



## Methodological and conceptual issues confronting a cross-country Delphi study of educational program evaluation

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### ABSTRACT

Although the Delphi is widely used, research on certain methodological issues is somewhat limited. After a brief introduction to the strengths, limitations, and methodological challenges of the technique, we share our experiences (as well as problems encountered) with an electronic Delphi of educational program evaluation (EPE) in the Asia-Pacific region. The study is described followed by a discussion of the difficulties in participant recruitment and selection, sample size, instrumentation, data collection and analysis and attempts to resolve them. Some of these problems are generic to the Delphi whereas others related to the specifics of the investigation. What we learned should be useful for future Delphis with a similar focus.

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### 1. Introduction

The Delphi technique (referred to as the Delphi) has been recognized as an effective method for reaching consensus and/or forecasting future events. It is a good vehicle for collecting opinions from geographically dispersed experts who cannot meet face to face (Delbecq, Van de Ven, & Gustafson, 1975; Linstone & Turoff, 1975). Delphi has been widely used in numerous settings (industry, government, and academe) and in education the procedure has been employed for curriculum development, institutional planning, and other similar matters (Clayton, 1997). Delphi as key word generates about 188,000 records on Google scholar search and over 3600 on the EBSCO academic electronic search. The numbers indicate that it is well-accepted across many disciplines.

While there are numerous Delphi studies that report answers to specific questions, there are fewer that deal with methodological issues such as recruiting the panel, survey administration, and other challenges as well as use in evaluation studies. Limited information pertaining to cross-country applications is available. Thus, the main purpose of this paper is to share our experiences with an electronic Delphi in the Asia-Pacific region. The focus is not on research findings, but on issues encountered and their

resolution. We also describe some of the difficulties that arose in the researchers' collaboration in conducting this research.

### 2. The Delphi technique

The development of the Delphi is attributed to Dalkey and Helmer (1963) of the Rand Corporation in the 1950s (Eggers & Jones, 1998; Franklin & Hart, 2007; Garavalia & Gredler, 2004; Gordon, 1994; Hasson, Keeney, & McKenna, 2000; Hsu & Sandford, 2007; Linstone & Turoff, 1975; Milkovich, Annoni, & Mahoney, 1972; Mitchell, 1991; Skulmoski, Hartman, & Krahn, 2007; Spinelli, 1983; Williams & Webb, 1994; Witkin & Altschuld, 1995). Predicated on the logic that "two heads are better than one" (Dalkey, 1972, p. 15), the Delphi is a structured group communication process (Delbecq et al., 1975; Linstone & Turoff, 1975; Powell, 2003), designed to obtain a consensus of opinion from a group of experts.

The Delphi solicits and judgment through sequential questionnaires interspersed with summary and feedback derived from previous responses (Delbecq et al., 1975; Linstone & Turoff, 1975; Witkin & Altschuld, 1995). During the process, panelists contribute individual knowledge, assess group views, and revise their judgments, and express their reasons when they disagree. It ends when consensus or stability of responses has been achieved (Dalkey & Helmer, 1963; Skulmoski et al., 2007; Witkin & Altschuld, 1995). Three rounds of iterations are commonly viewed as sufficient for arriving at a high-level of agreement (Delbecq et al., 1975; Linstone & Turoff, 1975).

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Linstone and Turoff (1975) identified three types of Delphi—classical/conventional, policy, and decision-oriented (Franklin & Hart, 2007; Lang, 1994; Woudenberg, 1991). Classical/conventional from the perspective of the above authors focuses on forecasting and estimating unknown parameters. The objectives of the policy and decision-oriented ones are to generate ideas and explore opinions about policy and to reach decisions among a diverse group of people with different stakes in the solution, respectively.

The procedure calls for anonymity of participants, successive iteration, controlled feedback, and statistical aggregation of group responses (Rowe & Wright, 1999). For example, the classical Delphi begins with an open-ended questionnaire to obtain ideas about future issues which tend to be less certain or sure. This is a good way to explore unfamiliar topics (Delbecq et al., 1975; Linstone & Turoff, 1975; Ruhland, 1993).

### 3. Strengths and limitations of the technique

The many varied applications of the technique in the literature will not be examined here. Strengths and limitations have also been discussed extensively (Eggers & Jones, 1998; Franklin & Hart, 2007; Gordon, 1994; Hartman, 1981; Hsu & Sandford, 2007; Lang, 1994; Linstone & Turoff, 1975; Mitchell, 1991; Powell, 2003; Price, 2005; Williams & Webb, 1994; Yousuf, 2007). They are summarized in Table 1.

