1 The Delphi Technique

Introduction

Most research studies are driven by research questions that need answering. To do so, the researcher must employ a research design. While there is little agreement among researchers as to the proper classification, Parahoo (2006) suggested that there are three types of research designs: experimental, case study and survey designs.

Experimental designs tend to be future oriented and the researcher often has to set up the conditions under which the investigation will take place. The most 'scientific' version of the experiment involving human subjects is the double-blind randomised clinical trial. It is employed widely in medicine in the testing of new drugs and is often referred to as the gold standard of research designs.

Case studies are in-depth investigations of phenomena. This type of design helps researchers gain an intimate knowledge of a person's or a group's condition, thoughts, feelings, actions both past and present, intentions and environment (Creswell, 2003).

Survey designs are by far the most common type used in health care research. This may be classified as descriptive, exploratory or comparative. The aim of a survey is to gather data from specific individuals, groups or populations for the purpose of addressing a particular issue. A more detailed overview of survey designs can be found in McKenna et al. (2006).

One type of survey that is gaining in recognition and popularity is the Delphi Technique and that is the focus of this book. This chapter will define and describe the technique, provide background as to its origins and outline the different types of Delphi surveys available to researchers. The characteristics of the Delphi will be outlined and there will be discussions on who can be categorised as experts, what constitutes a round, how feedback is handled and what is meant by anonymity and consensus. Finally, the Delphi will be compared with other consensus reaching methodologies including the nominal group technique and the consensus conference.

History of the technique

The desire for humankind to predict their future is an ongoing quest. Dating back thousands of years, oracles had a firm place in the life of Greeks and Romans. One of the most important oracles in the classical Greek world was at 'Delphi'. The Greek word *Delphois* refers to the womb indicating the Grandmother earth (Fontenrose, 1978). The name 'Delphi' is derived from the Oracle of Delphi. Delphi is an archaeological site in Greece on the south-western face of Mount Parnassus. In Greek mythology, Delphi was the location of the most important oracle in the classical Greek world, and a major site for the worship of the god Apollo. The god Apollo made himself master of Delphi, after slaying the dragon Pathos who protected the site, was also famous for his ability to foresee the future (Linstone, 1978). Legend has it that Apollo prophesies were transmitted through female intermediaries, known as *Pythia*, a name derived from the python, a source of wisdom in ancient Greece (von der Gracht, 2008). She had to be an older woman of blameless life chosen from among the peasants of the area.

In a state of trance, induced by vapours rising from a chasm in the rock, the Pythia (or priestess) would sit on a tripod over an opening in the earth and would communicate Apollo's answers to priests who would translate these back to the petitioners. People from far and wide consulted the Delphic oracle on a range of topics including important matters of public policy, to personal affairs, to the outcome of wars and the founding of colonies. Therefore, the term 'Delphi' has become synonymous with receiving good judgement on an issue.

The Delphi technique itself was developed at the beginning of the cold war to forecast the impact of technology on warfare (Custer *et al.*, 1999). In 1944, General Henry Arnold commissioned a report for the US Air Force on the future technological capabilities that might be used by the military.

Two years later, the Douglas Aircraft Company started Project RAND to study inter-continental warfare. Different approaches were tried, but the shortcomings of traditional forecasting methods, such as theoretical approaches, quantitative models or trend extrapolation, in areas where precise scientific laws have not been established yet, quickly became apparent. Similarly, exploring the use of focus groups to forecast events indicated three main problems including the influence of dominant personalities, noise and group pressure (Dalkey, 1969a).

To combat these shortcomings, the Delphi method was developed, essentially founded on the premise that individual statistical predictions were stronger than unstructured, face to face group predictions (Kaplan *et al.*, 1949). Entitled Project RAND during the 1950–1960s (1959) by Olaf Helmer, Norman Dalkey and Nicholas Rescher (Rescher, 1998) the Delphi

method started to develop. Initial application of the method required experts to provide their opinion on the probability, frequency and intensity of possible enemy attacks and the number of atomic bombs needed to destroy a particular target. This process was repeated several times until a consensus emerged.

