



## A Literature Review of Group Decision-Making: The Case Study of Delphi Method

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### Abstract

The emergence of complex issues about which not enough information exists has led to the development of consensus methods. Delphi method can be mentioned among these. This study aimed to review related studies and general familiarity with the characteristics, goals, implementation process, strengths, and limitations of this method. In this review, Web of Science, Scopus, PubMed, ERIC, ProQuest, and CIVILICA databases, as well as Google Scholar, were searched using English and Persian keywords with no time restrictions (up to June 2023) to find related articles.

A review of studies shows that the Delphi method is used to collect and combine the opinions of experts to reach a general conclusion about a specific issue, especially when the experts are geographically distant. It is especially helpful for reaching a consensus on issues that are ambiguous, uncertain, and with little empirical evidence. The advantages of Delphi include using different communication approaches, the identification and basic understanding of the subject, and the lack of influence of the opinions and personality of certain people in the opinions of the group.

However, there are limitations such as the slow and time-consuming process, the bias of the source of information, the loss of experts, the possibility of receiving a low response rate, the fatigue of people from the steps and the topic, the absence of specific criteria in the definition of experts, the level of consensus, and the size the expert group participating in the study. By understanding the steps involved and their pros and cons, researchers can effectively leverage the Delphi method to make well-informed decisions and gain valuable insights into the future.

**Key Words:** Advantages, Delphi Method, Group Decision-Making, Limitation.

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## 1- INTRODUCTION

Collective decision-making involves a group of people making a single decision on a specific issue to improve their situation by realizing their goal. It is one of the important methods of achieving an optimal decision (1). In collective decision-making, two or more people, each with their own perceptions, attitudes, motivations, and personalities, recognize the existence of a common problem and try to reach a decision collectively. In this process, they aim for a common solution for a decision-making problem with several options according to their opinions or preferences (2-4).

The emergence of complex and new issues with insufficient information has resulted in the development of consensus methods. Some important consensus methods include interactive groups, the nominal group technique, the Delphi method, consensus development panels, and consultation (2, 3, 5-7). This study aimed to review related studies and general familiarity with the characteristics, goals, implementation process, strengths, and limitations of the Delphi method.

## 2- MATERIALS AND METHODS

In this review, PubMed, Web of Science, Scopus, ProQuest, ERIC, and CIVILICA databases, as well as Google Scholar search engine, were searched using English and Persian keywords with no time restrictions (up to June 10, 2023) to find related articles about Delphi method and its process, goals, advantages, and limitations. The full texts of related studies were reviewed, and their main results were extracted. Then, similar results were categorized and presented descriptively. The search was done independently and in duplication by two reviewers, and any disagreement between the reviews was resolved by the supervisor.

## 3-RESULTS

### 3-1. Delphi method

The name Delphi derives from the Oracle of Delphi in ancient Greece (8). The Delphi method was first proposed in the 1950s by the Rand Corporation (9), and is used to collect and combine the opinions of qualified experts on a specific issue, especially if these experts are geographically far from each other. The names of these experts, known as Panel members, can remain secret, but the sum of the opinions that they have agreed upon will be published (10).

Delphi has been described as a technique, approach, survey, study, poll, consensus study, and method. This diversity of words has led to several definitions, including the Delphi method or technique defined as a structured communication technique and was originally developed as a systematic, interactive forecasting method that relies on a panel of 5 to 10 experts (2, 3, 11-15).

Delphi can also be used to help reach expert consensus and develop professional guidelines. It is used for such purposes in many health-related fields, including clinical medicine, public health, and research (16, 17). The Delphi method assumes that group judgments are more valid than individual judgments (8). While most surveys try to answer the question "what is", Delphi answers the question "what can/should be" (18).

### 3-2. Types of Delphi

There are three types of Delphi methods/survey:

- 1- Policy (where there is a need to devise a strategy to address a specific problem);
- 2- Classical (used to forecast future trends);
- 3- Decision-making (used to achieve better decision-making) (18, 19).

### **3-3. Characteristics of the Delphi method**

There are four features that distinguish the Delphi technique from other group decision strategies: anonymity, iterative feedback, group response, and consulting experts' opinions.

