



Guidelines for Using the Delphi Technique

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ABSTRACT

The Delphi Technique has been useful in educational settings in forming guidelines, standards, and in predicting trends. Judd lists these major uses of the Delphi Technique in higher education: (a) cost-effectiveness, (b) cost-benefit analysis, (c) curriculum and campus planning, and (d) university-wide educational goals and objectives. The thorough Delphi researcher seeks to reconcile the Delphi consensus with current literature, institutional research, and the campus environment. This triangle forms a sound base for responsible research practice. This paper gives an overview of the Delphi Technique and the primary uses of this technique in research. This article on the Delphi Technique will give the researcher an invaluable resource for learning about the Delphi Technique and for applying this method in educational research projects.

KEYWORDS

Delphi Technique, Delphi method, guidelines, consensus, trends, planning, groupthink, expert opinion, expert consensus

Introduction

The most notable use of the Delphi Technique was the RAND-Corporation study conducted by Norman Dalkey and Olaf Helmer in 1963 to assess the direction of scientific breakthroughs, population control, automation, space progress, war prevention, and weapons systems (Jones, 1980). Many similar studies were patterned after the RAND study and used by the Department of Defense and other government agencies, factories, businesses, and health care agencies for the purpose of forecasting future trends and as a planning tool. Researchers at the RAND Corporation in the 1960s jokingly referred to the research of Norman Dalkey and Olaf Helmer as Delphi research (Turoff & Hiltz, 1996). They applied this label because of the anonymous manner in which Dalkey and Helmer contacted nuclear science experts to gain information about future nuclear science trends and the forecasts that resulted from these queries. The Delphic aura created by the anonymity and distance of the panelists continues as both a blessing and a curse for researchers. Proponents of the Delphi Technique agree that researchers can obtain more accurate data using questionnaires distributed to a group of anonymous experts at a distance than in face-to-face committee meetings where certain individuals tend to dominate the decision-making process (Delbecq, Van de Ven, & Gustafson, 1975; Linstone & Turoff, 1975; Moore, 1987). Critics of the Delphi Technique insist that the absence of social-emotional support makes the process too mechanical, non-motivating, and more disliked than liked among the respondents (Van de Ven, 1974).

The Delphi Technique is laden with many misconceptions as noted by Turoff and Hiltz (1996). Some of the following misconceptions noted by Turoff and Hiltz were as follows:

(a) It is a method for predicting future events and for generating a quick consensus by a group; (b) it is the use of an anonymous survey to collect information;

(c) it is a method for quantifying group judgment. Although these statements are partially true, they are often oversimplified or taken out of context by Delphi researchers. For example, Turoff and Hiltz concluded that reaching consensus is actually contrary to the purpose of a Delphi.

Delphi Technique in Educational Settings

The Delphi Technique had its beginnings in academia in then 1930s. Cyphert used the Delphi Technique at Ohio State University to develop criteria for evaluating the faculty at Ohio State (Fortune, personal communication, June 2, 1999). The Delphi Technique has not been widely used by educators until recently because it is both time-consuming and labor intensive (Weingand, 1998). Electronic mail and computer analysis software make the Delphi Technique more appealing to modern researchers.

Delphi studies have been useful in educational settings in forming guidelines, standards, and in predicting trends. Judd (1972) lists five major uses of Delphi Techniques in higher education: (a) cost-effectiveness, (b) cost-benefit analysis, (c) curriculum and campus planning, (d) university-wide educational goals and objectives, and (e) generalized futuristic educational goals and objectives.

Lewis (1984) found that most of the Delphi studies in higher education were used to solve problems. In commenting on the likelihood that a Delphi study will have a strong impact in higher education, Lewis (1984) stated the following conditions: a solution to a recognized problem is actively being sought; the persons who will be affected and whose cooperation is needed are involved with the Delphi study; and the persons who conduct the Delphi are able to act upon the results.

The Delphi technique works well as an initial step in defining planning and marketing issues. Marketing has become a critical issue as more and more educational institutions compete to obtain necessary funding and support from academic and community sources. The Delphi Technique will be useful for educators in developing curricula and learning experiences to prepare our students for future careers. These studies will be useful when coordinated with other grounded research in determining curricular needs, training and staffing needs, and for recruitment purposes.

Trend studies will be useful because they can be conducted representing a broad international base and the result can be easily disseminated via professional websites. Organiza-

tions using the Delphi technique in a setting where it will be broadly distributed should take care to explain this method and to encourage libraries to review the findings in terms of their own campus and benchmark findings. Studies to determine issues and to establish guidelines are useful because they can involve an entire panel of experts on these issues. These experts volunteer to spend the minimal amount of time that is required to complete a Delphi questionnaire.