Whilst Helmer and Dalkey developed the method, Abraham Kaplan, a qualified philosopher employed by the RAND Corporation, coined the name 'Delphi'. The founders of the method, however, were critical of the name 'Delphi'. As Dalkey (1969a, p. 8) explained:

> In some ways it is unfortunate – it connotes someone oracular, something smacking a little of the occult – whereas as a matter of fact, precisely the opposite is involved; it primarily is concerned with making the best you can of a less than perfect fund of information.

Nevertheless, since the Delphi's development, there has been a broadening of the technique and it is now commonly used across a wide range of disciplines including health, nursing and medical research. The use of the Delphi technique to identify research priorities and gain consensus in many areas of health research is clearly apparent (Edwards, 2002; Sowell, 2000; Palmer & Batchelor, 2006; Byrne *et al.*, 2008).

What is the Delphi technique?

The main premise of the Delphi method is based on the assumption that group opinion is more valid than individual opinion. A novel and contemporary way of illustrating this is through the use of 'ask the audience' in the popular game show, *Who Wants to Be a Millionaire?*, where the audience effectively act as the 'expert panel', experts in general knowledge, and the contestant asks the audience for their opinion on a certain question. The audience is asked to vote on the answer using a keypad and the results displayed in a bar chart form showing where the consensus lies. Obviously, the use of the word 'expert' is used loosely here but this demonstrates the main premise of the Delphi Technique that group opinion is considered more 'valid' and 'reliable' than individual opinion.

Defining the Delphi technique

The Delphi technique has been defined as a multi-staged survey which attempts ultimately to achieve consensus on an important issue (McKenna,

1994a). Prior to this, Dalkey and Helmer (1963) asserted that the Delphi was a method used to obtain the most reliable consensus of opinion of a group of experts by a series of intensive questionnaires interspersed with controlled feedback. In essence, all definitions agree that the purpose of the technique is to achieve agreement among a group of experts on a certain issue where none previously existed.

The original advocates of the Delphi Technique, Dalkey and Helmer (1963), defined the Delphi technique as 'a method used to obtain the most reliable consensus of opinion of a group of experts by a series of intensive questionnaires interspersed with controlled feedback' (p. 458). With increasing usage, broader definitions have been put forward. For instance, Reid (1998) believed that Delphi is a method for the systematic collection and aggregation of informed judgement from a group of experts on specific questions and issues.

Lynn *et al*. (1998) defined the Delphi technique as an iterative process designed to combine expert opinion into group consensus. Most definitions attempt to encompass or highlight the ever-adapting Delphi process in one sentence, which has resulted in broad and varying interpretations of the technique. Regardless of definition, as alluded to above the purpose of the technique is to achieve consensus among a group of experts on a certain issue where no agreement previously existed.

There are many differing forms of Delphi now in existence, such as the 'modified Delphi' (Rauch, 1979; McKenna, 1994a), the 'policy Delphi' (Crisp *et al*., 1997), and the 'real-time Delphi' (Beretta, 1996). Few researchers now use a uniform method of the Delphi technique, and this has been heavily criticised since the emergence of modifications of the technique poses a threat to the credibility of the Delphi technique and the validity and reliability of the research findings (Sackman, 1975).

The Delphi process

Original Delphi

In its original form, the Delphi process consists of two or more rounds of questionnaires administrated by post to an expert panel. The first questionnaire asks the expert panel for their opinions on a certain issue or topic in an open-ended manner. These responses are then analysed by the researchers and sent back to the expert panel in the form of statements or questions. The expert panel rate or rank the statements or questions within the second questionnaire according to their expert opinion on the subject. Rounds continue until a consensus is reached on some or all of the items as required. Today, this is known as the Classical Delphi.

Idea generation

This original approach sets the foundation for an idea-generation strategy to uncover the issues pertaining to the topic under study. To do this, the respondents, referred to as panellists or experts, are asked to put forward as many relevant issues as possible in Round 1. Once analysed, these responses act as a springboard for the rest of the Delphi process. Feedback from Round 1 is provided in the form of a second questionnaire and opinion is asked on the issues raised. Normally, in subsequent rounds each panel member is provided with their own responses as well as those of the other panellists or experts and he or she is asked to reconsider and (if they wish) change it in the light of other panellists' responses. This continues for subsequent rounds until consensus is obtained. This process is best described as multi-stage where each stage builds on the results of the previous one (Sumsion, 1998).

