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USING CASE STUDIES AND MIXED METHODS

What is case study research?

In case study research, the primary focus is the particular case that is the object of interest. Robert Stake explains that a case study is not a methodological choice but 'a choice of what is to be studied' (2008, p. 119). In case study research the focus of attention is a 'specific, unique and bounded system' (Stake, 2008, p. 121). The case might be bounded by time, place, events, processes or activities—in other words, by whatever 'unit of research' makes a 'coherent entity' (David, in Liamputtong, 2009, p. 190). In a design context, the unit of research might be a particular object, a system, a design process or a workplace such as a studio or workshop. In planning and presenting the research, the nature of such boundaries must be made clear (Liamputtong, 2009). Whatever the focus, whether it is the particular location or time frame in which the research takes place, the cultural practices and/or work processes of the group concerned or the broader institutional or professional contexts, the boundaries of the case will all be made explicit both at the start of the research and in the final research text, which is also a 'case study'.

Not all commentators share Stake's position, and the concept of a case has been understood in 'remarkably different ways' (Ragin & Becker, 1995, p. 8). For Creswell, a case study is a particular form of ethnography in which the case is 'separated out for research in terms of time, place, or some physical boundaries': it is a 'procedure of inquiry' (2008, p. 476). Ethnographic approaches are appropriate for much case study research, although in the context of research in the design field, other approaches such as research into materials may be needed (as in the logo example discussed later). In this discussion, Stake's position that case study research is distinguished by its boundedness and not by its methodological choices is adopted, though the methodological choices themselves will be shaped by the need to show the particularities of the case (Stake, 2008). The case to be researched may be a pre-existing concept or theory (such as function or collaboration), an event or a process, or a group of people with some shared experience such as team membership or educational background. In these situations, the case is identified at the start of the

research. In other instances, the case only emerges during the research process as its defining features become evident through analysis of data. While it is useful to consider a case as a specific or particular instance of something, besides collecting data relating to the nature of the case itself, researchers may also decide to explore such elements as the case's historical background, or the economic, political cultural or aesthetic contexts of the case. Indeed, an examination of other comparable cases may be important in identifying the particular features of a specific case (Stake, 2008).

Although in most instances of case study research the nature of the case to be studied is clear in advance, sometimes a case emerges out of a different type of study, such as an ethnography, from which the nature of the case emerges inductively (see Ragin & Becker, 1995). For example, ethnographic research that began with the intention of looking into the work culture of a design studio might bring to light a case of gendered work practices. The research might then be presented in the form of a written case study with the particularities of the location, the individuals involved and other contextual features made explicit in order to explore the case of gendered work practices.

It is worth noting the distinction between a case study as a piece of writing and case study as research. The former is a way of presenting a set of connected information in the form of a case study, whereas case study research is a research approach that when complete will lead to a written case study (Patton, 2002, p. 447). In both cases the term case study is used to bring to the fore the specific focus of the research. For example, written case studies of the creative work of a particular advertising agency, of the design practices of a particular historical period or of the use of a particular material for a particular purpose are all examples of research texts that have a focus that is bounded by the particularities of the case, whether or not the original intention was to conduct research into that particular case.

Sometimes, the decision to use a case study approach is a pragmatic one. When research is constrained by time, by resources, by limited access to the research field or to participants, rather than attempt to encompass as much as possible, the decision can be made to limit the scope of the research so that its boundaries are explicit and the project feasible. Otherwise, as suggested, a specific focus is already built in to the research. Such a focus might be temporal, such as the time period during which a project is developed or implemented; or spatial, such as a particular building or part of a building; or conceptual, such as the use of the logo (Spooner, 2009) or the notion of form in a crafted object.

In case study research it is important that the particular focus of the research is already identified. Similarly, identifying the purpose of the research is important, too, since different kinds of case studies will lead to different types of research outcomes, and it is useful to consider which type of case study best suits the research purpose. Stake (2008) broadly differentiates between intrinsic, instrumental and collective case studies. A researcher will conduct an intrinsic case study to understand the particular case better. Kayo's ethnographic research into the cultural

practices associated with the school ball could be reframed as an intrinsic study. Here, the intention is not to generalize from the case but to explore the particularities of the case, which are themselves of interest in.

The intention behind an instrumental case study is to help us understand something outside the case by providing additional insight or helping illustrate a phenomenon or issue (Creswell, 2008; Stake, 2008). Here, the case assists our understanding of other cases, either because it is typical or because it is not. For example, case study research into the effect on family relationships of the introduction of a particular new piece of technology into the home could be used instrumentally as a means of exploring a more general problem of the introduction of new objects into the home environment. It is important to bear in mind that while one strength of case study research is its potential to explore a phenomenon in depth, case study research is limited in its breadth. The insights gained from the close study of one context do not necessarily transfer to another (Ary, Jacobs & Sorensen, 2010, p. 457), although the insights gained from one case may help inform our understanding of others. As with every research project in design, each new case study in design will add to the body of knowledge in the field.

