

The Delphi technique: myths and realities

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Aim. To outline the key concepts and principles of the Delphi technique.

Methods. Reference is made to a selection of studies that illustrate a variety of methodological interpretations. Drawing on Heshusius's concept of 'goodness criteria', particular emphasis is given to the question of scientific merit and means of evaluation.

Conclusion. Although the technique should be used with caution, it appears to be an established method of harnessing the opinions of an often diverse group of experts on practice-related problems.

Keywords: Delphi, critique, consensus, expert panel, data analysis, goodness criteria, nursing research

Introduction

A wealth of studies claiming to have used the Delphi technique have been widely published in the nursing and allied health literature. However, an abundance of methodological interpretations are demonstrated, leaving the technique open to criticism (see for example Goodman 1987, Reid 1988, Williams & Webb 1994, Keeney *et al.* 2001). Drawing on seminal texts, recent methodological reviews and a selective range of Delphi studies, this paper aims to demystify Delphi methodology and update knowledge in order to inform future debate. Particular emphasis is given to the question of scientific merit and the means by which the findings of Delphi studies may be evaluated.

The Delphi technique

The Delphi technique (subsequently referred to as the Delphi) is in essence a series of sequential questionnaires or 'rounds', interspersed by controlled feedback, that seek to gain the most reliable consensus of opinion of a group of experts (Linstone & Turoff 1975). It is a technique that is useful for situations where individual judgements must be tapped and combined in order to address a lack of agreement or

incomplete state of knowledge (Delbecq *et al.* 1975). As such, the Delphi is particularly valued for its ability to structure and organize group communication.

Delphi's use as a tool for solving problems in health care settings is well recognized (Fink *et al.* 1991). Lindeman's (1975) frequently cited and pioneering use of Delphi to determine clinical nursing research priorities has been replicated by a number of other nursing and midwifery researchers (Bond & Bond 1982, Goodman 1986, Broome *et al.* 1996, Schmidt *et al.* 1997, Sleep 1999). However, Delphi's flexibility and adaptability is illustrated by many other applications to nursing, including service planning (Beech 1997), the analysis of professional characteristics and competencies (Duffield 1993, Butterworth & Bishop 1995) and the development of pre- and postqualifying nurse education (Hartley 1995, Gibson 1998). Although Delphi has been reported to be 'growing in popularity' in health care research (Fink *et al.* 1991, Daly *et al.* 1996, Hasson *et al.* 2000, Keeney *et al.* 2001), a recent analysis suggests that its popularity may, in fact, have peaked (Bowles 1999).

Understanding the principles and practice of Delphi methodology can be confusing, and for the uninitiated it can be difficult to distinguish between a genuine lack of methodological rigour and the fact that Delphi comes in different guises. While Keeney *et al.* (2001) highlight the existence of

What is already known about this topic

- The Delphi technique is in essence a series of sequential questionnaires or 'rounds', interspersed by controlled feedback, that seek to gain the most reliable consensus of opinion of an 'expert panel'.
- The technique has been used widely in business, industry and health care research with a variety of methodological interpretations and 'modifications'.
- Although methodological reviews and critiques of the method are available in the literature, these give scant attention to the question of scientific merit and means of evaluation.

What this paper adds

- With reference to Heshusius's concept of 'goodness criteria' this paper debates the scientific merit of the Delphi technique and discusses mechanisms for evaluation of findings.
- The paper may be particularly useful to researchers who are considering using the Delphi technique for the first time.

differing forms of the Delphi technique as 'modified', 'real-time' and 'policy', the reality is that interpretation and application of the technique are extremely varied. Mead and Mosely (2001) have recently proposed the term *Delphi approach* as a more accurate description of many Delphi studies.

Key principles

In a critique of the method, Rowe *et al.* (1991) suggest that for Delphi to be useful it should provide more accurate assessments or judgements than those obtained either by individuals or by interacting groups. Informal methods of reaching consensus, such as committees, are recognized to be prone to domination by powerful individuals (Murphy *et al.* 1998), the biasing effects of personality traits, seniority (Jairath & Weinstein 1994) and the fact that only one person can speak at a time (Murphy *et al.* 1998). Thus whilst Rowe *et al.* (1991) acknowledge the principle that groups perform better than their best member (the $n + 1$ principle), they also recognize that the presence and actions of others in group situations may inhibit creativity and the possibility of resolving ambiguous and conflicting issues. Rowe *et al.* (1991) describe this state of affairs as a *process loss*.