Priority setting versus consensus

The Delphi technique is used for two main purposes within nursing and health research. Firstly, it is commonly used to set priorities, for example the identification of nursing research priorities. Nurses, academics and researchers could form an expert panel to identify research priorities for the nursing profession at present. There are a large number of studies that have been undertaken in this area across the world (e.g. French *et al.*, 2002; Griffen-Sobel & Suozzo, 2002; McIlfatrick & Keeney, 2003; Cohen *et al.*, 2004; Annells *et al.*, 2005; Back-Pettersson *et al.*, 2008; Grundy & Ghazi, 2009). This type of priority setting exercise can be useful for the profession or experts involved or for funders to prioritise what areas of research should be funded in the short, medium and long term.

The second main use of the Delphi technique is to gain consensus. This can be on any set of issues or ideas. The expert panel are asked to rank or rate items either generated by themselves within Round 1 of the Delphi, as in the Classical Delphi, or in a modified Delphi through the literature or the use of focus groups or interviews. A consensus level is set (e.g. 70%) and once the pre-determined percentage of the expert panel has come to agreement on the importance or position of the statement, it is said to have reached consensus. Consensus studies have been widely utilised in nursing and health research to date (e.g. Butterworth & Bishop, 1995; Beech, 1997; Graham *et al.*, 2003; Beattie *et al.*, 2004; Cornick, 2006; Ferguson *et al.*, 2008; Jorm *et al.*, 2008).

Non-consensus Delphi

While it may not appear immediately relevant to nursing or health research, it is important to point out that not all Delphi's aim to reach

consensus. Traditionally, the method has aimed at gaining consensus but other Delphi's, such as the Policy Delphi, aim to support decisions by structuring and discussing the diverse views of the 'preferred future' (Turoff, 2006). The Argument Delphi, a derivative of the Policy Delphi (Kuusi, 1999), focuses on ongoing discussion and seeking relevant arguments rather than focusing on the output. The 'Disaggregative Policy Delphi' (Tapio, 2002) uses cluster analysis as a systematic tool to construct various scenarios of the future in the latest Delphi round.

Types of Deplhi

How has the Delphi evolved?

Since its inception the Delphi technique has evolved into a number of modifications (see Table 1.1). There are hundreds and possibly thousands of studies in the literature reporting on studies using these different manifestations, and this is tribute to the flexibility of the method.

The reason for these adaptations is based on the fact that there are no formal, universally agreed guidelines on the use of the Delphi. Its original form, known as the *classical Delphi*, involves the presentation of a questionnaire to a panel of 'informed individuals' in a specific field of application, in order to seek their opinion or judgement on a particular issue. After they respond, the data are summarised and a new questionnaire is designed based solely on the results obtained from the first round. This second instrument is returned to each subject and they are asked (in the light of the first round's results), to reconsider their initial opinion and to once again return their responses to the researcher. Repeat rounds of this process may be carried out until consensus of opinion, or a point of diminishing returns, has been reached. This illustrates the Delphi technique is a multi-stage approach with each stage building on the results of the previous one. Hitch and Murgatroyd (1983) saw it resembling a highly controlled meeting of experts, facilitated by a chairperson who is adept at summing up the feelings of the meeting by reflecting the participants' own views back to them in such a way that they can proceed further – the only difference is that the individual responses of the members are unknown to one another. A *classical Delphi* format was employed by McIlfatrick and Keeney (2003) with 112 nurses attending a cancer nursing research conference in Northern Ireland. The aim of this survey was for those attending to identify priorities for cancer research.

Nevertheless, it is widely used in a great variety of forms (Mead, 1991; Butterworth & Bishop, 1995; Green *et al.*, 1999) without adequate consideration of the consequences. For further reading of the numerous variations of formats of the Delphi, see Chien *et al.* (1984).