Where the intention is to explore different aspects of the same issue through the lenses of several cases, Stake suggests the implementation of a collective case study (2008, p. 123). Patton extends this idea somewhat when he refers to the idea of a 'layered or nested' approach to case study research, where larger units of study are built up out of smaller ones (2002, p. 447). Often, the main study is made up of descriptions of other smaller events of interest such as celebrations or critical incidents, and for this reason the final case is the product of a series of nested studies (Patton, 2002, p. 297). Collective or nested case studies might be adopted explicitly when the case under examination is large and complex. A team approach, whereby different individuals or small teams collaborate in the production of a multilayered case study by each focusing on research into smaller, more specific cases that are then brought together into a larger study, can be worthwhile when the project is large. This approach may be very appropriate for a team of designers faced with a complex task. For example, a research project aimed at determining the most successful strategies for designing, marketing and distributing a particular fashion item such as a surf T-shirt requires a focus on numerous different processes, including manufacturing, designing, advertising and distributing the T-shirts. In such a complex case study, a collaborative approach will be important. However, even when the case study is made up of several nested cases, Patton (2002) nevertheless advises us to ensure we do justice to the individual case by focusing initially on the smallest unit. Otherwise, there is a risk that the detail will be lost in the complexity of the whole. Since the research focus is the case then the final research text should itself reflect the case.

In having these very explicit boundaries, case study research differs from the more open-ended approaches characteristic of ethnographic and narrative approaches to research that we discussed earlier, because the limits of the research focus are in

place from the start. However, the example of the logo development that follows shows how, within the particular case that we are studying, we might draw on ethnographic, narrative or other methods depending on the research question and the research context. The use of multiple sources and techniques to gather data about a specific problem or phenomenon is a key feature of case study research. Depending on the type of case study, different methodological decisions will be appropriate (Patton, 2002). Given the range of methodological approaches that are typical in case study research, it will not be a surprise to know that the final product of the research may be made up of a range of different kinds of texts. Written case studies may for instance include narrative accounts of a series of events; vignettes or brief descriptions written to capture the essence of an event or experience; tables or charts to present quantitative data; or figures or diagrams that represent significant findings in visual form (Ary, Jacobs & Sorensen, 2010).

The logo project: a case study

Your clients want you to develop a logo for their healthy fast food restaurant. The logo will be used in signage outside the restaurant as well as in all print and online promotional material and on menus and tableware. Your brief is to create a logo that will ensure that the restaurant will stand out as being different from other fast food outlets while at the same time attracting a similar clientele: families and young people looking for healthy fast food. From this brief, a research question emerges: what logo would best communicate the two key messages of a new healthy fast food restaurant?

Because your research focus is clearly defined—to design a logo that will best suit this client's needs—you decide to use a case study approach to the research you will undertake to resolve this problem. However, as you begin to think through the different components of the problem, you discover that there are a number of smaller cases that are, as Patton states, 'nested' within the larger case (2002, p. 297). You decide that your case study will in effect be made up of a series of smaller interrelated cases, and your research design develops with this in mind. As your research plan develops, you also realize that each different case lends itself to the use of different methods.

Your first stage is to identify what the clients' feelings are about the kind of logo they want, and you decide to explore how your clients developed their ideas for their business, what their motivations were for taking their chosen direction, and how they imagine their restaurant will look when it is open for business. The focus on experiences, actions, values and feelings suggests a narrative approach to this phase of the research.

Secondly, you explore the questions of what signifies 'fast food' and what signifies 'healthy food' to potential customers. To do this you research the logos already in use by restaurants in the surrounding area. You make observations, collect visual

Figure 6 Nested case study (Stuart Medley).

Speech bubble: *Hmm ... Making T-shirts can actually be seen as many, linked processes; each one a worthy case study on its own.*

