Potential use of Delphi to conduct mixed-methods research: A study of a research project on leadership.

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Introduction

The aim of this paper is to illustrate how the Delphi method normally used for obtaining consensus among experts on uncertain events or issues can be used as a research method for academic work. Specifically, it is the intent of this paper to show that a well-designed and conducted Delphi process can be used as a mixed-methods approach to deliver valid outcomes. To do this, this paper will briefly describe the characteristics of the Delphi method based on a review of the recent literature. However, this paper will focus on the anonymous mail (or email)-based Delphi. It will then provide some key characteristics of the Delphi method from the literature. This will be followed with a specific example of the use of Delphi in leadership research to explain how data was collected and analysed both quantitatively and qualitatively. The paper will conclude with reflections on the use of Delphi in the case study and how it supported the use of mixed-methods research.

Delphi had its origins in the work of the RAND Corporation for gathering expert knowledge to make a decision by the US defence force in the 1950s. Due to confidential nature of its original application the details of the process used were only published in 1963 (Dalkey & Helmer 1963). One of the early works that explains the process of Delphi in detail was by Turoff in 1970 where she discusses its use in policy research. This was followed by a book by Linstone and Turoff (1975) detailing the process. Delphi can be used either as a face-to-face method or through mail (nowadays email) or groupware to keep the participation anonymous. The rigour of the findings is dependent on the choice of experts as well as the way in which

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controlled feedback is provided during subsequent rounds to move the process towards agreement from disagreements. (Dick 1998). As such, there is no single standard for the use of Delphi but there are some common characteristics which are now explained.

Delphi Method in Brief

Delphi is a dialectical consensus-seeking process that uses:

- A panel of experts, identified as knowledgeable about an issue, that is the focus of the process

- A process managed by a researcher or facilitator using several rounds where controlled feedback is provided to the experts with a view to move towards a consensus

- A method of analysing and summarising the data provided by the experts in each round to help converge the opinions.

The classical Delphi process has the following characteristics (Rowe & Wright 1999; Skulmoski et al. 2007):

1. Ensures anonymity of participants so that they can express their opinion freely.

2. Allows participants to refine their views based on feedback provided to them in several rounds.

3. Controls the entire process through feedback to participants about the other participants' perspectives so that they can modify their views or clarify their position.

4. Quantitative analysis of the responses to the participants using statistical techniques.

A Delphi process is generally based on four iterations in the literature even though three rounds are commonly used in practice. The first round of Delphi usually starts with an open-ended questionnaire that is then converted into a more structured questionnaire in the next round where it is often used as a survey instrument. In the second round, the panellists may be asked to rank the items according to priority. The experts may also be asked to explain the reasons for their ranking. In the third round, the researcher will send back to the experts all the panellists' rankings and explanations for the highly prioritised items that receive the most consensus, giving the experts an opportunity to revise or clarify their ratings. A fourth round is sometimes proposed if consensus is not reached in the third round, in which a list of items not

prioritised in the earlier round is also distributed. The paper will now discuss specific aspects of the process and participants, and the variety of views expressed.

The Delphi method may not suit all types of research questions although its use has been steadily increasing (Donohoe and Needham 2009). McKenna (1994: 1222) writing about Delphi applications in nursing research suggests that Delphi is a useful approach when:

- The research problem cannot be analysed precisely using analytical techniques and subjective judgements are useful

- The research population may be diverse in terms of background and experience

- It may not be practical to have many participants meet face-to-face; this may also be limited by time and cost

- Where there is a lack of empirical data

Skulmoski et al. (2007) describe how Delphi is used in graduate research and explain that it could be done in several ways – co-developed by a student and supervisor; based on the researchers' own experience in practice; or through a literature review. Some authors suggest using a focus group of experts and/or a pilot study to develop questions for the first round.