Table 1.1   Types of Delphi's and main characteristics

Classical Delphi	Uses an open first round to facilitate idea generation to elicit opinion and gain consensus
	Uses three or more postal rounds
	Can be administered by email
Modified Delphi	Modification usually takes the form of replacing the first postal round with face-to-face interviews or focus group
	May use fewer than three postal or email rounds
Decision Delphi	Same process usually adopted as a classical Delphi
	Focuses on making decisions rather than coming to consensus
Policy Delphi	Uses the opinions of experts to come to consensus and agree future policy on a given topic
Real Time Delphi	Similar process to classical Delphi except that experts may be in the same room
	Consensus reached in real time rather than by post
	Sometimes referred to as a consensus conference
e-Delphi	Similar process to the classical Delphi but administered by email or online web survey
Technological Delphi	Similar to the real time Delphi but using technology, such as hand held keypads allowing experts to respond to questions immediately while the technology works out the mean/median and allows instant feedback allowing experts the chance to re-vote moving towards consensus in the light of group opinion
Online Delphi	Same process at classical Delphi but questionnaires are completed and submitted online
Argument Delphi	Focused on the production of relevant factual arguments
	Derivative of the Policy Delphi
	Non-consensus Delphi
Disaggregative Delphi	Goal of consensus not adopted
	Conducts various scenarios of the future for discussion
	Uses cluster analysis

Source: Keeney (2009).

Sampling and the use of experts

Defining 'expert'

The fact that the Delphi does not always use a random sample which is representative of the target population is a point that must be given consideration by researchers; rather, it employs 'experts'. This means that each respondent is an expert in the area in which the researcher is interested. An expert has been defined as a group of 'informed individuals' (McKenna, 1994a) and as 'specialists' in their field (Goodman, 1987) or someone who has knowledge about a specific subject (Davidson *et al.*, 1997; Lemmer, 1998; Green *et al.*, 1999). For example, a study investigating the role of the health visitor may include health visitors

who are knowledgeable about the subject under consideration (Lemmer, 1998).

Employing an expert panel

The identification of experts has been a major point of debate in the use of the 'Delphi'. Since deciding on the makeup of the expert panel is the first stage in the Delphi process, the formation of this panel is regarded as the 'lynchpin of the method' (Green *et al.*, 1999, p. 200). However, it is also the selection of the expert sample that raises methodological concerns. Sackman (1975) criticised the use of experts as did Linstone and Turoff (1975) and McKenna (1994a). The claim of the 'Delphi' to represent valid expert opinion has been criticised as scientifically untenable and overstated (Strauss & Zeigler, 1975a). It is not surprising that Linstone (Linstone, 1975; Linstone & Turoff 1975) refers to the pitfall of 'illusory expertise' (p. 566) and Goodman (1987) warned about the 'potentially misleading title of expert' (p. 732).

Simply because individuals have knowledge of a particular topic does not necessarily mean that they are experts. In fact, those who are willing to engage in discussion are more likely to be affected directly by the outcome of the process and are also more likely to become and stay involved in the Delphi. Hence, the commitment of participants is related to their interest and involvement with the question or issue being addressed. However, respondents must be relatively impartial so that the information obtained reflects current knowledge or perceptions (Goodman, 1987). This balance is difficult to achieve and justify to the consumers of the finished research. There is also little agreement about the size of the expert panel, the relationship of the panel to the larger population of experts and the sampling method used to select such experts (Williams & Webb, 1994a, 1994b).

Size of the expert panel

Sample size and heterogeneity depends upon the purpose of the project, design selected and time frame for data collection (Goodman, 1987; McKenna, 1994a; Green *et al.*, 1999). For the conventional Delphi, a heterogeneous sample is used to ensure that the entire spectrum of opinion is determined (Moore, 1987). Sampling different groups of experts, such as nurse educators and nurse students (Sullivan & Brye, 1983), may ensure heterogeneity.

It is becoming increasingly frequent for Delphi researchers to employ clear inclusion criteria to create boundaries around their expert panel (Keeney *et al.*, 2001, 2006). The inclusion criteria can include, for example

specific qualifications, number of publications in the area of expertise, geographical location or years experience in a particular area.