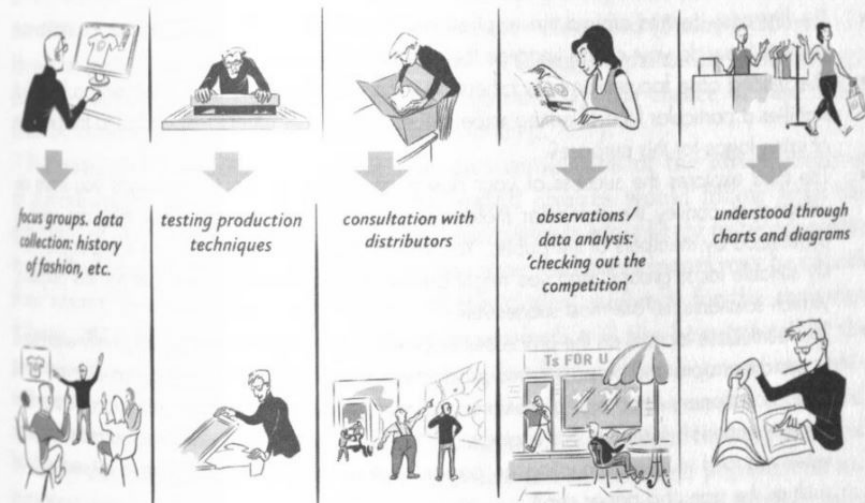Labels: *focus groups, data collection: history of fashion, etc.* — *testing production techniques* — *consultation with distributors* — *observations / data analysis: 'checking out the competition'* — *understood through charts and diagrams*

evidence and analyse this data to identify some of the key components of the different logos. You will then be able to analyse and compare the different pieces of evidence. As you start to synthesize the different sets of data, you will be in a position to create some examples of logos. At this stage you might set up some focus group interviews that will enable you to gauge the responses of potential patrons of the restaurant to your different designs. This will be your third case. Based on your work on these three embedded cases, you will now be ready to create some designs to show your clients. This particular case relates back to the first one, as it develops your research into your clients' experiences, feelings and values. Depending on their response, you may need to go back and work through some of the research processes again (which ones they are will depend on the nature of your clients'

responses), or you may be able to proceed with the next stage, which would involve experimental research into different materials. You will need to explore how each design works when scaled up or down, whether the designs are appropriate for the different materials or media you will use for the different products, and do some costing exercises. This phase of the research will provide you with your final case.

The overall research we have described is made up of four distinct case studies that are then brought together to form the single 'big picture' case. To develop a solution that is well informed by research, it has been necessary to develop each nested study with its own particular set of research aims and its own methodological approach. Each separate component is distinct, and given sufficient development could constitute a separate research focus (and a distinct case) in its own right. But in the context of the logo project, each component case is essential to the compilation of the larger, composite case. To elaborate:

- The first case centres around the inspirations, motivations and aspirations of the restaurant owners. How do your clients imagine their future enterprise?
- The second case focuses on how others have solved the problem of designing a logo that signifies a particular kind of eating experience. How have others responded to the problem of using logos for this purpose?
- The third explores the success of your design solutions (shown in the logos you have developed) to convey the particular messages you intend, based on how they are read or understood by members of the public. You would probably use purposive sampling to identify suitable focus groups, and you might devise a 'paired adjective' scale for this purpose. Which solution(s) is/are most successful?
- The fourth case focuses on the processes involved in bringing an image, originally expressed in two dimensions and on paper, into production as signage and as a logo on different items such as stationery, crockery, glassware and table napkins. This has further ramifications in terms of materials research. For example, is the logo adaptable to different formats, such as when reduced in size for printing on paper napkins, or when printed on a curved surface such as the side of a paper cup?
- The whole case is developed as a written case study, in which you explore your work as a designer by making explicit the processes that are involved in fulfilling this design brief.

Methodological choices in case study research

As we have shown in discussing the choices made by the researcher in the logo project, the initial examination of the brief led to a series of research questions that each focused in more detail on smaller components of the larger case. However, in this example each small case was clearly framed both in terms of the limits of its focus and in terms of its relation to the larger case, which also had clearly defined boundaries. Each different nested case required the use of different research methods, and for each case the methodological choices were suggested by the nature of the research problem. It should be obvious from this example that the use of mixed research methods is particularly appropriate for case study research. In fact, the idea

of mixing research methods within any methodological framework is becoming widespread, and has many advantages for researchers.

Case study research is less open-ended in design than ethnographic or narrative research. Often, in the interests of gaining a full picture of the case, a great deal of information will be gathered, and unlike most ethnographic and narrative research, the types of data will be extremely diverse. Typically, such methods as observations, in-depth interviews with individuals and focus groups, and opportunistic conversations with participants are combined with analysis of personal journals, documents, photographs or film, archives or physical artefacts or even numerical data (Liamputtong, 2009; Patton, 2002; Yin, 2008). As with ethnographic research, the triangulation of data, typically achieved by using different sources of data (such as interviews with both designers and with consumers) or by using different methods of data collection (such as large scale surveys, small scale interviews and observations), will be important to ensure that the diverse perceptions and different realities of the individuals at the centre of the study are identified (Stake, 1995, p. 113). However, given that the boundaries of the case will suggest particular methodological approaches, case study research is distinguished by 'the choice of case rather than the choice of methods' (Liamputtong, 2009, p. 191).