The information that is collected from this questionnaire may be useful to more than one university and generally may be shared in aggregate form. Most universities could not afford to pay travel expenses and honoraria for all of these experts to come to one campus. Delphi studies are extremely useful for collecting data from students and alumni regarding the curriculum, and information science trends, and funding. Some of these individuals may be hesitant to speak out in a focus group or other traditional forums. The Delphi Technique may also be used to further clarify or validate findings from surveys, focus groups, and interviews.

Expert Opinion

Helmer (1966) suggested applying the Delphi whenever policies and plans have to be based on informed judgment, and to some extent to any decision-making process. When formulating policies and plans based on expert opinion, it is important to recognize the fallacies inherent in human judgment.

Despite the fallacies inherent in seeking advice from the experts, the Delphi Technique can provide important insights from a panel of expert educators when developing standards, guidelines, and determining future trends.

Guidelines for Using the Delphi Technique

Linstone and Turoff (1975) have identified criteria that can be used to determine when the Delphi Technique should be used.

1. A problem does not lend itself to precise analytical techniques but can benefit from subjective collective judgments.
2. The individuals needed to contribute to the examination of a broad or complex problem have no history of adequate communication and may represent diverse backgrounds with respect to expertise or experience.
3. The heterogeneity of the participants must be preserved to assure validity of the results.

Purpose and Objectives

Socrates described himself as a gadfly "appointed to this city as though it were a large horse which because of its great size is inclined to be lazy and needs the stimulation of a stinging-fly" (Plato, 1957, p. 17). The Delphi serves a similar purpose in education. Educators can uncover and discuss issues and problems in an anonymous forum that would not otherwise be brought to the forefront.

Developmental research

The Delphi Technique is useful for exploratory research and planning as indicated by Linstone and Turoff (1975), Moore (1987), and Delbecq et al. (1975). The Delphi Technique provides a useful means for exploring and describing current issues and problems and is useful for developmental research.

Isaac and Michael (1997) indicate that the purpose of developmental research is to ask questions about the patterns, direction, and sequence of growth or change and to explore the interrelated factors affecting these characteristics.

Research Procedures

Turoff and Hiltz (1996) state that the heart of the Delphi is the structure that relates all the contributions made by the panelists and produces a group view. Turoff and Hiltz (1996) provide a detailed explanation of the Delphi phases as follows:

1. Formulation of the issues: What is the issue that really

should be under consideration? How should it be stated?

2. Exposing the options: Given the issues, what are the policy options?
3. Determining initial positions on the issues: Which are the issues everyone agrees on and which are the unimportant ones to be discarded: Which are the one disagreement?
4. Exploring and obtaining the reasons for disagreements: What individual underlying assumptions, views, or facts are being used to support the panelists' respective positions?
5. Evaluating the underlying reasons: How does the group view the separate arguments used to defend various positions, and how do they compare to one another on a relative basis?
6. Reevaluating: Reevaluation is based on the views of the underlying evidence and the assessment of its relevance to each position. (p. 88)

Panel Selection

Patton (1990) recommends including key experts in a subject field to solicit the latest thinking and to inform policy making. He recommends synthesizing expert opinion with existing

opinion to pull together a research base for policy making.

Delbecq et al. (1975) suggest focusing the Delphi question using the following three probes. Why are you interested in this particular Delphi? What do you need to know that you do not know now? How will results from the Delphi influence decision making once the procedure is completed? The first Delphi probe might mention the need for providing individuals with disabilities equal access to academic library services and ask the panel to identify exhaustively the substantive issues and critical problems with using assistive technologies in academic libraries and to suggest corresponding guidelines for addressing these issues and problems (Green, 1999). The results may be used along with other research to provide a basis for establishing standards and evaluating assistive technologies services.

The Delphi Process

Stewart and Shamdasami (1980) outline the steps in the Delphi process as follows:

1. Develop the initial Delphi probe or question;
2. Select the expert panel;
3. Distribute the first round questionnaire;
4. Collect and analyze Round 1 responses;
5. Provide feedback from Round 1 responses, formulate the second questionnaire based on Round 1 responses and distribute;
6. Repeat Steps 4 and 5 to form the questionnaire for Round 3;
7. Analyze final results;
8. Distribute results to panelists.