Valid opinion

One of the most important things that any researcher using the Delphi technique must remember is that this method elicits valid opinion from experts in the area. An opinion is a belief that may or may not be backed up with evidence but which cannot be proved with any evidence that may exist. The Delphi technique does not produce any right or wrong answers or any definitive answers; instead, it produces valid expert opinion.

It is assumed that the Delphi technique 'works' due to the feedback given to the expert panel and the quasi-anonymity afforded to the panel (Rowe *et al.*, 2005). This feedback allows the panel to consider the group response and their own response in the light of this. It is at this point that an expert panel member may 'change' or modify their opinion, having considered the group opinion, and the panel may move towards consensus.

Anonymity

Anonymity provides an equal chance for each panel member to present and react to ideas unbiased by the identities of other participants (Goodman, 1987). Reactions are given independently; so each opinion carries the same weight and is given equal importance in the analysis. In this way, subject bias is eliminated, as the respondents are not known to each other (Goodman, 1987; Jeffery *et al.*, 1995). This promise of anonymity facilitates respondents to be open and truthful about their views on certain issues, which in turn provides insightful data for the researcher. Furthermore, Couper (1984) suggested that this provides each participant with an opportunity to express an opinion to others without feeling pressured psychologically by the more influential panel members. It is unclear at present whether respondents in a Delphi process change their opinions on the basis of new information or, despite the protection of anonymity, feel pressurised to conform to the group's view. Complete anonymity may lead to a lack of accountability for the views expressed, thus encouraging ill-considered judgements (Goodman, 1987).

Quasi-anonymity

Complete anonymity cannot be guaranteed when using the Delphi technique; a fact that many studies do not address. Firstly, the researcher knows the panel members and their responses; this in itself threatens true

anonymity. Secondly, it is often the case that panel members know each other, but they cannot attribute responses to any one member. It is like being in an elite 'expert' club where the membership is known but they do not meet face to face to discuss the issues. In fact, knowing that you are a member of an exclusive club may help motivate panellists to participate. McKenna (1994a) used the term 'quasi-anonymity' when the respondents may be known to one another, but their judgements and opinions remain strictly anonymous. Anonymity has recently been questioned by other Delphi users, such as Sumsion (1998), who recommended that a 70% response rate is obtained for each round: to achieve this respondents and non-respondents must be known. The influence of anonymity upon findings has not to the authors' knowledge been reported in the Delphi literature.

Group dynamics

Group dynamics is a general term used to describe group processes. A group is considered to be two or more individuals who are connected to each other by some form of relationship. Members of groups interact and influence one another and due to this groups develop a number of dynamic processes that separates them from a random collection of individuals. Such processes could include roles, relationships, development and influence.

The group dynamics within a Delphi study exist with the expert panel. They have several things in common; they are a member of the panel and have knowledge and insight into the same area of expertise. They may even work together in a geographical tight Delphi. Even if they are world experts in a narrow field, they may be well known to each other. These factors can produce influence by one panel member over another in later rounds of the technique when group feedback is provided to the expert panel. This influence can result in individuals changing their opinion to come into line with the group and, hence, converge on consensus on identified issues.

Delphi rounds

As discussed above, the Delphi technique employs a number of rounds in which questionnaires are sent out and are used until consensus is reached (Beretta, 1996; Green *et al.*, 1999). In each round, a summary of the results of the previous round is included and evaluated by the panel members. McKenna (1994a) implies that this process facilitates the 'systematic emergence of a concurrence of judgement/opinion' (p. 1222). The number of

rounds depends upon the time available and whether the experimenter commenced the Delphi sequence with one broad question or with a list of questions or events. The process raises the question of how many rounds it takes to reach consensus. The classical original Delphi used four rounds (Young & Hogben, 1978). However, this has been modified by many to suit individual research aims and, in some cases, it has been shortened to two or three rounds (Proctor & Hunt, 1994; Beech, 1997; Green *et al.*, 1999). It is difficult to retain a high response rate within a 'Delphi' that has many rounds. The topic needs to be of great interest to the panel members or they have to be rewarded in other ways.