In contrast, Rowe *et al.* (1991) suggest that the democratic, structured approach and participant anonymity offered by Delphi leads to a *process gain*. Furthermore, Delphi's systematic control has been noted to lend an air of objectivity to the outcome and provide a sharing of responsibility that is both reassuring and releases the participants from group inhibition (Lindeman 1975). Such benefits have been succinctly summarized by Butterworth and Bishop (1995) as decreasing the tendency to follow the leader. Yet these ideas may reflect undue optimism as to the validity of the findings as there are those who argue that the move towards consensus that occurs in a Delphi study reflects a normative rather than informational influence (Murphy *et al.* 1998). In a similar vein Goodman (1987) comments that panellists may be persuaded to conform rather than express true agreement; a process that appears to mirror some of the disadvantages of informal methods of reaching consensus already stated. Delphi may best be viewed as a useful communication tool to generate debate, rather than reach a conclusion (McKenna 1994). As one supporter of Delphi has indicated, output is at best an opinion and should be interpreted as such (Pill 1971).

Strengths and weaknesses

The main advantage of the Delphi is reported to be the achievement of consensus in a given area of uncertainty or lack of empirical evidence (Delbecq *et al.* 1975, Dawson & Barker 1995, Murphy *et al.* 1998). The feedback between rounds can widen knowledge and stimulate new ideas and in itself be highly motivating (Pill 1971) and educational (Stokes 1997) for the participants. Murphy *et al.* (1998) note that Delphi participants bring a wide range of direct knowledge and experience to the decision-making processes, while Jones *et al.* (1992) remark on the benefit of few geographical limitations.

The Delphi has been described as a quick (Everett 1993), cheap (Jones *et al.* 1992) and relatively efficient way to combine the knowledge and abilities of a group of experts (Lindeman 1975). Not everyone would agree with this; Jairath and Weinstein (1994) and Williams and Webb (1994) argue that extensive time commitment is needed. Clearly, as with any method, the duration and cost of a Delphi study will be related to the scale of the survey (up to 1000 items may be addressed), the complexities involved in the processing of the questionnaires and the number of rounds.

Sackman (1975) notes that the consensus approach may lead to a watered down version of the best opinion, while Rennie (1981) expressed concern that the method

generated only bland statements that represented the lowest common denominator. Sackman (1975) also proposes that one of the key principles of the Delphi, anonymity, may lead to lack of accountability of views expressed and encourage hasty decisions. It could be argued that this is not a limitation unique to Delphi studies as it could apply to any anonymous postal questionnaire. Furthermore, the use of experts and sequential processes may positively discourage such action. Murphy *et al.* (1998) suggest that, while two or more rounds are likely to result in some convergence of individual judgements, it is unclear whether this actually increases the accuracy of the group's decision-making.

Conduct of a Delphi survey

Although many studies demonstrate some degree of interpretation and flexibility, a classic Delphi survey follows a prescribed set of procedures that reflect both behavioural and statistical processes. Typically three rounds of questionnaires are sent to a preselected expert panel, although the decision over the number of rounds is largely pragmatic (Jones *et al.* 1992). Pilot testing of questionnaires is said to be optional but may help to identify ambiguities and improve the feasibility of administration (Jairath & Weinstein 1994).

First round

The first round questionnaire is usually unstructured and seeks an open response. This allows the participants relatively free scope to elaborate on the topic under investigation (Rowe 1994). A qualitative analysis of the results is then undertaken and this provides the basis on which to construct the second and subsequent questionnaires.