*Anonymity:* The benefit of anonymity is that it encourages group members to express their opinions freely. It prevents the collection of dishonest thoughts by removing the potential effects of peer pressure.

*Iterative feedback:* This is achieved by implementing controlled feedback rounds so members can get a bird's eye view of what the rest of the panel members are thinking. This gives them insight into how they might adapt their response.

*Group response:* This gives participants the opportunity to adapt and build upon the information in the feedback round. It is done multiple times until the experts reach a consensus.

*Using experts:* Rather than extracting participants from a random sample, inventors of the Delphi technique advocate for consulting experts in the field in which the prediction is being made (20-24).

### **3-4. Objectives and application**

The main purpose of Delphi was to predict the future (25); however, it is also used in many areas of decision-making and increasing its effectiveness, judgment, facilitating problem-solving, needs assessment, goal setting, planning, setting priorities, creativity, organizing group communication, group gathering of information, training of the respondent group, determination of policies, specialization of resources, and consensus or group agreement (18, 19).

### **3-5. Number of specialists**

There is no explicit rule about the selection and number of specialists, and their

number depends on factors such as the homogeneity or heterogeneity of the sample, Delphi goal, the scope of the problem, decision quality, the ability of the research team to manage the study, internal and external credibility, data collection time, available resources, and the acceptability of the answer. In various studies, the number of participants was usually less than 50 and mostly 15 to 20 people. A number of 10 to more than 2000 people have also been reported, but in homogeneous groups, usually 10-15 people are enough. In Delphi, heterogeneous samples are usually used to obtain a wide range of opinions, quality answers, and acceptable solutions. This increases the sample size, data collection problems, the complexity of reaching a consensus, performing analysis, and reviewing the results, although the number of judgments increases with a larger sample size, and their combination increases confidence. Some experts maintain that 30 people are enough to provide information, and a higher number only repeats the answers without adding new information. However, others believe that there is little empirical evidence about the effect of the number of participants on the trustworthiness of the consensus process (18, 19, 25-33).

### **3-6. Ethical considerations**

Delphi is similar to survey or questionnaire research in terms of ethical considerations. The anonymity of the participants should be preserved as much as possible and their answers should not be sent to others in a specific and identifiable way. However, it is not possible to determine how many people completed the questionnaire and were willing to discuss it with others and whether the panelists answered correctly or based on the researcher's opinion (18, 33, 34).

### **3-7. Advantages of the Delphi consensus method**

The Delphi method is a powerful technique that collects expert insights that has many advantages but also several drawbacks. Some of the benefits of applying the Delphi method are:

*Structured system of communication for clear results*

The systematic nature of the Delphi method and the controlled feedback that it generates mean that a conclusion will always be achieved, and the group reach a consensus that fits the research question with a high level of accuracy.

*Anonymity for unbiased responses*

Delphi participants offer anonymous responses in the process. Being able to answer without fear of repercussion or judgment from group opinion encourages honest responses.

*Flexibility in geographical location*

The Delphi method can be used globally to survey expert opinion. This allows access to a diverse group of experts with expertise in a wider range of fields, markets, and locations, removing geographical limitations imposed by some other research techniques.

*Removing the impact of dominant individuals*

As the Delphi method uses anonymous responses and lengthy discussions are avoided, each voice can be weighed equally in a Delphi study. In-person discussions used in other methods have the risk of bias in group consensus by the effect of dominant individuals on group dynamics during discussions. Controlled feedback and anonymity eliminate these obstacles.

*Time- and cost-effectiveness of obtaining expert group opinion*

Employing the Delphi method via online tools avoids the cost of hiring, transport, and setting a destination for implementing it. Time-consuming, lengthy discussions

are avoided due to the controlled feedback of the Delphi method, and the expert panel is not tied to a set time and date, increasing flexibility and broadening the range of experts one has access to.

The following are further advantages of this method:

Answers are tested repeatedly until a consensus is reached. This creates concrete information.

Delphi technique is very easy to learn and implement.

No one can easily change the opinion of the group.