Round 1

Round 1 of the classical Delphi starts with an open-ended set of questions, thus allowing panel members freedom in their responses. The number of items generated can be extremely large, especially if the researcher opts for an inclusive approach. Supporting this Proctor and Hunt (1994) stated that the Delphi process can produce 'large and unwieldy amounts of information particularly if the researcher adopts a qualitative stance towards the data and is reluctant to collapse categories' (p. 1004). Unfortunately, this tendency to include all the panel members' Round 1 views can create second round questionnaires of over 25 pages. Being all inclusive can put panel members off participating and can become very difficult to sustain (Green *et al.*, 1999). A further critique concerns the view that if questions are not well phrased and definitive, the reliability and validity of data may be threatened. Reliability and validity of the Delphi are discussed in detail in Chapter 7.

Traditionally, Round 1 is used to generate ideas and the panel members are asked for their responses to or comments about an issue. There is now some support for revising the approach and providing pre-existing information for ranking or response. However, it must be recognised that this approach could bias the responses or limit the available options. Nonetheless, a clear advantage to commencing the process in this way is that it could be more efficient in a technique that has the potential to be very time consuming (Duffield, 1993; Jenkins & Smith, 1994).

Subsequent rounds

Rounds 2–4 often take the form of structured questionnaires incorporating feedback to each panel member. These rounds are analysed and re-circulated, and it has been shown that this process encourages panel members to become more involved and motivated to participate (Walker & Selfe, 1996). In this way, the Delphi allows efficient and rapid collection of expert opinions, while the feedback is controlled (Buck *et al.*, 1993).

The ability of the Delphi to involve and motivate panel members means that they can be involved actively in the development of the instrument: this leads to perceptions of ownership and acceptance of the findings (McKenna, 1994a). The active involvement of staff in the identification of their own development needs is crucial for the success of any development program (Shepard, 1995). This can be viewed as an incentive and major advantage in using this technique.

The Delphi often collects qualitative and quantitative data yet little guidance exists in relation to the balance of data collected and how to manage the data generated (Green *et al.*, 1999). The lack of guidance leads to a variety of approaches and can result in different Delphi studies interpreting and reporting in different ways: this could affect the integrity of the method.

The Delphi technique might encounter problems due to a decline in response rate because, in order to achieve consensus, it is important that those panel members who have agreed to participate stay involved until the process is completed (Buck *et al.*, 1993). However, poor response rates are a characteristic of the final round of the Delphi. This has been a perennial criticism and could be an explanation as to why many researchers are now stopping at two or three rounds rather than the originally recommended four rounds. McKenna (1994a), however, found that using face-to-face interviews in the first round increases the return rates of postal questionnaires in the second.

Response rates

Enhancing response rate

In general, questionnaire research is notorious for its low response rates. Researchers often have to send out two or three reminder letters to non-responders. With anything up to four rounds of questionnaires, the Delphi asks much more of respondents than a simple survey and the potential for low response rates increases dramatically.

To enhance responses in Delphi rounds it is critical that participants realise and feel that they are partners in the study and are interested in the topic. The researcher should take every opportunity to remind participants that each round is constructed entirely on their responses to previous rounds encouraging ownership and active participation. This attempt to encourage participants to psychologically 'sign up to' a study is common in longitudinal cohort studies where researchers send regular updating newsletters to participants as well as birthday or Christmas cards. However, there could be ethical considerations with this approach as participants may feel 'forced' to continue even though they may wish to withdraw (Beretta, 1996).

McKenna (1994b) suggested that the 'personal touch' could help enhance return rates. Using face-to-face interviews as his first round, he achieved a 100% response rate, which is very rare in a Delphi study. Such a relationship is necessary to increase the likelihood of ongoing commitment from the participant. It starts at initial contact where the researcher gains informed consent and explains either in writing or verbally the nature of the research, what the participant's role is and what is required of them. Another currently emerging trend with the Delphi is a recruiting round as a preliminary round to the first 'proper' Delphi round (Hung *et al.*, 2008). Recruiting letters should include an explanation of the study, anticipated number of rounds, outline of time commitment and a consent form or confirmation of acceptance to take part in the study. The idea behind this is to get the expert panel to sign up or even 'consent' to take part in the study before it begins. There is no evidence as yet as to whether this enhances the response rate.