Typically, Delphi studies include three rounds. The purpose of the first round is to form issues. The second round provides the panelists with feedback from the first round and presents a questionnaire to the panelists. The panelists rate the items on the questionnaire using a predetermined scale. The Delphi moderator uses measures of central tendency to determine consensus from the second round. Individuals are asked to reevaluate their opinions in the third round when they differ significantly from the other panelists. The purpose of the third round is to provide feedback from the previous round and to reach a final consensus or to indicate that consensus cannot be reached. Measures of central tendency are used to present and determine the consensus. Individuals who express different views from other panelists may be asked to provide reasons for their dissenting views to clarify their positions. Comparisons are made between the panelists' views and the literature. The purpose of this comparison is to triangulate expert opinion with

the literature. Lincoln and Guba (1985) emphasize the importance of triangulating qualitative research using the constructs or canons of credibility, transferability, dependability, and confirmability.

Fields of research with Delphi technique:

Author	Title	Research Gap	Contribution
Ludwig, B. (1997)	Predicting the Future: Have you considered using the Delphi Methodology?	Frequently business, governmental agencies and organizations are faced with the problem of predicting or forecasting future events and relationships in order to make appropriate and reasonable plans or changes.	Goal setting, policy investigation, or predicting the occurrence of future events
Hsu and Sandford (2007)	The Delphi Technique: Making Sense Of Consensus	Delphi technique provides those involved or interested in engaging in research, evaluation, fact-finding, issue exploration, or discovering what is actually known or not known about a specific topic a flexible and adaptable tool to gather and analyze the needed data.	Important data collection methodology with a wide variety of applications and uses for people who want to gather information from those who are immersed and imbedded in the topic of interest and can provide real-time and real-world knowledge.
Habibiet al. (2014)	Delphi Technique Theoretical Framework in Qualitative Research	Theoretical Framework in Qualitative Research	In qualitative research, it is recommended to use a group of ten experts with different specialties. Concluded that the Delphi technique is an appropriate and acceptable mechanism to achieve consensus when developing sets of indicators.
Skulmoski and Hartman (2007)	The Delphi Method for Graduate Research	Used successfully in there program at the University of Calgary to explore new concepts within and outside of the information systems body of knowledge.	Flexible, effective and efficient research method that can be successful used by IS graduate students to answer research questions in information systems and to rigorously advance the IS body of knowledge.
Thomas Grisham (2008)	The Delphi technique: a method for testing complex and multifaceted topics	The Delphi technique: a method for testing complex and multifaceted topics	It is appropriate for researching complex issues where larger scale quantitative "hard data" fails to unearth richness in tacit knowledge to help the research understand subtle expert opinion.
Yousuf (2007)	Using Experts' Opinions Through Delphi Technique	Used in a variety of ways in government, business, and education	Sequence are only as valid as the opinions of the experts who made up the panel, whereas the panel viewpoints are summarized statistically rather than in terms of a majority vote.

Beech (1999)	Gotheextramile—usetheDelphiTechnique	It has the ability to elicit quantitative data similar to other survey research, but also to explore qualitative data such as attitudes and moral judgments.	The Delphi Technique is a useful management tool that can provide data that are difficult to obtain by other means. "added value".
Plessis and human (2007)	The art of the delphi technique: highlighting its scientific merit	Delphi technique was forecasting in order to be able to plan ahead	Used as a constructive method in facilitating controlled, rationale group communication to develop knowledge for decision-making.
Hallowell and Gambatese (2010)	Qualitative Research: Application of the Delphi Method to CEM Research	Construction engineering and management (CEM) researchers often rely on alternative research techniques when traditional methods fail. For example, surveys, interviews, and groupbrain storming techniques may not be appropriate for research that involves confounding factors and requires access to sensitive data.	Delphi technique allows researchers to obtain highly reliable data from certified experts through the use of strategically designed surveys.
Green (2014)	The Delphi Technique in Educational Research	Educational research	Educational settings in forming guidelines, standards, and in predicting trends. Lists these major uses of the Delphi Technique in higher education: (a) cost-effectiveness, (b) cost-benefit analysis, (c) curriculum and campus planning, and (d) university-wide educational goals and objectives.

Conclusion

Delphi technique allows researchers to obtain highly reliable data from certified experts through the use of strategically designed surveys. The Delphi Technique is a communication structure aimed at producing a detailed critical examination and discussion. The Delphi Technique is an iteration of anonymous questionnaire responses to achieve consensus by an expert panel (Stag, 1983). Lincoln and Guba (1985) emphasize the importance of triangulating qualitative research using the constructs or canons of credibility, transferability, dependability, and confirmability. The Expert Consensus in Academia Model at the end of this article reflects the importance of previous research in interpreting a Delphi study and views the findings of the Delphi in light of instructional design principles, campus environment, and respects the views of non-experts who will be involved in the decision-making process.

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