**3-8. Disadvantages of the Delphi consensus method**

As with everything, the Delphi method has disadvantages, including:

*Limited open discussion*

The Delphi technique uses controlled feedback, meaning that ideas are not openly discussed by participants (questionnaire responders), who may not be able to elaborate in the same way as other research techniques. This is mitigated to a degree by the incorporation of a small steering group of experts within the study design. This restriction, however, means that the Delphi method may not be as helpful where opinions are highly polarized, and deeper investigation may be required.

*Requiring commitment in case of multiple rounds*

The Delphi method can sometimes require participants to be engaged in and respond to more than one round of questionnaires, which may include many similar questions to those already answered. This can cause a practical problem if participants become disengaged or stop responding, affecting the magnitude (and, potentially, the quality) of the results. Well-designed

Delphi studies consider and accommodate this challenge.

#### *Dependence of study interpretation on the responders' expertise*

The Delphi method is often used where there is no absolute answer to a question, and the opinion is the most valuable data asset available. This places strong importance on the qualification of the responder group to answer the survey questions at hand. Therefore, confidence in the level of experience and expertise of the responder group is essential. Otherwise, it will be challenging to reach clear conclusions or recommendations. Again, this is overcome by good study design and well-managed processes.

#### *A rather long and tedious process*

The Delphi method requires great care in selecting participants and preparing questionnaires. Also, questionnaires may limit the respondents from proceeding within the framework designed by the researcher.

Some researchers believe that the Delphi method does not give more accurate answers than other methods, and the agreement obtained is the result of the pressure on the participants who have unusual ideas. In this consensus, individual characteristics play an effective role.

In addition, some possibly influential opinions of people are ignored because the opinion of the majority is important.

The technique is based on opinions, and consensus does not mean the correct answer. Also, the procedure is easy and does not have a high internal validity, and it is difficult to ensure the reliability of the results.

The Delphi technique is slow because it relies on expert response (35-52).

### **3-9. Carrying out the Delphi method**

The Delphi method is a systematic process that involves gathering insights and opinions from a panel of experts to reach a group consensus on a specific topic. Implementing the Delphi method process is broadly defined in four steps.

#### *Step 1: Defining the objectives*

The first step is to define the objectives and scope of the Delphi study clearly. Determining the specific questions or topics that need expert input and identifying the key issues to be addressed are essential. This step lays the foundation for the entire process and ensures that the study remains focused and relevant.

#### *Step 2: Selection of experts*

Selecting the right panel of experts is crucial for the success of the Delphi technique. Experts should possess the knowledge, expertise, and experience related to the topic under investigation. The panel should be diverse enough to provide a comprehensive range of perspectives. The number of experts can vary depending on the scope and complexity of the study, but it is generally recommended to have at least 10-15 participants.

#### *Step 3: Elaboration and launching of questionnaires*

This step involves creating questionnaires to gather input from the experts. The questionnaires can be structured, semi-structured, or open-ended, depending on the objectives of the study. The first-round questionnaire is usually open-ended, allowing participants to express their opinions and insights freely without influence from others.

Round 1: In the initial round, the open-ended questionnaire is distributed to all experts. Each expert responds independently, providing their insights, predictions, or suggestions related to the defined objectives.

Round 2: After collecting the responses from Round 1, the facilitator summarizes and compiles the expert opinions without revealing individual identities. The summary is then used to create a more focused and structured questionnaire for the next round.

Subsequent rounds (optional): Depending on the level of consensus achieved in each round, additional rounds can be conducted to refine the opinions further. The process may continue until a predefined consensus level is reached or the facilitator decides to end the iterations.

#### *Step 4: Using the results*

Once the Delphi process is concluded and a Delphi consensus exercise is reached, the results can be analyzed and used for decision-making, forecasting, policy development, or any other purpose defined in the study's objectives. The anonymized nature of the Delphi studies helps ensure that the outcomes are unbiased and represent the collective wisdom of the experts.

### **3-10. Continuous communication and feedback**

Throughout the Delphi process, continuous communication with the experts is essential. Regular updates, reminders, and clarifications may be necessary to ensure high participation and engagement from the panel members. The facilitator plays a crucial role in managing the process, collating responses, and providing feedback to the participants (7, 18, 48, 53-57).