The role of the first round is to identify issues to be addressed in later rounds. Open-ended questions are recognized to increase the richness of the data collected. However, alternative approaches are widely found in the Delphi literature. Bond and Bond (1982), for example, used semi-structured questions in their first round, while Duffield's (1993) structured questionnaire drew on the 'literature'. Other Delphis form part of larger studies; Oranga and Nordberg (1993), for instance, based their first round on information gleaned from a concurrent household survey. Delphi purists reproach such modifications. Rowe *et al.* (1991) go so far as stating that structured or predetermined first rounds equate to 'sloppy execution' (p. 240) of the Delphi, a point reinforced by Lemmer (1998), who questions the subjectivity of items that are

supplied by the researcher rather than elicited by an expert panel.

Subsequent rounds

The second and subsequent rounds are more specific, with the questionnaires seeking quantification of earlier findings, usually through rating or ranking techniques. Because the researcher feeds back results from previous rounds, there tends to be convergence to a consensus of opinion (Jairath & Weinstein 1994). Murphy *et al.* (1998) describe the process of feedback to participants as paramount, since this is the only communication between them. Although the possibility of more than three rounds is offered, there is a need to balance time, cost and possible participant fatigue (Jones *et al.* 1992, Rowe 1994, Hasson *et al.* 2000).

Expert panel

The success of a Delphi study clearly rests on the combined expertise of the participants who make up the expert panel. There are two key aspects to this: panel size and qualifications of experts.

Panel size

It is clear that there is wide variation in numbers of participants. Reid (1988), for example, notes panel sizes ranging from 10 to 1685. Guidance suggests that numbers of participants will vary according to the scope of the problem and resources available (Delbecq *et al.* 1975, Fink *et al.* 1991, Hasson *et al.* 2000). Resources in terms of time and money are important and influential, yet an assessment of the magnitude of the problem and acceptability of answers are open to interpretation by researcher and commentator alike. Murphy *et al.* (1998) believe that the more participants there are the better, suggesting that as the number of judges increases, the reliability of a composite judgement increases. However, they also comment that:

There is very little actual empirical evidence on the effect of the number of participants on the reliability or validity of consensus processes (p. 37).

The Delphi does not call for expert panels to be *representative samples* for statistical purposes. Representativeness, it seems, is assessed on the qualities of the expert panel rather than its numbers. Confusion on in press abounds in the nursing literature: Williams and Webb (1994) for example, criticize a number of Delphi studies for their lack of 'random samples' (p. 182).

Qualifications of an expert

If the method is to be successful in achieving its objectives, it is important that expert panel members are willing and able to make a valid contribution. Linstone and Turoff (1975) note that potential users of the findings may be willing and useful members. They also suggest that a diversity of viewpoints that span respectable controversy will help to generate interest and involvement. Although agreeing with this to some extent, Jairath and Weinstein (1994) propose that participants should be experts who reflect current knowledge and perceptions, yet are relatively impartial to the findings.

It has been noted that heterogeneous groups, characterized by panel members with widely varying personalities and substantially different perspectives on a problem, produce a higher proportion of high quality, highly acceptable solutions than homogeneous groups (Delbecq *et al.* 1975). This finding is strongly supported by Rowe (1994) who suggesting that experts be drawn from varied backgrounds in order to guarantee a wide base of knowledge. Murphy *et al.* (1998) conclude that diversity of expert panel membership leads to better performance as this may allow for the consideration of different perspectives and a wider range of alternatives. In contrast, Jones and Hunter (1995) advocate that for studies concerned with clinical intervention, specialists in that area would be appropriate. Such a professional group may well have individual viewpoints and differing opinions, yet may be deemed to be like-minded by outsiders. The danger of bias is recognized by Murphy *et al.* (1998), who propose that experts should not be selected on the basis of acquaintance with the researchers – a factor that may be difficult to address in intensely specialist areas.

Most Delphi users suggest that experts should be chosen for their work in the appropriate area and credibility with the target audience. Experts in the clinical field may include expert clinicians, researchers with scientific expertise and patients/lay people who have expertise by virtue of having experienced the impact of a condition or intervention. Service users featured in Mayers's (1998) Delphi study of the lifestyle needs of people with disabilities, while Kennedy (2000) received an insightful response through the inclusion of midwifery clients in her study.