The follow-up of non-respondents within a classical or modified Delphi approach is essential. Researchers' choose to do this in different ways including sending follow-up postcards or letters, a further copy of the questionnaire, or a follow-up phone call or email (McIlfatrick & Keeney, 2003; McKenna & Keeney, 2004). Prompt and appropriate feedback can also facilitate a high response rate as it keeps the members of the expert panel interested. Interest will be lost if weeks and months pass before feedback is received on the previous round.

Consensus

It is of utmost important to remember that achieving consensus on a certain issue does not mean that the correct answer has been found. It means that consensus has been reached among a panel of participants. The Delphi has been criticised as a method which forces consensus and does not allow participants to discuss issues. This means that no opportunity arises for respondents to elaborate on their views (Goodman, 1987, Walker & Selfe, 1996). However, there are other research approaches, such as focus groups that cater for discussion and elaboration. In a face-to-face discussion, there is always the disadvantage that strong-minded people or those who are more persuasive will dictate the direction of the discussion. One advantage of the Delphi is that this is avoided.

This method is not a replacement for rigorous scientific reviews of published reports or for original research. There is a danger that the 'Delphi' can lead the observer to place greater reliance on their results than might otherwise be warranted. However, as long as this is kept in mind and addressed, consensus can be gained and the Delphi can be used as a useful, integral consensus technique.

Does consensus exist in expert panels?

Expert panels are increasingly being used to determine whether or not consensus exists about many issues, for example criteria for good practice (Scott & Black, 1991). Scott and Black (1991) explored whether or not consensus exists in expert panels by establishing two expert panels to assess the appropriate indicators for cholecystectomy. Results showed that when extreme views (outliers) were eliminated agreement was fairly easy to achieve. The authors concluded that given that the overall aim of expert panels is to identify broad areas of agreement, that it would seem reasonable to disregard extreme opinions.

Concept of consensus

Consensus can have many different connotations depending on its reference. However, the concept of 'consensus' could also be termed as 'collective agreement'. It usually involves collaboration rather than compromise. Rather than opinion being adopted by a plurality, stakeholders are brought together, often with facilitation until a convergence of opinion is reached. It is important to keep in mind that a high degree of variation is possible among individuals even within consensual groups, and this can affect outcomes if action is to be taken on agreed issues.

In relation to the Delphi technique, these principles apply to the process of using the technique to gain consensus on an issue or a set of issues. Experts are brought together and the process is 'facilitated' by the researcher through the use of questionnaire rounds. Some Delphi studies have defined the concept of consensus as 'a condition of homogeneity or consistency of opinion among the panellists' (Graham *et al.*, 2003, pp. 1152–1153).

Increasing popularity in nursing and health research

The Delphi has been growing in popularity over recent years within health care research. This growth is centred on the fact that, like a questionnaire, it allows the inclusion of a large number of individuals across diverse geographic locations. However, unlike questionnaires, the Delphi aims to gain consensus of opinion, judgement or choice. The four key characteristics which are the necessary defining attributes of a Delphi technique include anonymity of response among participants, thus avoiding group dominance; iteration which allows participants to change their opinions in subsequent rounds, controlled feedback showing the distribution of the group's response and statistical group response which expresses judgement using summary measures of the full group response (Rowe & Wright, 1999). Each of these issues will be discussed in more detail in the following chapters.

A perusal of modern health care literature or a key word search in an online database uncovers a wealth of studies where the Delphi technique was employed (Green *et al.*, 1999; Alahlafi & Burge, 2005; Avery *et al.*, 2005; Mackellar *et al.*, 2007). The Delphi is often used to identify guidelines or set priorities. Bond and Bond (1982) used the technique to establish clinical nursing research priorities as did many others (Lindeman, 1975; Daniels & Ascough, 1999; Soanes *et al.*, 2000; Cohen *et al.*, 2004; Annells *et al.*, 2005). Nurse researchers were one of the first to identify the strengths of the Delphi and the number of published papers in the nursing literature is testament to that (Love, 1997; Lemmer, 1998; Moreno-Casbas *et al.*, 2001; Peters *et al.*, 2001; Sharkey & Sharples, 2001; O'Brien *et al.*, 2002; Hermann *et al.*, 2006).