### **3-11. Comparison of the Delphi method with other research methods**

Research techniques play a vital role in gathering data, analyzing information, and drawing conclusions. When obtaining expert opinions and insights, the Delphi technique is often compared with other research techniques. Here, we explore how

the Delphi method compares to some common research approaches.

#### **Delphi method vs. expert panels**

The Delphi method engages a diverse panel of experts from various fields to reach a group consensus on a specific topic. The process often involves anonymity and iterative feedback.

Expert panels involve gathering a group of experts to provide individual opinions or advice on a particular subject without anonymity or iterative feedback.

Comparison: The Delphi method shares similarities with expert panels as both involve engaging experts for their insights. However, the Delphi method's anonymity and iterative approach reduce bias and encourage more candid responses.

#### **Delphi method vs. surveys**

The Delphi method utilizes iterative questionnaires to collect expert opinions, allowing participants to revise their responses based on group feedback.

Surveys involve distributing questionnaires or interviews to a larger sample, typically aiming for quantitative data collection.

Comparison: The Delphi method focuses on qualitative data collection and expert consensus, while surveys aim for broad data collection and statistical analysis. The Delphi method allows for the exploration of complex issues and expert insights, while surveys are more suitable for descriptive and statistical analysis.

#### **Delphi method vs. focus groups**

The Delphi method involves collecting opinions and feedback from a selected panel of experts anonymously through multiple rounds of questionnaires. Participants do not interact directly.

Focus groups involve conducting group discussions with participants to explore their opinions, attitudes, and perceptions.

Participants interact and discuss their views openly.

dominant personalities and minimizing groupthink. Focus groups, on the other hand, foster face-to-face interactions and spontaneous discussions, allowing for in-depth exploration of ideas (1, 58-62).

#### **4- CONCLUSION**

Collective decision-making is one of the important tools to achieve the right choices, bringing numerous benefits to individuals and organizations. Delphi is one of the collective decision-making methods used to collect and combine the opinions of experts to reach a general conclusion about a specific issue, especially when the experts are geographically distant. It is particularly helpful for reaching a consensus on ambiguous, uncertain issues with little empirical evidence. The process of the Delphi method is broadly defined in four steps: defining the objectives, selecting the experts, elaborating and launching questionnaires, and using the results. There are four features that distinguish the Delphi technique from other group decision-making strategies: anonymity, iterative feedback, group response, and consulting experts' opinions.

There is no explicit rule about the selection and number of specialists, and their number depends on factors such as the homogeneity or heterogeneity of the sample, the goal or the scope of the problem, decision quality, the ability of the research team to manage the study, internal and external credibility, data collection time, available resources, and the acceptability of the answer. In most studies, the number of participants is less than 50 and usually 15 to 20 people. Guaranteeing the success of the Delphi method in the correct selection of panel members requires the preparation and provision of useful questions at the first stage, paying attention to the opinions of

Comparison: The Delphi method provides anonymity, reducing the influence of the panel members, and summarizing their opinions in each round of review. The advantages of Delphi are the use of different communication approaches, identification and basic understanding of the subject, and the lack of influence of the opinions and personality of others on the opinions of the group. However, the method has limitations such as the slow and time-consuming process, the possibility of superficial consensus, the distortion of the information source, the loss of experts, the possibility of a low response rate, the fatigue of people from the steps and the topic, the absence of specific criteria in the definition of experts, the level of consensus, and the size of the expert group participating in the study. Therefore, implementing this method requires caution, consideration, and careful planning. By understanding the steps involved and their pros and cons, researchers can effectively leverage the Delphi method to make well-informed decisions and gain valuable insights into the future.

#### **5- AUTHORS' CONTRIBUTIONS**

Study conception or design: FB and KS; Data analyzing and draft manuscript preparation: BE, SS, RR, and KS; Critical revision of the paper: FB; Supervision of the research: FB and KS; Final approval of the version to be published: FB, BE, SS, RR, and KS.