Analysis of findings

Methods of data analysis appears to vary according to the purpose of the Delphi study, structure of the rounds, types of questions and numbers of participants. Typically, content analysis techniques are used to identify the major themes

generated by the initial unstructured questionnaire. These are then translated into a structured questionnaire that forms the basis of the following rounds. Second and subsequent round data, being quantitative in nature, are analysed using ranking or rating techniques (Jairath & Weinstein 1994). Third and subsequent rounds should indicate to participants the central tendency and dispersion of scores from the previous round. A means of showing the dispersion of scores is important, as a bi-modal distribution would demonstrate a lack of consensus that might otherwise be hidden. Participants should also be given an indication of where their scores were placed in relation to the overall picture. The opportunity to revise previous scores in light of this is an important element in the move towards consensus.

Meaning of consensus

Mechanisms for the aggregation of scores may be open to arbitrary judgement (Murphy *et al.* 1998, Stewart *et al.* 1999). Failure to offer an interpretation of the meaning of consensus is an important omission in many examples of Delphi studies. There seem to be no firm rules for establishing when consensus is reached, although the final round will usually show convergence of opinion (Linstone & Turoff 1975), with the dispersion of participants' views lessening with each round. Although Murphy *et al.* (1998) note that the convergence of opinion is usually comparatively slight, they comment that the degree of dissent and divergence amongst participants' views should be highlighted.

In a selection of Delphi studies that I reviewed, consensus was defined (or 'achieved') in a variety of ways. Setting a percentage level for inclusion of items appears to be a common interpretation, albeit one that is construed at different levels. In their Delphi study on curriculum content, Williams and Webb (1994) sought 100% agreement for items to be accepted. However, they note that others had set the level of agreement as low as 55%. Others were less specific. Beech (1997), for example, suggested that consensus was *implied* by the results, whereas for Butterworth and Bishop (1995) it was *most* participants' agreement. In contrast, Duffield (1993) defined consensus according to stability of responses between rounds. A number of studies appear to leave interpretation of consensus entirely to the reader (Lindeman 1975, Bond & Bond 1982, Gabbay & Francis 1988, Hartley 1995, Gibson 1998).

Scientific merit

At a fundamental philosophical level it has been proposed that the Delphi builds on the Lockean notion of the function

of human experience and agreement as the basis for truth (Mitroff & Turoff 1975). The Delphi is clearly dependent on the experiential knowledge of its expert panel. Thus, the scientific merit of the findings may reflect Mitroff and Turoff's (1975, p. 21) assertion that:

An empirical generalization or communication is judged objective, true or factual if there is sufficient widespread agreement on it by a group of experts.

However, in the context of contemporary debate on the evolution of postpositivist paradigms, epistemological deliberation as to the interpretation of *objective, true and factual* is clearly an important task for the researcher. With the notable exception of Kennedy (2000), whose research was structured within a feminist critique, most Delphi studies lack clarity about the framework in which the findings are to be judged.

Heshusius (1990) provides an interesting report on an academic debate about the evaluation of research findings in postpositivist inquiry. Three key stances were taken. The first was that if something were good, it would be instantly recognized as such and that it was naïve to rely on a list of criteria to arrive at this conclusion. The second was that criteria are *okay* (sic) but they can never be fixed or descriptive, as the need to stay true to the context and phenomenon of the study was central to any inquiry. The third stance was that criteria were important and powerful as they separated fact from fiction.

Sackman (1975), in his critical review of the method, notes that Delphi studies are often oblivious to reliability measurements and scientific validation of the findings. Because the technique is intended to correct for lack of conclusive data by drawing on, and sharing, the knowledge and experience of experts (Fink *et al.* 1991), it should not be open to the same validation criteria as hard science. Murphy *et al.* (1998) note that the Delphi technique and other consensus development methods should not be viewed as a scientific method for creating new knowledge, but rather as processes for making the best use of available information, be that scientific data or the collective wisdom of participants. As Pill (1971, p. 62) suggested:

It is the questions of intuitive judgements, the marshalling of subconscious processes, dredging of half-formed ideas from the group memory that Delphi is most useful and as such, one cannot judge it on the same basis as a concrete measurement.