Since the Delphi process is usually carried out within a limited period, Hsu & Sanford (2007) point out that expert selection is crucial. They suggest that people who have a background and experience of the issue being addressed are important. They add that experts should be open to revising their opinions if reasonable. Sometimes (as in the case study explored in this paper) the subjects who have a stake in the decisions being arrived at from the Delphi process should be also be used as experts. Keeney et al. (2006) warn that bias should be avoided in selecting experts. They suggest selecting experts randomly and to have diversity in terms of "gender, professional experience, education, employment and designation" (p. 208). Another issue related to experts is anonymity. In some studies, such as Hasson et al. (2000), 90% of the staff in a maternity hospital were used. Keeney et al. (2006) suggest one way of dealing with this issue is to consider quasi-anonymity where the researcher knows who responded and what their response was, but the experts may not know each other. There is also difference of opinion in the literature on the number of experts. The common number seems to be around 40 to 50 whereas numbers as low as 8 and as high as 345 have been used in doctoral theses that used Delphi.

A problem that needs to be addressed with experts is to keep them interested to continue participation through subsequent rounds. This may also be a consideration is choosing experts as attrition is a problem that can lead to a loss of stability. Day and Bobeva (2005:106) suggest that a 15% attrition limit as a threshold to ensure stability.

While the rounds can continue until consensus is reached it will take time and experts may become disengaged with the process. So, Dick (1998:10) states that "In practice it is common to limit a Delphi to three rounds". This is also confirmed by Hasson et al. (2000) who agree that based on recent evidence two or three rounds are deemed enough.

It may be difficult to get 100% consensus. Researchers accept that 51% to 80% consensus is acceptable while 75% is considered robust according to Keeney et al. (2006). On the other hand, Hasson et al. (2000) consider stability of the response through a series of rounds is more important than looking for a percentage.

According to Hasson et al. (2000), data from the first round is often qualitative and content analysis techniques are used to analyse them. Software such as QSR NVIVO or Ethnograph can be used for this. Statistical analysis using mean, median and interquartile range are often used in quantitative analysis to report on central tendency and spread.

While there are advantages of using the Delphi method in certain contexts, some limitations have been observed (Skinner et al. 2015):

1. Group pressure may force the consensus

2. The controlled feedback my lead to conformity rather than consensus

3. Time delays between rounds may make the process unwieldy and time consuming and lead to attrition

4. Concerns about the reliability of the findings.

Therefore, it is good to design and carry out a Delphi study systematically. To ensure a reliable and valid study some useful suggestions can be found from the literature (Day & Bebova 2005)

1. Ensuring that Delphi is the right approach

2. Selection of experts or panel

3. Ongoing management of the expert panel

4. Designing the instrument used to solicit the opinions

5. Timing of the survey

6. Proactive management of the process

7. Choice of the data analysis method in analysing the results from each round.

8. Documenting the results

Next, we describe how a modified Delphi study was used in a study to investigate leadership capability of not-for-profit (NFP) organizations providing aged and community care in Australia. The organizations where the research was carried out were also faith-based organizations.

Case Study

The Delphi approach was used as one of the methods used to build a leadership framework of NFP organizations providing aged and community care in Australia.

The Delphi process used in the case study is a modified form of the method designed as a "dialectical process to reach agreements from disagreements" (Dick 1998) and used a democratic approach following open systems principles.

The process used was designed by Alan Davies (Hase & Davies 2009) which has been developed over ten years combining a diagnostic tool based on a Strength Weakness Opportunities and Threats (SWOT)-based questionnaire in Round 1 followed by controlled feedback through subsequent rounds. Davies felt that an online use of SWOT would allow respondents for the organization to express their opinions freely without being 'shouted down' by more dominant voices.

Quantitative phase

Each organization that participated in the research was asked to nominate three representatives from the eight levels of management arrived at by the research team. The levels identified were:

1. Board

2. CEO

3. Regional general managers

4. Specialist executive level managers

5. Service-level general managers

6. Service-level middle managers

7. Directors of nursing/clinical managers

8. Faith leaders

Four additional CEOs from similar organizations were included to make up the number of CEOs in the sample. Four other experts knowledgeable about the NFP sector were also included in the first round.

Thirteen questions were developed for comment by the expert panel in the first round. They were derived from the analysis of interviews and a survey that had been carried out in the study before the Delphi process was used.

Seventy-four experts participated in the first round that generated a total of 256 responses. Davies and the key members of the research team analysed the responses, combined similar items, and selected 64 questions to be used in the second round. However, as the questionnaire was presented in a spreadsheet, the respondents in Round 2 could click on the questions presented to reveal the original responses to the questions asked in Round 1. Keywords were also added to group the questions under some broad themes such as communication, vision, etc.