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#### **7- REFERENCES**

1. Mirbagheri, S. M., Rafiei Atani, A. O., Parsanejad, M. A Systematic Literature Review of the Collective Decision-Making. *Modern Research in Decision Making*, 2021; 6(3): 239-258.
2. T. X. Bui and A. Co-oP. "A group decision support system for cooperative multiple criteria group decision making". *Lect. Notes*

- Comput. Sci. Berlin Heidelberg, Ger. Springer-Verlag, 1987.
3. B. Wu, X. Zhou, Q. Jin, F. Lin, and H. Leung. "Analyzing Social Roles Based on a Hierarchical Model and Data Mining for Collective Decision-Making Support". *IEEE Syst. J.* 2017;11(1):356–65. Mar. 2017, doi: 10.1109/JSYST.2014.2386611.
  4. A. T. de Almeida-Filho, D. F. de Lima Silva, and L. Ferreira. "Financial modelling with multiple criteria decision making: A systematic literature review". *J. Oper. Res. Soc.* 2020;1–19. doi: 10.1080/01605682.2020.1772021.
  5. H. Karami. "A Study of Problems and Problems of Group Decision Making". *Q. J. Manag. Account. Stud.* 2017;3(1):324–37.
  6. M. Iaryczower, X. Shi, and M. Shum. "Can Words Get in the Way? The Effect of Deliberation in Collective Decision Making". *J. Polit. Econ.* 2018;126(2): 688–734.
  7. Rahmani A, Vaziri Nezhad R, Ahmadi Nia H, Rezaeian M. Methodological Principles and Applications of the Delphi Method: A Narrative Review. *JRUMS* 2020; 19 (5):515-38.
  8. Ziglio E. "The Delphi Method and its Contribution to Decision Making". In Adler M, Ziglio E (eds.). *Gazing Into the Oracle: The Delphi Method and Its Application to Social Policy and Public Health*. Jessica Kingsley Publishers, 1996. p. 5. ISBN 978-1-85302-104-6.
  9. Linstone HA, Turoff M. *The Delphi survey: method techniques and applications*. Reading: Addison-Wesley; 1975.
  10. Brownson RC, Baker EA, Deshpande AD, Grillespie KN. *Evidence-based public health*. 3rd ed. New York, NY: Oxford University Press. 2018; 209-37.
  11. Dalkey N, Helmer O. "An Experimental Application of the Delphi Method to the use of experts". *Management Science.* 1963;9(3):458–67. doi:10.1287/mnsc.9.3.458. hdl:2027/inu.3000029301680.
  12. Brown BB. *Delphi Process: A Methodology Used for the Elicitation of Opinions of Experts (Report)*. Santa Monica CA: Rand Corp. September 1968, P.3925.
  13. Sackman H. *Delphi assessment: Expert opinion, forecasting, and group process (Report)*. Santa Monica CA: The Rand Corporation. 1974, R-1283-PR.
  14. Brown T. *An Experiment in Probabilistic Forecasting (Report)*. Santa Monica CA: The Rand Corporation. 1972, R-944-ARPA.
  15. Linstone HA, Turoff M, eds. *The Delphi Method: Techniques and Applications*. Reading, Mass.: Addison-Wesley, 1975. ISBN 978-0-201-04294-8. Archived from the original on 2008-05-20.
  16. Taylor E. "We Agree, Don't We? The Delphi Method for Health Environments Research". *HERD.* 2020;13 (1):11–23. doi:10.1177/1937586719887709.
  17. Moher D, Schulz KF, Simera I, Altman DG. "Guidance for developers of health research reporting guidelines". *PLOS Medicine.* 2010;7 (2): e1000217. doi:10.1371/journal.pmed.1000217. PMC 2821895. PMID 20169112.
  18. Ahmadi F, Nasiriani Kh, Abazari P. Delphi technique: a tool in research. *Iranian Journal of Medical Education*, 2009;8(1): 175-85.
  19. Skinner, Richard; Nelson, R. Ryan; Chin, Wynne W.; and Land, Lesley (2015) "The Delphi Method Research Strategy in Studies of Information Systems," *Communications of the Association for Information Systems: Vol. 37* , Article 2. DOI: 10.17705/1CAIS.03702.
  20. Nasa P, Jain R, Juneja D. Delphi methodology in healthcare research: How to decide its appropriateness. *World J Methodol.* 2021 Jul 20;11(4):116-129. doi: 10.5662/wjm.v11.i4.116.
  21. Vogel C, Zwolinsky S, Griffiths C, Hobbs M, Henderson E, Wilkins E. A Delphi study to build consensus on the definition and use of big data in obesity research. *Int J Obes (Lond)* 2019;43:2573–86.
  22. Diamond IR, Grant RC, Feldman BM, Pencharz PB, Ling SC, Moore AM, Wales PW. Defining consensus: a systematic review recommends methodologic criteria for reporting of Delphi studies. *J Clin Epidemiol.* 2014;67:401–9.