Whilst it is clear that Delphi methodologists reject conventional scientific criteria of rigour, alternative means of demonstrating the scientific merit of the findings have been suggested. The collective term *goodness criteria* proposed by Heshusius (1990) seems appropriate here.

Goodness criteria

Fink *et al.* (1991) note that evaluation of findings will help to build a body of knowledge about the validity of consensus studies. Despite this, many published studies appear to rely on the reader's implicit understanding of methodological processes and goodness criteria. Perhaps this state of affairs reflects Sandelowski's (1986) observation that limited space in journals may bring about such problems, but it may do little to reassure detractors of the method.

Fink *et al.* (1991) suggest that a number of features are important to ensure *credibility* in Delphi findings. Of key importance is the inclusion of a clear *decision trail* that defends the appropriateness of the method to address the problem selected, choice of expert panel, data collection procedures, identification of justifiable consensus levels and means of dissemination and implementation.

Using the term *validity* in possible deference to the dominant paradigm, Murphy *et al.* (1998) also highlight a number of ways in which the findings of a Delphi study can be evaluated. The first is a comparison with the 'gold standard' [by comparing the findings with the results of a randomized-controlled trial (RCT), the results of which are unknown to the Delphi participants]. The second applies criterion-related (predictive and concurrent) validity (by comparing findings with data from other sources). The third is an assessment of internal logic (by checking consistency of the group's output, for example by showing greater agreement about clinical intervention for high-risk patients). A fourth suggestion refers to assessment of face validity (through judgement of usefulness in terms of correctness, commitment and implementation).

Follow-on enquiry based on Delphi findings featured in a number of the studies I reviewed. Dawson and Barker (1995, p. 122), for example, interviewed four members of their expert panel following receipt of the final questionnaire to:

Gain feedback regarding the findings, particularly in relation to the applicability and credibility of the results.

Crotty (1994) took a similar approach following her Delphi study of preregistration nurse education. Here she sought further exploration of areas of high and low agreement through interviews with a sample of nurse teachers. However, not all Delphi findings appear to be subject to such evaluation. Mackway-Jones *et al.* (1999), whose Delphi concerned major incident planning for child casualties, appear confident in the use of their findings by suggesting that they may be applied generally (albeit with local discussion about their implementation).

In contrast to the researchers who appear to give scant attention to the goodness criteria of their own studies, a number of Delphi users have attempted to justify the scientific merit of the method through parallel data collection and analysis. Such studies not only reflect a primary purpose of seeking consensus about a particular issue, but also provide interesting insight into methodological issues of credibility and reliability (see for example McKee *et al.* 1991, Duffield 1993, Campbell *et al.* 1999).

Whatever methods are used to assess the goodness criteria of Delphi findings, there may remain those who question their value. Indeed, I am aware of one academic who dismissed Delphi as 'opinion-based' rather than 'evidence-based' medicine (J.R. Sibert, personal communication, 2000). This viewpoint may be understandable in light of the dominant paradigm. However, it is noteworthy that in their seminal paper Sackett *et al.* (1996) describe the evidence-based movement as integrating best available external clinical evidence from systematic research with individual clinical expertise. The latter is, in turn, described as the proficiency and judgement acquired through clinical experience and clinical practice. Such an interpretation is arguably more compatible with Delphi methodology than may at first appear, as expert opinion would presumably be evidence-based in precisely this way.

Conclusions

This paper has reviewed the key concepts and principles of the Delphi technique. A number of examples from the field of health and medicine have been discussed. The Delphi has been shown to be a widely used and flexible method that is particularly useful in achieving consensus in a given area of uncertainty or lack of empirical evidence. A variety of interpretations and modifications are recognized. The technique benefits from being a democratic and structured approach that harnesses the collective wisdom of participants. It is also recognized as a useful method for shaping communication and seeking agreement within diverse groups. However, a lack of clarity as to the means by which consensus may be defined and the resultant differing interpretations of the Delphi suggest methodological weaknesses and the need for careful and explicit decision-making in its application.