For example if the research focus was an examination of the effectiveness of an advertising campaign, certain methodological choices would follow from the definition of the research boundaries. Here, sampling is most likely to be purposive to give the most useful data in relation to the case, and participants may be chosen from among those groups that are part of the typical audience for the campaign (Glesne, 2011; Patton, 2002). Data collection methods will also be suggested by the particular focus of the case. In this instance, individual and focus group interviews will elicit more useful data than observations when there is the need for targeted, specific information, but such ethnographic types of data might be supplemented by survey data to identify changes in brand awareness across larger populations, and statistical data might be used to show the effect of the campaign on product sales. In case study research, the planning process is crucial in determining the research focus and identifying the precise boundaries of the case. Having made these decisions, the methodological choices should follow on clearly. Based on the project's needs, the researcher should feel confident in choosing a mixture of methods when appropriate.

Mixed methods in case study research

A major advantage of using mixed methods is that they provide opportunities for triangulation of data (Patton, 2002, p. 247). As mentioned, triangulation can strengthen a study by providing evidence from different perspectives that serves to cross check and provide validity for the claims being made (Patton, 2002, p. 248). While in Chapter 6 we suggested that observation is particularly appropriate for ethnographic research, other approaches such as interviews and document analysis

are invaluable to enable the researcher to gain fuller perspectives. Similarly, while in-depth, open-ended interviews are particularly suitable for narrative research, these could usefully be supplemented by data based on observations, for example observations of a craftsperson at work or in interaction with clients. No matter the project, it will be essential for researchers to explore every possibility for using a range of methods to add depth to their understandings and make their studies more credible.

We have so far suggested possibilities for combining different methods from within qualitative traditions. Increasingly, researchers are choosing to combine qualitative and quantitative methodological approaches when such a combination is suggested by their research purposes (Ary, Jacobs & Sorensen, 2010; Tashakkori & Teddlie, 2003; Teddlie & Tashakkori, 2009). Quoting Aldous Huxley's words, 'That which works, works', and arguing that the sole use of a qualitative approach may leave gaps in the data that could be filled using quantitative methods, Ary, Jacobs and Sorensen suggest that by mixing qualitative and quantitative methods researchers may obtain 'better information to understand a particular phenomenon' (2010, p. 558). Where words and narratives can add meaning and richness to numerical data, numbers can add clarity and precision to the qualitative data (Ary, Jacobs & Sorensen, 2010). For example, in the logo case study mentioned throughout this chapter, the data collected using the Likert-type scales could be presented simply and effectively in numerical form, perhaps as percentages. This mixing of data can occur at all stages of the research: by combining quantitative and qualitative approaches to data collection (such as using a large scale survey that is then supplemented by data collected in interviews with individuals), and by using quantitative and qualitative tools for analysis or for presenting the research (Tashakkori & Teddlie, 2003).

An example of the latter is a continuum, which is a quantitative device for showing a gradual transition from one state to another but would be a very suitable choice to represent continuity of experience (such as how participants' perspectives changed over time) and could therefore be used to summarize and present qualitative data clearly and succinctly (see Pearce, 2008a). While a research project can be considerably enhanced by the combination of qualitative and quantitative methods, the project should be designed to allow the different components of the research to be brought together in logical and purposeful ways, to avoid the risk of conducting two distinctly different studies (Yin, 2006, in Ary, Jacobs & Sorensen, 2010). In other words, the qualitative components such as written narratives or vignettes might be used to elaborate or explain quantitative data, or quantitative devices might be used to summarize or encapsulate qualitative data. As with all research, the coherence of the research design, the appropriateness of the methods and the consistency of interpretations across qualitative and quantitative phases of the study should all be examined for their rigour (Ary, Jacobs & Sorensen, 2010, p. 567). Choices about how to present data should be made that ensure the research outcomes are presented in meaningful ways.

Quantitative methods enable researchers to gather data that reflects the perspectives of large groups of people or populations. These approaches may be particularly valuable for designers, since their work often involves providing solutions that will work for large numbers of people such as the population that comprises a representative sample of all possible users of a new product. For these reasons, a mixed methods approach might be valuable for many design-focused research projects. Given the importance of matching the research methods to the case, we suggest that the possibilities of using mixed methods are explored whenever case study research is undertaken. A mixed methods approach would certainly be appropriate for the logo project discussed in this chapter. We earlier noted the stages at which methods such as individual and focus group interviews and observations could be used in this project. In the next part of the chapter, we further illustrate how quantitative methods such as surveys could be incorporated into the logo project.