23. Jünger S, Payne SA, Brine J, Radbruch L, Brearley SG. Guidance on Conducting and REporting DELphi Studies (CREDES) in palliative care: Recommendations based on a methodological systematic review. *Palliat Med.* 2017;31: 684–706.
24. Santaguida P, Dolovich L, Oliver D, Lamarche L, Gilsing A, Griffith LE, Richardson J, Mangin D, Kastner M, Raina P. Protocol for a Delphi consensus exercise to identify a core set of criteria for selecting health related outcome measures (HROM) to be used in primary health care. *BMC Fam Pract.* 2018;19:152.
25. Sydjavadin R. Barnameriziye niroye ensani. 1st ed. Tehran: Pajoheshkadeh Olume Ensani va Motaleate Farhangi. 1994.
26. Landeta J. Current validity of the Delphi method in social sciences. *Technological Forecasting and Social Change* 2006; 73(5); 467-82.
27. Chu H, Hwang GJ. A Delphi-based approach to developing expert systems with the cooperation of multiple experts. *Expert Systems with Applications* 2008; 34(4): 2826-40.
28. Manca DP, Varnhagen S, Brett-McLean P, Allan GM, Szafran O, Ausford A. Rewards and challenges of family practice: web-based survey using the Delphi method. *Can Fam Physician* 2007 Feb; 53(2): 278-86.
29. Windle PE. Delphi technique: assessing component needs. *J Perianesth Nurs* 2004 Feb; 19(1): 46-7.
30. Tavakol M, Torabi S. Payehaye tahghig dar parastari. Nizoyadomi R (Author). 1st ed. Tehran: Boshra; 1993.
31. Ali, A. K. (2005). Using the Delphi Technique to Search for Empirical Measures of Local Planning Agency Power. The Qualitative Report, 2005;10(4):718-44. <https://doi.org/10.46743/2160-3715/2005.1829>.
32. Landeta J. Current validity of the Delphi method in social sciences. *Technological Forecasting and Social Change* 2006; 73(5); 467-82.
33. Powell C. The Delphi technique: myths and realities. *J Adv Nurs* 2003 Feb; 41(4): 376- 82.
34. Windle PE. Delphi technique: assessing component needs. *J Perianesth Nurs* 2004 Feb; 19(1): 46-7
35. Lindeman CA. Delphi survey of priorities in clinical nursing research. *Nursing research* 1975;24(6):434 - 41.
36. Pill J. The Delphi method: substance, context, a critique and an annotated bibliography. *Socio - economic planning sciences* 1971 Feb 1;5(1):57 -71.
37. Cornick P. Nitric oxide education survey– Use of a Delphi survey to produce guidelines for training neonatal nurses to work with inhaled nitric oxide. *Journal of Neonatal Nursing* 2006 Apr 1;12(2):62 – 8.
38. Jairath N, Weinstein J. The Delphi methodology (Part one): A useful administrative approach. *Canadian journal of nursing administration* 1994;7(3):29 -42.
39. Landeta J. Current validity of the Delphi method in social sciences. *Technological forecasting and social change* 2006 Jun 1;73(5):467 -82.
40. Ahmadi F, Nasiriani K, Abazari P. Delphi technique: a tool for research. *Iranian Journal of Medical Education* 2008;8(1):175 -85.
41. Danica Fink-Hafner, Tamara Dagen, May Dousak, Meta Novak, Mitja Hafner-Fink. Delphi Method: Strengths and Weaknesses. *Metodoloski zvezki*, 2019;16(2):1–19.
42. Donohoe H, Stellefson M, Tennant B. Advantages and limitations of the e-Delphi technique: implications for health education researchers. *Am J Health Educ.* 2012;43(1):38-46.
43. Grove, S.K., Burns, N. and Gray, J. *The Practice of Nursing Research. Appraisal, Synthesis and Generation of Evidence*, 2012. Elsevier, Saunders.
44. Beech B. Studying the future: a Delphi survey of how multi -disciplinary clinical staff view the likely development of two community mental health centres over the course of the next two years. *Journal of advanced nursing* 1997 Feb;25(2):331 -8.