In conclusion, the findings of a Delphi represent expert opinion, rather than indisputable fact. Goodness criteria rest on the justification of detailed decision-making and rigour in the execution of the study. Further inquiry to validate the findings may be important. Both of these processes will contribute to the credibility of the research. A Delphi study

will be further enhanced if its limitations, possible implementation of findings and future research directions are discussed.

References

- Beech B. (1997) Studying the future: a Delphi study of how multi-disciplinary clinical staff view the likely development of two community mental health centres over the course of the next 2 years. *Journal of Advanced Nursing* 25, 331–338.
- Bond S. & Bond J. (1982) A Delphi study of clinical nursing research priorities. *Journal of Advanced Nursing* 7, 565–575.
- Bowles N. (1999) The Delphi Technique. *Nursing Standard* 13, 32–36.
- Broome M.E., Woodring B. & Von O'Connor S. (1996) Research priorities for the nursing of children and their families: a Delphi study. *Journal of Pediatric Nursing* 11, 281–287.
- Butterworth T. & Bishop V. (1995) Identifying the characteristics of optimum practice: findings from a survey of practice experts in nursing, midwifery and health visiting. *Journal of Advanced Nursing* 22, 24–32.
- Campbell S.M., Mann M., Roland M.O., Quayle J.E. & Shekelle P.G. (1999) The effect of panel membership on ratings in a two round Delphi survey: results of a random controlled trial. *Medical Care* 39, 964–968.
- Crotty M (1994) *The Emerging Role of the Nurse Teacher in Project 2000 Programmes in England*. Unpublished PhD Thesis, University of Manchester, Manchester.
- Daly J., Chang E.M.L. & Bell P.F. (1996) Clinical nursing priorities in Australian clinical care: a pilot study. *Journal of Advanced Nursing* 23, 145–151.
- Dawson S. & Barker J. (1995) Hospice and palliative care: a Delphi survey of occupational therapists roles and training needs. *Australian Occupational Therapy Journal* of 42, 119–127.
- Delbecq A.L., Van de Ven A.H. & Gustafson D.H. (1975) *Group Techniques for Program Planning: A Guide to Nominal and Delphi Processes*. Scott, Foresman and Co., Glenview, IL.
- Duffield C. (1993) The Delphi Technique: a comparison of results obtained using two expert panels. *International Journal of Nursing Studies* 30, 227–237.
- Everett A. (1993) Piercing the veil of the future: a review of the Delphi method of research. *Professional Nurse* 9, 181–185.
- Fink A., Kosecoff J., Chassin M. & Brook R. (1991) *Consensus Methods: Characteristics and Guidelines for Use* RAND, Santa Monica, California.
- Gabbay J. & Francis L. (1988) How much day surgery? Delphic predictions. *British Medical Journal* of 297, 249–252.
- Gibson J.M.E. (1998) Using the Delphi technique to identify the content and context of nurses' continuing professional development needs. *Journal of Clinical Nursing* 7, 451–459.
- Goodman C (1986) A Delphi survey of clinical nursing research priorities within a Regional Health Authority. Unpublished MSc Thesis, University of London, London.
- Goodman C. (1987) The Delphi technique: a critique. *Journal of Advanced Nursing* 12, 729–734.
- Hartley M. (1995) The development of module evaluation: a Delphi approach. *Nurse Education Today* 15, 267–273.