Survey research

While it is true that using methods from qualitative and quantitative traditions together can be more time consuming and more demanding of research expertise than working within one tradition (Ary, Jacobs & Sorensen, 2010), it is possible to find creative ways to combine both qualitative and quantitative approaches without embarking on approaches to data gathering that require complicated procedures. Some typical qualitative methods were discussed in Chapters 6 and 7; we now suggest some accessible ways to develop quantitative approaches such as surveys that could be used in research in design. Some advantages of using surveys are their versatility—they can be used to research a wide range of topics—and their usefulness for collecting a large amount of data from a large number of people relatively quickly (Walter, 2010a, p. 152). They have disadvantages, too. The data can quickly become out of date, responses are subjective and they can only give a limited picture of the issue that is researched (Walter, 2010a). As always, the decision about whether or not to use surveys in research goes back to the original research question. What potential do these methods have for helping you find out what you need to know?

The first task in developing a survey is, as with any research, to develop the initial research question (Punch, 2005). By doing this you will successively refine the focus of your research and clearly identify what you plan to find out. In the logo project, the research question ('what logo would best communicate the two key messages of a new healthy fast-food restaurant?') has developed from a professional problem, defined in terms of the clients' needs. Then, having defined the concepts to be explored and having decided that a survey is the most suitable approach for the planned research, the process of developing and administering a survey involves defining the sample to be surveyed, developing the survey itself, then conducting the survey and, finally, analysing and interpreting the data. Each stage also involves

further detailed tasks such as writing and refining the questions, piloting the questionnaire, and deciding how best to present the data that has emerged (Ary, Jacobs & Sorensen, 2010; Walter, 2010a). In a study that uses mixed methods, careful decisions will be needed about how and at what stage to present the different types of data, and how to synthesize the different data that has emerged from the different data collection methods.

Several options are available to researchers whose project would benefit from the use of surveys. We list these briefly here, but if planning to use survey methods, we would recommend you to read further to clarify and refine your understanding before embarking on the project. (Here it is worth noting that creating surveys is a complex process, and there are numerous useful guides that will provide more detail then we can do here. The list of references provided at the end of the book includes several useful texts.)

Different types of surveys

Should you choose to undertake survey research, you will need to decide what type best serves your needs. One key task is to decide who will participate in the survey. Sample surveys are manageable ways for individual researchers to collect information that can be used as the basis for making inferences for the population as a whole (Ary, Jacobs & Sorensen, 2010; Creswell, 2008). A sample is a proportion of the total population, chosen for a particular reason and to suit the research purposes. You might use random or cross-sectional sampling, in which you choose individuals at random to be representative of the whole population (Walter, 2010a), or you might use convenience sampling, where the researcher chooses participants because of their availability and their willingness to take part. Such a sample cannot be said to be representative, however. An alternative to convenience sampling is snowball sampling, where existing research participants are asked to recommend others to take part in the research. Researchers planning a qualitative study will use purposeful sampling, where individuals are chosen specifically for their capacity to provide information about the research topic. This practice is particularly relevant to case study research, where the nature of the case will suggest the sample (Stake, 2008). See also Ary, Jacobs and Sorensen (2010) and Creswell (2008) for further information about sampling.

Surveys may then be designed to collect information over a period of time (longitudinal surveys) or at a specific point in time (cross-sectional surveys). Longitudinal surveys explore change over time either with the same group of participants, or with different individuals such as in a study of trends, or with cohorts of people having something in common with each other such as age, education or social status. In cross-sectional surveys the focus is a study of a cross-section or sample of a population at a given point in time. This has the advantage that the data collection takes place on only one occasion, whereas longitudinal studies require data to be collected on several different occasions. Having decided to use surveys as a data

collection method, there are four ways you can administer them: as printed surveys that are posted to people; as electronic surveys emailed to people; as surveys placed on a Web site constructed by the researcher and made available through the Internet; or they may be personally administered to a group of people in a specific place or on a specific occasion. Different advantages and disadvantages are associated with these different approaches to administering surveys (Ary, Jacobs & Sorensen, 2010, pp. 384–387).

Finally, surveys may be designed to focus on tangibles, by asking for straightforward information such as who uses what, how often, where and when, or on intangibles, which ask participants to respond on more complex factors such as their values, opinions, attitudes (Ary, Jacobs & Sorensen, 2010, pp. 375–376). Surveys used in research in design might well need to focus on both tangibles (questions about practices or preferences in using a designed object or system) and intangibles (questions about attitudes to or feelings about a particular product), depending on the research purpose.