The respondents were then asked to vote on the major categories derived from the responses to determine the ranking of these categories. Out of the 74 original respondents 53 responded.

Five items were identified as the most essential capabilities to demonstrate effective leadership in the NFP sector in faith-based organizations. These were:

1. Clear communication

2. Building and motivating a high-performance team

3. Demonstrating honesty and integrity

4. Ability to communicate as well as establish effective communication systems

5. Effective interpersonal communication skills (especially listening skills).

The results from the Delphi survey were also analysed using SPSS software and fed back to the senior management of the two organizations. This provided some ideas to the senior management on how leadership capability was acquired and developed in the two organizations.

Following the Delphi, a focus group was conducted with selected mangers from the two organizations to elaborate on what they expected from their leaders regarding the five essential capabilities that resulted from the survey.

Qualitative Phase

During the quantitative analysis only 10 of the 13 questions had been analysed. Responses to Questions 11 to 13 were set aside for further analysis as they were designed as open questions seeking responses to peripheral issues as well as to get some opinions important to the managers.

These questions were:

- What differences, if any, are there in the leadership requirements of for-profit and not-for-profit organizations?

- What differences, if any, are there in the leadership requirements of faith-based and non-faith-based organizations?

- What else would you like to say about leadership capabilities and their development?

When the final report for the original research was submitted (Cartwright et al. 2013) it only reported on the results from the quantitative phase of the Delphi survey. In this paper we present the analysis of the responses for the last three questions and discuss how it contributed to a better understanding of leadership capabilities in the two organizations studied.

The inputs from the spreadsheet for the last three questions were combined into a consolidated file for each question and imported into NVIVO. The results were coded by one of the researchers involved in the original Delphi and analysed by the authors.

The following nodes resulted from the coding:

1. Features of Leadership

2. Features of NFP

3. For Profit Organization and Profitability

4. For Profit Deficiencies

5. NFPs' Financial Focus

6. NFPs' Mission Focus

7. NFPs' Mission and Market Tension

8. Person-centred Care

9. Treatment of Staff

The following codes had the most mentions in the nodes: Features of Leadership (20); For Profit Organizations and Profitability (18); NFPs' Financial Focus (12); NFPs' Mission Focus (12); and Person-centred Care (15).

The quotes from the node Features of Leadership are most relevant to the findings from the original Delphi analysis on what contributes to effective leadership. So, the statements from this node are examined first to look at similarities and differences from the original analysis.

Items that were similar are highlighted in the following statements:

'Leadership is required to bring/keep people on board to achieve whatever the organization's goals are'; 'Less tangible "carrots" to motivate staff (like money, etc.) – so greater need to lead through motivation, inspiration, building teams and community, developing intangible rewards, etc.'; and 'Motivating and leading volunteers' (These statements relate to the original finding that the leader needs to motivate people and teams in the original analysis.)

'Stronger demands on the "soft skills" of leaders' (This statement aligns with the importance of communication and listening skills in the original findings).

No other statement that supported the original findings were found under this node but there were a few that were reported under the other nodes that are discussed briefly next.

While some statements did not find the leadership challenges in NFP's to be different from for-profits, some others commented that NFP leaders face different challenges: 'not-for-profit has a culture of volunteers, which requires very different management skills'; and 'The expectation of individual leaders is quite different. Some not-for-profit boards operate like committees of

management whereas in some others the board merely ratifies the decisions recommended by the executive in a very passive way'.

The following statements provided some new dimensions of effective leadership.

'The leader needs to work effectively in an uncertain environment'; 'Need to both be professional and provide a service or a product; 'Lack in having robust processes and systems to support their leaders [in NFP's] which can lead to frustration'

To summarize, the managers felt that NFP leaders must deal with uncertainty and frustration and must demonstrate professionalism.

The statements captured under the node NFPs' Financial Focus some managers alluded to the fact that the focus of leadership is different in NFPs compared with For Profits in terms of financial goals. They felt that NFP leaders need to have humanitarian goals and that they should demonstrate a 'balanced approach incorporating operating margins and provision of quality care'. One manager pointed out that NFP leaders having less pressure on financial goals could be an advantage as this could enable them to focus more on the customer. These statements show some variance in views among the managers of the two organizations on the differences between leadership capabilities required in the different sectors.

