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Conduct a Delphi Study

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Delphi is a research survey technique used as a way of collecting data from respondents within their domain of expertise. Its aim is to deal with divergent opinions or controversial issues to achieve consensus concerning real-world knowledge on a certain topic. In the field of medical education, it has been used extensively to research topics such as curriculum and clinical procedure development (Tonni and Oliver 2013; Meshkat et al. 2014). Despite some variations in the way Delphi is applied, there is an overall agreement as to its distinct features (Iqbal and Pipon-Young 2009). This article provides health professional educators and practitioners an overview of the Delphi method focusing on how it is conducted and issues that need consideration when employing this method in practice.

An Overview of the Delphi Process

Delphi is a questionnaire technique that uses multiple iterations designed to develop a consensus of opinion concerning a specific topic (e.g., curriculum).
Figure 1 provides a pictorial summary of the Delphi process.

Figure 1
The Delphi Process
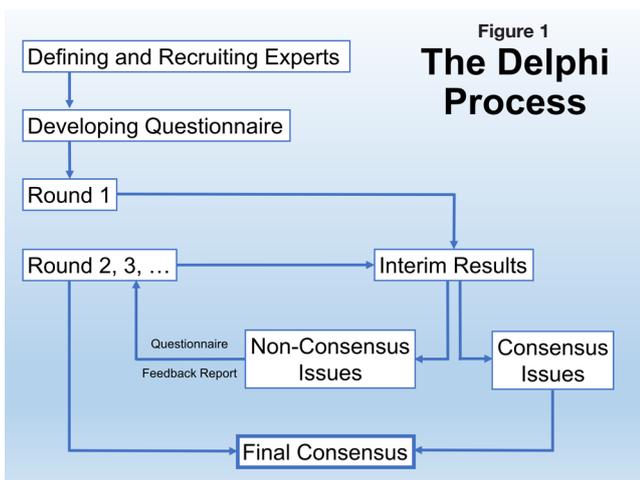
The first step is to define and recruit the experts. A Delphi questionnaire is then developed and sent to the experts to gather their opinions (Round 1). The questionnaire responses are analysed providing interim results demonstrating consensus and non-consensus issues. Another questionnaire containing non-consensus issues and the Round 1 results are sent out to the experts (Round 2). This feedback encourages the experts to compare their initial opinions with the group result. The expectation is that outlier responses will be adjusted and a level of agreement achieved. Round 2 provides further data toward the interim results.

Subsequent rounds continue until an acceptable level of consensus is achieved, no further consensus issue is emerged, or until the response rate is too low. The final consensus will present issues upon which the experts agree (consensus), along with the items which remain controversial (non-consensus).

The Experts

Experts could be people who possess knowledge in a particular area, who are representatives in the specific discipline, or who have relevant experience. All need to be willing to contribute their opinions. However, people who are willing to participate in the study may not necessarily be people who hold important views. Selecting the right people to be experts is crucial as it determines the validity and relevance of the Delphi results.

Panel Size

The expert panel should reflect the representativeness of the study. The appropriate panel size can range from very few to hundreds of people depending on the study's purpose. The minimum number of samples needs to be at least 30 to provide rigour for statistical analysis. A panel size which is greater than 30 may not improve the quality of the Delphi result (de Villiers et al. 2005).

Questionnaire Design and Administration

A Delphi questionnaire can be developed from primary data (e.g. interviews) or literature analysis. Using existing literature can enhance validity; however, pre-existing information may inappropriately restrict the experts' opinions and introduce researcher bias in the selection of questionnaire items. Paper-based or e-Delphi can be administered to experts.

E-Delphi can reduce the time and cost of data collection. However, its main disadvantage is that experts must be technologically literate and can access the internet, otherwise the response rate may be low due to technical difficulties.

The First Round

Round 1 can be either qualitative (e.g. open-ended questions) or quantitative (e.g. rating scale). A qualitative Round 1 enables experts to generate ideas and express their opinions. For example, they may provide ideas as to what changes or additions should be made to a curriculum, or what should be included in a new policy. The researcher then uses this information to develop a quantitative questionnaire. In contrast, a quantitative Round 1 asks experts to rate items in terms of agreement or importance with concepts that were pre-determined by the researcher. Ideally, these would be based upon a thorough review of the relevant and most up-to-date literature on the topic. A quantitative Round 1 does provide space for additional comments, asking experts whether they think that items should be amended or added, but it does not have the advantage of the qualitative Round 1 in engaging experts. The downside of the qualitative approach though is the risk of participant fatigue which may impact on the response rate.

Response Rate

To maintain rigour, as a guide it is suggested that the response rate of each Delphi round should not fall below 70% (Kilroy and Driscoll 2006). No subsequent rounds should be launched if the response rate of the previous round is low.

Two strategies have proved useful for increasing or maintaining the response rate in Delphi rounds. Firstly, the use of reminders after each questionnaire can increase the response rate; however, excessive reminders can alienate experts which may also reduce the response rate. Secondly, interest can be sparked by offering incentives which may increase the response rate.

Data Analysis

Group opinions are reported numerically but questionnaires usually include open comments questions where participants can offer reasons for their ratings. This qualitative data is also analysed. Descriptive statistics (e.g. mean, median) are reported for representing the group opinion. Inferential statistics (e.g. non-parametric analysis) are used to identify relationships between specific factors in the study. For qualitative data, thematic analysis is used to summarise the rationale behind the consensus or explain lack of agreement.

Definition of the Consensus

In theory, consensus is achieved when all panellists agree or disagree on the items; however, this is almost never achieved. The level of consensus can vary from 51% to 80% and depends on the study's aim. The chosen level of consensus is informed by the mean or median which can be used to define the cut-off value for agreement. This value depends on the rating scale and nature of data. Standard Deviation (SD) is used to define an acceptable level of agreement. The accepted value of SD is 1.0 for a Delphi study (Robinson 1991). However, the use of statistic values depends on the rating scale (i.e. ordinal or interval scale) and the number of points on the scale.

Ethical Consideration

Given the iterations process and the number of questionnaire rounds required in Delphi, complete anonymity cannot be achieved. There is value in the researcher knowing who the response is from so that they can issue targeted reminders. The concept of 'quasi-anonymity' is therefore applicable to Delphi; it allows the researcher to know the identity of the experts, and allow the experts to know who else is participating. However, no one involved in the study is made aware of the response or opinion of any individual panellist.

Conclusion

The Delphi method is a tool for collecting experts' opinions on a specific issue through a series of questionnaires. Careful research design, planning and justification are fundamental. The experts should be clearly defined and the panel must demonstrate representativeness. Delphi Round 1 can be qualitative or quantitative; however, a quantitative first round can maintain the response rate and reduce subsequence rounds. The definition and level of consensus should be realistic and not too difficult to achieve. Finally, 'quasi-anonymity' allows a researcher to contact panellists for further clarification while no panellist knows the responses of other panellists.

References and Further Reading

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