by this, then it may be better to remove them from the data set.

One further problem that may arise is that of respondents' literacy issues. They may have difficulty reading or fully comprehending the questionnaire due to low literacy levels (Al-Tayyib et al., 2002). Whether this is likely a problem or not depends very much on the target audience. If it is anticipated that respondents may have low literacy levels, then questions must be carefully worded. It is useful here to seek external professional help in designing clear, unambiguous, and understandable questions for a target audience with low literacy levels. To maximize the potential to gather high-quality data, the questionnaire must be easy to follow and structured questions so that there is no room for ambiguity, misunderstanding, or misinterpretation by the respondent (Patton, 2016).

### Operationalizing the Questionnaire

Before using any research questionnaire, one, preferably two, pilots should be conducted with a small sample of people who form a test pilot group (Oppenheim, 1992; Patten, 2014; Stone, 1993). This will help identify any potential problems with the questionnaire and make any necessary changes before it is used. The pilot group should typically be comprised of similar people as the intended questionnaire respondents, yet it is also useful to include university tutors and student peers. It is helpful to ask the group for feedback about all aspects of the questionnaire. Typically, the pilot group should be asked questions about the following aspects: its length, the clarity of questions, did they understand what they needed to do, was each question unambiguous, did they feel anything was missing, did at any stage they felt they could not answer a question because it was not clear what was being asked of them, was the sequence and order of questions logical, and can they make any suggestions for improving any aspect of it? Once feedback has been gained, the questionnaire can be revised, questions, re-phrased, removed, and new ones added. A second pilot is often useful for further developing and improving the questionnaire.

## Practicalities

Students commonly want to know how many questions to include in a questionnaire. The advice I always give is; to include as many as necessary to gather the data needed to answer, or illuminate, your research questions, yet to use no more than is necessary and, that it is unreasonable to expect respondents to spend much more than ten minutes of their time completing it. Only include what is vital/necessary. For example, do not ask for personal or irrelevant information such as age, gender, occupation, or income, if they are not germane to the research. It is tempting to ask for information that may be useful yet is not vital. Try to avoid that temptation. When designing a questionnaire, novice researchers often need to ask more questions than is necessary because they feel that 'may' be useful. Do not. Only include questions central to answering/illuminating the main research question(s).

## Conclusion

The design and use of questionnaires are important aspects of educational research (Newby, 2013, Cohen et al., 2017). By following key considerations about the design and operationalization of the questionnaire, as outlined in this paper, novice researchers can ensure that the data they collect is accurate and representative of the population being studied. The study's results may then be used to illuminate their central research question and contribute to a high-quality student research project.

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