The statements captured under the node NFPs' Mission Focus pointed to the fact that there could be some issues in defining the mission clearly due to the large number of stakeholders. However, others felt that NFP leaders are accountable to the 'organization's mission and vision' as well as the 'ethos of the company'. Leaders were also expected to take into consideration the 'special needs of volunteers and lowly paid workers who do not work for the money but for a vision or ideal'. The last statement resonates with the previous findings during the quantitative phase on the capacity of leaders to motivate people in the NFP organization.

The statements captured under the node Person-centred Care pointed to the different goals of the NFPs from For Profits by stating that while both organizations have to take their customer into account, NFPs should consider that they must 'serve people and make a difference in their lives'. There was also a statement of their leaders being guided by the religious ethos of the faiths represented by the two organizations and learning to treat people not as 'commodities' but individuals who are 'in need of our love and service'. Some statements agreed that For Profits and NFPs may have similar attitudes towards customers while others did not. An interesting statement with a neutral view was that 'NFP has a balanced approach incorporating operating margin and provision of quality care'.

Other relevant statements captured under other nodes pointed to 'more autonomy of NFPs'; leaders requiring 'more belief in self and competency; 'more capacity to be innovative as the outcome is not about the bottom line'; to be more 'patient and empathetic towards followers'; the need for motivation by 'intrinsically satisfying and worthwhile work, high team spirit, supportive environment, commitment to the cause'; and show 'greater need to lead through motivation, inspiration, building community, developing intangible rewards'. This also resonates with the original findings on motivation.

There was also a feeling that the people focus of NFPs might be changing due to the 'increased regulatory focus'. The Mission vs. Market node also captured the dilemma for leaders to balance 'margin' and values' and the need to maintain financial viability while providing expected service.

Discussion

The analysis of the qualitative data was carried out to extend the findings from the earlier quantitative analysis. Some of the original findings were reinforced such as the need for clear communication and motivation of the staff.

Some other attributes of effective leadership were revealed from the qualitative analysis. These were:

1. The capacity to deal with uncertainty and frustration in an environment that provided little room for monetary rewards.

2. Conflicting views on whether leaders of NFPs needed different capabilities from their counterparts in the For-Profit sector.

3. The need for professionalism, self-belief and competency (to lead).

4. The capability to focus on service, ethos and commitment to the cause of the organization.

While the open questions only captured brief statements in a spreadsheet, they did provide some additional information on the required capabilities of leaders and clarified the reasons behind some of the findings from the earlier analysis.

Interviewing the managers could have given more information and an opportunity to probe some of the answers. However, the online method used for the Delphi only offered the opportunity for short statements although it provided anonymity.

From a mixed-methods research perspective, this study provided the opportunity to collect qualitative data that could be analysed quantitatively and qualitatively. In the first phase, a combination of qualitative analysis (combining themes) and quantitative analysis (through ranking by voting) were used to drive consensus, which met the aim of the Delphi method. In the second qualitative phase reported in this paper, the responses from the remaining questions were analysed. While the data was collected simultaneously for both phases, the analysis was carried out sequentially.

Richer data could have been captured for the last three questions if a different online format had been used for collecting the data that allowed respondents more space. However, this may have resulted in attrition of respondents, which is a problem often faced with the Delphi method that affects the rigour of the findings. From this perspective, collecting short statements that do not take much time is more efficient when online Delphi is used. On balance, the online method used to collect both forms of data satisfied the needs of this study.

Conclusions

The case study shows that the Delphi method can be used to collect data that can be analysed both qualitatively and quantitatively to triangulate or extend/explain the findings, which is also one of the aims of mixed-methods research. The purpose of this paper was to show that an online Delphi can be used as a mixed-methods approach to collect and analyse data both quantitatively and qualitatively. If the research team had analysed the last three questions while the Delphi rounds were being carried out it could have served as a triangulation, but the study was not set up to do so. However, it has served the purpose of extending the findings. Therefore, the authors feel that for certain types of studies an online Delphi can be designed and executed as a mixed-methods research with the advantage of collecting and analysing the data at the same time.

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