Surveys: asking good questions

The introduction of the question into the problem/solution dialogue is helpful for the designer who is thinking about research. From this perspective, questions have a role at the higher levels of thinking about design problems, to help identify what the problem actually is and to shape strategies for the eventual resolution of the problem. Thus, questions become intellectual tools for exploring the problem/solution dynamic. Another role for questions is as intellectual tools for eliciting information that can be used by the researcher to move towards solutions. The use of questions to gather information from research participants, whether in interviews or through surveys, is one of the most important strategies in social research.

In Chapter 7 some approaches to framing questions in relation to interviews were explored, and the use of semi-structured interviews and open-ended questions to provide opportunities for research participants to engage in open conversations with the interviewer and shape the research in their own ways was advocated. In contrast, written surveys are carefully structured so that each participant is given the opportunity to respond to exactly the same items in exactly the same way. It is therefore important to develop questions that really work well to elicit the kinds of information that are of interest. Written surveys typically use a combination of open and closed questions (see also Chapter 7). Survey questions might ask for relevant demographic questions such as age group, gender or size of family, or questions about practices that are relevant to the research. Answers to these will be useful later when analysing responses, as they will help identity any common patterns based on age or gender. Surveys often include some open-ended questions in the form of completion questions (What does this logo remind you of?) or that give respondents the option to make additional comments. The outcome of a survey can be significantly influenced by the way questions are phrased, the amount of

information provided and the choice of answers made available to participants (Ary, Jacobs & Sorensen, 2010, p. 395). Ary, Jacobs and Sorensen list eleven factors to be considered when writing survey questions. These include the need to:

- Be brief
- Make the questions easy to understand
- Ensure that questions will not give rise to ambiguous answers
- Ensure that questions do not predetermine an answer
- Avoid leading questions
- Avoid writing questions that attempt to ask two questions in one (2010, pp. 395–397)

When writing questions it is important to be aware that sometimes how a question is asked 'may prescribe the answer' (Ary, Jacobs & Sorensen, 2010, p. 395). Every question should be checked for evidence of the researcher's agenda coming through in the phrasing. For example, in the question, 'How often do you take your children to fast food restaurants?' there is an assumption that the respondent both has children and regularly takes them to fast food restaurants. Only someone to whom both these conditions apply can answer the question, so this would only be an appropriate question for a member of a particular research sample. Piloting questions is a vital stage in the process of survey development, to ensure that survey respondents read the questions in the ways intended, and to identify any possible ambiguous words or phrases. Finally, it will be important to make sure that the questions are both necessary and appropriate to the research purpose (Walter, 2010a).

Examples of survey questions

Simple examples of survey questions invite participants to write an answer to open-ended questions or complete a phrase or sentence using their own words. Checklists, where participants are asked to tick items that apply to them from a list provided, are also often found in surveys. Scaled items, where participants are asked to rate a concept or situation on the basis of a concept such as quality or frequency are also useful, as are ranking items and Likert-type items (see further on for a fuller description). Examples of a Likert scale and a rating scale are shown below. Surveys may incorporate some element of ranking or rating at the start. The different surveys shown here are particularly relevant to research in design, as they explore people's attitudes, beliefs, behaviour and opinions. The particular examples all relate to the logo project.

Attitude scales are used when the researcher is interested in research participants' attitudes or opinions, and measure the degree to which an individual exhibits a particular characteristic or attitude. They can be used alone or in combination with methods such as observation and interviews (both individual and group). The Likert scale, developed by psychologist Rensis Likert in 1932 to measure attitudes (Ary, Jacobs & Sorensen, 2010, p. 209), is a well-established

instrument commonly used in surveys. It enables the respondent to show the extent of their agreement with a particular statement by marking the appropriate box in response to each statement. Note that statements are used, not questions. Most Likert surveys have an odd number of possible responses (five is common), with a neutral option in the middle and agree and disagree items on either side (see Table 4).

A well-designed Likert scale will use a large numbers of statements about a topic, evenly divided between statements that express a positive attitude and those that express a negative one. Taken together the statements should as far as possible represent the full range of possible responses to the topic (Ary, Jacobs & Sorensen, 2010). In Table 4, the statements have been chosen to identify the extent to which respondents associate fast food with healthy eating and a pleasant dining experience. To score the scale, the different agree/disagree responses are each given a numeric value and responses are tallied to find the individual's responses to each item. When scoring, a weighting system applies so that the most positive responses are given five points and the most negative, one. However, depending on whether the original statement is negative or positive in its intent, the weighting will apply differently. In the example below, item 1 is a positive statement, so a strongly agree response would score five. Item 2, however, is negative, so a strongly agree response

Table 4 Likert Scale for Logo Project: Attitudes towards Fast Food Restaurants

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. Fast food can be healthy					
2. Fast food restaurants encourage poor eating habits in children					
3. Fast food restaurants are ideal for everyone					
4. I would not go to a fast food restaurant if I wanted a healthy meal					
5. Fast food restaurants are not my idea of a pleasant dining experience					
6. Fast food restaurants are great for young families					

would score only one. The final score shows the individual's overall attitude towards the subject. The results of the survey will help a designer to pitch the logo appropriately, either to emphasize the fast food nature of the projected dining experience or to play down the association with typical fast food establishments.