- Hasson F., Keeney S. & McKenna H. (2000) Research guidelines for the Delphi survey technique. *Journal of Advanced Nursing* 32, 1008–1015.
- Heshusius L. (1990) Goodness Criteria. In *The Paradigm Dialog* (Guba E.G. ed.). Sage, Newbury Park, CA, pp. 198–201.
- Jairath N. & Weinstein J. (1994) The Delphi methodology: a useful administrative approach. *Canadian Journal of Nursing Administration* 7, 29–42.
- Jones J. & Hunter D. (1995) Consensus methods for medical and health services research. *British Medical Journal* of 311, 376–380.
- Jones J.M.G., Sanderson C.F.B. & Black N.A. (1992) What will happen to the quality of care with fewer junior doctors? A Delphi study of consultant physicians' views. *Journal of the Royal College of Physicians London* 26, 36–40.
- 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* 38, 195–200.
- Kennedy H.P. (2000) A model of exemplary midwifery practice: results of a Delphi Study. *Journal of Midwifery and Women's Health* 45, 4–19.
- Lemmer W.E. (1998) Successive surveys of an expert panel: research in decision-making with health visitors. *Journal of Advanced Nursing* 27, 538–545.
- Lindeman C. (1975) Delphi survey of priorities in clinical nursing research. *Nursing Research* 24, 434–441.
- Linstone H. & Turoff M. (eds) (1975) *The Delphi Method: Techniques and Applications*. Addison-Wesley, Reading, MA.
- Mackway-Jones K., Carley S.D. & Robson J. (1999) Planning for major incidents involving children by implementing a Delphi study. *Archives of Disease in Childhood* 80, 410–413.
- Mayers C.A. (1998) An evaluation of the use of Mayers' Lifestyle Questionnaire. *British Journal of Occupational Therapy* 61, 393–398.
- McKee M., Priest P., Ginzler M. & Black N. (1991) How representative are members of expert panels? *Quality Assurance in Health Care* 3, 89–94.
- McKenna H. (1994) The Delphi Technique: a worthwhile approach to nursing? *Journal of Advanced Nursing* 19, 1221–1225.
- Mead D.M. & Mosely L.G. (2001) The use of Delphi as a research approach. *Nurse Researcher* 8, 4–37.
- Mitroff I. & Turoff M. (1975) Philosophical and methodological foundations of Delphi. In *The Delphi Method: Techniques and Applications* (Linstone H. & Turoff M. eds). Addison-Wesley, Reading, MA, pp. 17–35.
- Murphy M.K., Black N., Lamping D.L., McKee C.M., Sanderson C.F.B., Askham J. *et al.* (1998) Consensus development methods and their use in clinical guideline development. *Health Technology Assessment* 2(3).
- Oranga H. & Nordberg E. (1993) The Delphi panel method for generating health information. *Health Policy and Planning* 8, 405–412.
- Pill J. (1971) The Delphi method: substance, context, a critique and an annotated bibliography. *Socio-Economic Planning and Science* 5, 57–71.
- Reid N. (1988) The Delphi technique: its contribution to the evaluation of professional practice. In *Professional Competence and Quality Assurance in the Caring Professions* (Ellis R. ed.). Chapman & Hall, London.
- Rennie D. (1981) Consensus statements. *New England Journal of Medicine* 304, 665–666.
- Rowe E. (1994) *Enhancing Judgement and Decision Making: a critical and empirical investigation of the Delphi technique*. Unpublished PhD Thesis, University of Western England, Bristol.
- Rowe G., Wright G. & Bolger F. (1991) Delphi: a re-evaluation of research and theory. *Technical Forecasting Social Change* 39, 235–251.
- Sackett D.L., Rosenburg W.M.C., Gray J.A.M., Haynes R.B. & Richardson W.S. (1996) Evidence-based medicine: what it is and what it isn't. *British Medical Journal* 312, 71–72.
- Sackman H. (1975) *Delphi Critique*. Lexington Books, Boston, MA.
- Sandelowski M. (1986) The problems of rigor in qualitative research. *Advances in Nursing Sciences* 8, 27–37.
- Schmidt K., Montgomery L.A., Bruene D. & Kenney M. (1997) Determining research priorities in pediatric nursing: a Delphi study. *Journal of Pediatric Nursing* 12, 201–207.
- Sleep J. (1999) Establishing priorities for research: report of a Delphi survey. *British Journal of Midwifery* 3, 323–331.
- Stewart J., O'Halloran C., Harrigan P., Spencer J.A. & Barton J.R. (1999) Identifying appropriate tasks for the pre-registration year. *British Medical Journal* 319, 224–229.
- Stokes F. (1997) Using the Delphi technique in planning of a research project on the occupational therapists' role in enabling people to make vocational choices following illness/injury. *British Journal of Occupational Therapy* 60, 263–267.
- Williams P. & Webb C. (1994) The Delphi technique: a methodological discussion. *Journal of Advanced Nursing* 19, 180–186.