Comparison of the Delphi with other consensus methods

Consensus building, also sometimes known as collaborative problem-solving or collaboration (Burgess & Spangler, 2003), is a process used to generate ideas, understand problems and to settle complex issues. Apart from the Delphi technique there are two other research approaches to achieving consensus. These include the nominal group technique (Carney *et al.*, 1996) and the consensus conference (Jones & Hunter, 1995).

Nominal group technique

The Nominal Group Technique (NGT) brings together participants for a discussion using a highly structured group approach, led by a moderator. It consists of two rounds in which panellists rate, discuss and then re-rate a series of items or issues (Jones & Hunter, 1995). The process begins with a question being posed to the group. Individually and silently, participants write their answers or ideas. These are then shared in 'round robin' fashion. This process can be repeated a number of times, with the aim of reaching a higher level of consensus. This method encourages contributions from everyone by allowing equal participation among group members (Gibson, 2001). Within the NGT, ideas are generated in a short period of time and participants can see at first hand the process of reaching consensus. According to Moore (1987), NGT is a useful method for idea generation in group discussions.

Scott and Deadrick (1982) referred to NGT as a special purpose group process appropriate for identifying elements of a problem situation, identifying elements of a solution programme and establishing priorities. According to Carney *et al.* (1996), it has a highly structured format and provides an opportunity to achieve a substantial amount of work in a relatively short space of time.

Consensus conference

Consensus conferences are organised when agreement has to be reached on a matter of importance. This could be a policy issue or an attempt to identify research priorities for a discipline. The means of doing this is to invite a purposive sample of individuals or groups to a conference venue and focus the presentations on the importance of the issue at hand and why the achievement of consensus is important. These presentations are normally followed by group work where the pros and cons of the issue at hand are discussed. The conference usually closes with a plenary session where delegates can vote or show their preference, judgement or decision on the issues.

Consensus conferences are often problematic for a number of reasons. They can be expensive to organise, selecting the correct type and number of delegates is difficult, and strong-willed individuals or groups can dictate the direction of the discussion. These limitations are offset by the importance of face-to-face discussion and the fact that everyone present is exposed to the same presentations and can better understand the context surrounding the issue requiring consensus.

Key learning points

- The Delphi method was developed originally at the beginning of the cold war to forecast the impact of technology on warfare.
- The main premise of the Delphi method is based on the assumption that group opinion is more valid than individual opinion.
- The Delphi technique is an approach used to gain consensus on a certain issue or set of issues.
- Since its inception the Delphi technique has evolved into a number of modifications.
- It does not use a random sample that is representative of the target population; rather, it employs a panel of 'experts'.
- The Delphi technique consists of a number of rounds which can be employed in different ways.
- The number of rounds depends upon how easily consensus is reached on a topic, the time available and the type of Delphi.
- The Delphi technique is not a replacement for rigorous scientific reviews of published reports or original research.
- Consensus reached using the Delphi technique does not mean that the correct answer has been found but rather that the experts have come to an agreement on the issue or issues under exploration.

Recommended further reading

Hasson, F., Keeney, S. & McKenna, H. (2000) Research guidelines for the Delphi survey technique. *Journal of Advanced Nursing* 32(4), 1008–1015.

Keeney, S., Hasson, F. & McKenna, H.P. (2001) A critical review of the Delphi technique as a research methodology for nursing. *International Journal of Nursing Studies* 38, 195–200.

Keeney, S., Hasson, F. & McKenna, H.P. (2006) Consulting the oracle: ten lessons from using the Delphi technique in nursing research. *Journal of Advanced Nursing* 53(2), 205–212.

McKenna, H.P. (1994) The Delphi technique: a worthwhile approach for nursing? *Journal of Advanced Nursing* 19, 1221–1225.