For the logo project, a rating scale might be used as a preliminary exercise, to find out such things as how regularly participants visit fast food restaurants, the types of meals they eat there most frequently (breakfast, lunch, snacks), and whether they visit more often alone, with family or with friends. Such questions can be useful to provide confirmatory data that can then be matched against participants' responses to other questions, and will also help orientate participants to the main topic or ideas (such as how participants read a logo) explored more specifically through the rest of the survey.

As it will be crucial to identify an appropriate range of statements when developing the survey, prior research involving relevant literature, examples of similar surveys or the input of experts will be important. Where the research is in response to a client's brief, it will be important to involve the client in the process of developing the statements.

An alternative device used to identify attitudes is the paired adjective scale (Ary, Jacobs & Sorensen, 2010, p. 212). Here, a list of adjective pairs is provided for research participants to tick to show where on a five- or seven-point scale their attitude is best represented (Table 5). This is a useful and flexible device and can be used to measure attitudes or opinions about a large range of topics or situations. It is easy to develop and quick for participants to use. There is a highly creative dimension to thinking up adjectives that relate well to the project. In the logo project, we have devised this scale to find out what is signified by the different logos produced during the third phase of the case study. The scale might be presented to different sample groups and a selection of logos provided for participants to rate, based on the same scale.

In this example there is no clear positive or negative end point on the continuum. This encourages respondents to read and think about each item separately before making their decisions. The responses are scored by converting the positions on the continuum into ratings (in this case from one to seven) depending on which

features the designer wants the logo to signify. The scores can then be averaged for each different logo presented, to find out which ones convey the desired message most successfully.

Another device used to measure attitudes is a rating scale (Table 6). In this case, a number of statements about a phenomenon are grouped in a list along with a scale of categories.

This rating scale could be used to initiate discussion in a focus group, with further questions developed to explore further the reasons for participants' ratings.

Finally, a ranking scale (Ary, Jacobs & Sorensen, 2010; Creswell, 2008) allows participants to show their attitudes to different attributes or concepts by placing them in rank order (see Table 7).

Scores are then tallied for each item, and an average found. The item with the lowest average score is the most important, and so on.

Data collected in these ways can also be used to inform later stages of the research. For example, having analysed the results of the surveys the results could be used to devise questions for focus groups that will enable exploration of the research outcomes in more detail. In the case of the logo project, focus groups might

Table 6 Rating Scale for Logo Project
Please Rate the Logo Based on the Categories Listed in the Left Hand Column.
This logo is:

	Very	Fairly	Not at all
Readable			
Attractive			
Distinctive			
Memorable			
Appealing			

Table 7 Ranking Scale for Logo Project: What Makes a Logo Stand Out?

Features of a logo	Order of importance (1 = most important, 6 = least important)
Use of colour	
Size	
Distinctiveness	
Originality	
Clear association with the product	
Sends a clear message	

Table 5 Paired Adjective Scale for Logo Project

What does this logo remind you of?							
Healthy food							Comfort food
Simple food							Gourmet food
Alternative food							Traditional food
Family dining							Fine dining

provide feedback about the different logos developed in light of the results of the surveys administered at an earlier stage of the project. Alternatively different survey questions could be developed to further investigate particular research outcomes. It is useful to keep in mind the possibility of using a range of devices for collecting data, and that project design needs to be flexible depending on the outcomes (which are often unexpected). We reiterate Stake's (2008) point that in case study research the methodological choices themselves will be shaped by the need to show the particularities of the case. This being so, we can expect our methodological choices to change as the research unfolds.

Sketches of research projects using a case study approach

We now outline some examples of research that use a case study approach. We have developed an example of a nested case study, in which the overall focus is 'design for liveable hospitals'. The research problem is: how can design be used to ensure that a hospital is a welcoming place for patients, visitors and staff? In the examples, several smaller case studies make up the larger one. They each focus on a different one of five specialist areas in design: fashion and textiles, interior design, architecture, product design and digital design.

FASHION, FABRICS AND TEXTILES

Research focus: Uniform design.
Research problem: To design a uniform that is functional, hygienic, reflects the status of the wearer but does not make the wearer appear intimidating to patients and visitors.
Sensitizing concepts: Designed object, users of design, function, aesthetics.
Methods:
Interviews with hospital staff, patients and visitors.
Materials research: durability, washability, comfort and wearability, functionality, attractiveness.
Research into other uniform designs and design solutions.
Data collected:
Interview data, observations of work practices.
Results of materials testing.
Final text: Case study of research process, including report of results and proposed uniform prototypes and patterns.
Who is the research for? Uniform designers, uniform wearers, hospital administrators.