**Table 1**  
Advantages/strengths and limitations/weaknesses of the Delphi

| Advantages/strengths  | Limitations/weaknesses  |
|---|---|
| Consensus-building  | Group pressure for consensus—may not be true consensus                                |
| Future forecasting  | Feedback mechanism may lead to conformity rather than consensus                       |
| Bring geographically dispersed panel experts together, overcoming spatial limitations                         | No accepted guidelines for determining consensus, sample size and sampling techniques |
| Anonymity and confidentiality of responses  | Outcomes are perceptual at best   |
| Limited time required for respondents to complete surveys   | Requires time/participant commitment  |
| Quiet, thoughtful consideration   | Possible problems in developing initial questionnaire to start the process            |
| Avoids direct confrontation of experts with one another (encourages honest opinion, free from group pressure) | May lead to hasty, ill-considered judgments   |
| Structured/organized group communication process  | Requires skill in written communication   |
| Decreasing somewhat a tendency to follow the leader   | Potential danger of bias—surveys are open to manipulation by researchers              |
| Focused, avoids unnecessary side-tracking for panelists   | Selection criteria for panel composition  |
| Ties together the collective wisdom of participants   | Time delays between rounds in data collection process                                 |
| Possibly motivational and educational for participants  | May force a middle-of-the-road consensus  |
| Cost effective and flexible/adaptable   | Concerns about the reliability of the technique                                       |
| Validity, as the content is driven by panelists   | Drop-outs, response rates   |
| Fairly simple to use  |   |
| Beneficial for long-range educational planning and short-term decision making                                 |   |
| Applicable where there is uncertainty or imperfect knowledge, providing data where little exists before       |   |
| Best used as establishing the basis for future studies  |   |
| Accommodates a moderately large group   |   |

Criticisms of the Delphi have been voiced since the mid-1970s. Sackman (1975) viewed it as unscientific and felt that its application was highly questionable (cited in Lang, 1994). Further, some advantages may become weaknesses or limitations. One is reaching consensus especially when there is a lack of empirical evidence regarding a topic or area of uncertainty (Delbecq et al., 1975). Consensus may be a “watered down version of the best opinion” (Powell, 2003, p. 377) because it produces only weak statements representing “the lowest common denominator” (Powell, 2003, p. 378). Similarly, Mitroff and Turoff (1975) observed that an unsound consensus could result in a compromised position or decision.

Anonymity may be another disadvantage even though it facilitates honest opinion without group pressure (Williams & Webb, 1994); avoids direct confrontation of experts with one another (Franklin & Hart, 2007; Milkovich et al., 1972); and leads to obtaining the collective wisdom of participants. At the same time, it may result in a lack of responsibility for answers as well encouraging quick replies (Sackman, 1975).

As a further illustration of how an advantage becomes a disadvantage, consider that the flexibility and simplicity of the technique could potentially lead to poor implementation. If this occurs, it underscores a lack of methodological rigor (Sackman, 1975) and constitutes a threat to reliability and validity (Linstone & Turoff, 1975; Sackman, 1975).

### 4. Methodological considerations

Some authors provide recommendations for improvement and better use of the Delphi (Eggers & Jones, 1998; Hasson et al., 2000; Keeney, Hasson, & McKenna, 2006; Lang, 1994; Skulmoski et al., 2007). The following observations are based on a number of concerns found in the literature.

#### 4.1. Sampling issues

The size and selection of experts for the panel and participant drop-out affect most Delphi studies. There is no established rule for sample size (Williams & Webb, 1994). Like other research methods, the more participants the better, but Powell (2003) points out the numbers of experts vary according to the nature of the problem and resources available to researchers and as would be expected with larger samples as well more heterogeneous ones, the complexity of the research would tend to be higher. Gordon (1994) notes that most panels have 15–35 respondents; however, there are studies with groups ranging from four to 345 experts. Witkin and Altschuld (1995) suggest that panels be less than 50 in size with some occasionally being larger. Skulmoski et al. (2007) observe that a homogeneous group needs a smaller sample (10–15) but heterogeneous ones (such as in an international study) may require up to several hundred subjects.

Choosing qualified subjects is critical for success. They should be able to offer informed opinion and be committed to the group process (Powell, 2003). Recruiting qualified experts is not easy (Mitchell, 1991). Recruiting letters should cover a brief outline of the project, its objectives, the anticipated number of rounds and time commitment, a guarantee of anonymity, and a confirmation of acceptance (Gordon, 1994). It takes 2–3 weeks to secure consent from potential participants (Price, 2005).

Skulmoski et al. (2007) recommend purposive sampling with ‘snowballing’ for expert recruitment. Well-defined criteria for selection purposes are needed but unfortunately guidelines are in short supply (Keeney et al., 2006). Mitchell (1991) advises that it is important to avoid selection bias. Lang (1994) emphasizes that

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