45. Ali AK. Using the Delphi technique to search for empirical measures of local planning agency power. *The Qualitative Report* 2005 Dec 1;10(4):718 -44.
46. Van Teijlingen E, Pitchforth E, Bishop C, Russell E. Delphi method and nominal group techniques in family planning and reproductive health research. *Journal of Family Planning and Reproductive Health Care* 2006;32(4):249 -52.
47. Jorm AF. Using the Delphi expert consensus method in mental health research. *Australian & New Zealand Journal of Psychiatry* 2015 Oct;49(10):887 -97.
48. Pashaeizad H. An overview of the Delphi method. *Journal of Peyk Noor (Humanities)*, 2009; 6(2):63-79.
49. Avella, J. R. Delphi panels: Research design, procedures, advantages, and challenges. *International Journal of Doctoral Studies*, 2016;11(1): 305-21.
50. Brady, S. R. Utilizing and adapting the Delphi method for use in qualitative research. *International Journal of Qualitative Methods*, 2015;14(5): 1–6.
51. Donohoe, H., Stellefson, M., Tennant, B. Advantages and limitations of the e-Delphi technique: Implications for health education researchers. *American Journal of Health Education*, 2012;43(1): 38–46.
52. Fletcher, A. J. and Marchildon, G. P. Using the Delphi method for qualitative, participatory action research in health leadership. *International Journal of Qualitative Methods*, 2014'13(1): 1–18.
53. Megan M. Grime, George Wright. *Delphi Method*. Wiley StatsRef: Statistics Reference Online, 2016 (pp.1-6). doi:10.1002/9781118445112.stat07879.
54. de Villiers MR, de Villiers PJ, Kent AP. The Delphi technique in health sciences education research. *Med Teach*. 2005 Nov;27(7):639-43. doi: 10.1080/13611260500069947.
55. Tonni, I. and Oliver, R. 2013. A Delphi approach to define learning outcomes and assessment. *European Journal of Dental Education*, 2013;17(1): e173-e180.
56. Chitu Okoli, Suzanne D. Pawlowsk. The Delphi method as a research tool: An example, design considerations and applications. *Information & Management*, 2004; 42:15–29.
57. Pretorius J. The Delphi technique: A credible research methodology. In 6th Annual International Conference on Industrial Engineering and Operations Management 2016 Mar 8.
58. Joyner, H., & Smith, D. Using Delphi surveying techniques to gather input from non-academics for development of a modern dairy manufacturing curriculum. *Journal of Food Science Education*, 2015;14: 88- 117. doi:10.1111/1541-4329.12062.
59. Duffield C. The Delphi technique: a comparison of results obtained using two expert panels. *Int J Nurs Stud*. 1993 Jun;30(3):227-37. doi: 10.1016/0020-7489(93)90033-q. PMID: 8335432.
60. David L. Morgan, Margaret T. Spanish. Focus Groups: A New Tool for Qualitative Research. *Qualitative Sociology*, 1984;7(3):253-70. DOI:10.1007/BF00987314
61. Dalkey, N. An experimental study of group opinion The Delphi method. *Futures*, 1969;1: 408-26. doi10.1016/S0016-3287(69)80025-X.
62. Grisham, T. "The Delphi technique: a method for testing complex and multifaceted topics", *International Journal of Managing Projects in Business*, 2009; 2(1):112-30. <https://doi.org/10.1108/17538370910930545>.