INTERIOR DESIGN

Research focus: Signage and way-finding.
Research problem: To design a way-finding system to enable ease of movement throughout the building.
Sensitizing concepts: Designed system, user of designed system, signage, movement, space, logistics.
Methods:
Observations.
Research signage and way-finding systems in other locations.
Logistical analyses.
Focus group interviews.
Data collected: Observation records, spatial and logistical analyses, movement modelling, interview data.
Final text: Case study reporting research process and including recommendations, sample signage and mapping of movement.
Who is the research for? Hospital administrators, staff, patients and visitors.

ARCHITECTURE

Research focus: Public and private space.
Research problem: How to create private spaces in wards without compromising patient safety and staff efficiency.
Sensitizing concepts: Designed system, users of design, private and public space, efficiency, emotional security.
Methods:
Observe movement in wards, medical and support staff, patients, visitors.
Individual interviews with medical and support staff, patients, visitors.
Research solutions in other locations.
Materials research, partition systems, blinds, curtains.
Focus group interviews to explore maquettes produced.
Data collected:
Mapping of movements around wards.
Interview data.
Results of materials testing.
Focus group feedback.
Final text:
Case study including research report and recommendations.
Plans and maquettes.
Who is the research for? Hospital administrators, staff, patients and visitors, architects.

PRODUCT DESIGN

Research focus: Workspace design.

Research problem: To design a site-specific nurses' station for an established children's ward. The workstation must function successfully as an observation point and focal point in the ward while being aesthetically appropriate for children.

Sensitizing concepts: Designed object, designed system, users of design, ergonomics, aesthetics.

Methods:

Observe work patterns of nurses.

Individual interviews with nurses, children with parents/caregivers.

Research solutions in other child-friendly locations.

Materials research—durability, ergonomics.

Design options—style, colour, finishes.

Focus group interviews to explore maquettes produced.

Data collected:

Mapping of work patterns.

Interview data.

Results of materials and styling research.

Focus group feedback.

Final text:

Case study including research report and recommendations.

Plans and maquettes.

Who is the research for? Nurses and children, other product designers.

2D AND DIGITAL DESIGN

Research focus: Web design for ease of use.

Research problem: To redesign a hospital website to make it more accessible, by improving navigation, legibility and appearance.

Sensitizing concepts: Designed system, users of designed system, visual literacy, digital literacy.

Methods:

Analysis of existing website navigation, involving focus groups (observe and interview).

Identify aspects that need revision and redesign.

Research navigation systems in other websites.

Prepare and test newly modelled site, involving same focus groups for comparison.

Analysis of existing visual appearance of website, involving focus groups (observe and interview).

Identify aspects that need revision and redesign.

Research visual solutions in other websites.

Prepare and test newly modelled site, involving same focus groups for comparison.

Data collected:

Feedback from observations and interviews with focus groups.

Results of research into other website solutions.

Feedback on redesigned website.

Final text: Case study including research report and redesigned website.

Who is the research for? All users of this website, web designers.

Conclusion

What can we learn from case studies? Perhaps because of its value strategically to 'draw attention to what can be learned from a single case' (Schram, in Glesne, 2011, p. 22), case study research is found in several professional fields such as social work, education and health, as well as used as a method in social research generally. It also enables focused research into systems and institutional practices, and has the potential to provide both large-scale portrayals and detailed insights. The focus on experiential knowledge in case study research assists our understanding of the social, political and cultural contexts of individual and collective experience, or the real life of the case (Liamputtong, 2009; Stake, 2008). Case study research is also valuable when we are interested in 'how?' or 'why?' questions (Yin, 2008) in the context of a new or previously unknown phenomenon such as social networking. Furthermore, a single case study can form a starting point for further investigations and theory development (Flyvberg, 2006, in Liamputtong, 2009). For these reasons, case study research has considerable potential for those who are working and researching in the field of design.

For further examples of case studies in design we suggest you explore the following sites:

http://www.designcouncil.org.uk/Case-studies/: this site provides examples of design success written in the form of case studies.

http://www.smashingmagazine.com/2009/09/20/showcase-of-case-studies-in-design-portfolios/: sometimes case studies are used for promotional purposes, as in this example. The site provides examples of how designers have used case studies to enhance their portfolios.

http://www.blog.spoongraphics.co.uk/tutorials/logo-design-process-and-walkthrough-for-vivid-ways: this site describes a case study that focuses on logo design.