

The Delphi Technique: A Possible Tool for Predicting Future Events in Nursing Education

Lillian Bramwell and Elaine Hykawy

The 27-year interval since World War II has witnessed far-reaching change in social, economic, and political institutions. The literature indicates no deceleration of this process (Doyle & Goodwill, 1971; Enzer, 1971). In fact, Toffler (1971) suggests that we are now experiencing "...the dizzying disorientation brought about by the premature arrival of the future..." (p. 11). The transition from a fatalistic acceptance of the inevitability of future events to a more positive consideration of "futures" planning is quite recent. "Once we think of futures as events which are at least partly subject to choice and control, we can work toward improving long-range planning" (Helmer, 1970, p. 1).

Several techniques have been developed to assist in predicting future events. Among these is the Delphi Technique (Helmer, 1966), which is a procedure for organizing and sharing expert forecasts about the future. It has been used in a variety of educational settings (Anderson, 1970; Clarke & Coutts, 1970; Cyphert & Gant, 1970; Doyle & Goodwill, 1971; Jacobsen, 1970). No studies using this technique were found in nursing literature, although individuals have made predictions about future events in nursing education (Burnside & Lenburg, 1970; Mussallem, 1970) and others have recommended that such studies be done (Applund, 1966; Seyffer, 1965).

A survey of the literature showed that the advantages of using the Delphi Technique in forecasting were as follows. It can involve a number of individuals from a wide geographical area while avoiding the disadvantages of the committee method (Campbell & Hitchin, 1968; Clarke & Coutts, 1970; Doyle & Goodwill, 1971). The influence of status and forceful personalities among panel members is eliminated (Cyphert & Gant, 1970; Doyle & Goodwill) and the problem of commitment to a publicly stated opinion is avoided (Cyphert & Gant; Doyle & Goodwill).

Originally published in *Nursing Papers*, 1974, Vol. 6, No. 1, 23-32.

Criticisms encountered included the following. Criteria for the identification and selection of experts have not been established (Anderson, 1970; Campbell & Hitchin, 1968; Cyphert & Gant, 1970; Helmer, 1966; Helmer & Rescher, 1959). Scholars in the same discipline tend to think along the same lines which may cause them to arrive at a consensus of opinion without considering all relevant factors (Boehm, 1970). The process of adapting panellist responses from Questionnaire I for use in subsequent questionnaire rounds may result in inaccurate translations of panellist predictions (Boehm; Helmer, 1966). And finally, not enough is known about the thought processes that are involved when the future is considered (Helmer, 1966; Weaver, 1971).

Despite these limitations, it has been recommended that studies employing the Delphi Technique be continued in order to further refine the technique and to explore its applications.

Purpose of the Study

The purpose of this study was to explore the potential of the Delphi Technique in predicting events of the next 50 years in nursing education. In employing the technique, data were collected about the events that will occur, when they will occur, and the degree of consensus reached by the group on events and time.

Definition of Terms

The Delphi Technique is "...a carefully designed program of sequential, individual interrogations (usually conducted through questionnaires...), interspersed with information feedback on the opinions expressed by the other participants in previous rounds" (Helmer, 1970, p. 4).

Experts in this study included persons who are presently involved in nursing education as planners, researchers, or teachers at universities, colleges, hospitals, professional or government agencies.

Consensus means that at least 75% of the panellists (or 10 of 13) agree that a specified prediction will occur within a certain time interval.

Dissenting opinions are predictions which do not fall within the time interval in which the largest number of panellists agree that the event will occur.

Limitations

The limitations of this study arose from two sources — the Delphi Technique and the sample. The limitations arising from the technique itself were: the inability of individuals to project into the future; the need to think of all other future developments that would affect nursing education in the future, e.g. technology, health problems, primary and secondary educational systems; the possibility of vague or ambiguous questions; and the possibility of responses being self-fulfilling and/or self-defeating prophecies. Limitations arising from the sample were the small number of panellists and the restriction of panellist selection to Ontario.

Assumptions

The following assumptions were held: respondents are competent in the field of nursing education; responses are individual, no advice is sought from other respondents; and responses are based on rational judgement.

Method

Sample Selection

Experts were selected on the basis of educational level, rank in educational institution and/or position in agency or organization. All experts who were selected as panellists had at least a master's degree. The selected panel consisted of 16 members as follows: seven assistant professors or higher in university nursing programs, three directors from diploma nursing programs, two directors from nursing service administration in hospitals, three executive officers from professional nursing organizations, and one nursing consultant from a government agency. There was one refusal to participate from a diploma nursing program director and two non-responses from university professors. The remaining 13 panellists completed the study.

The Delphi Technique

Four rounds, each involving a questionnaire and questionnaire analysis, were conducted in the following manner.

Round I. Panellists were requested to make a maximum of 10 predictions regarding the future of nursing education in the next 50 years. A grouping and collation of responses was done to reduce the number of predictions to a manageable size.

Round II. The predictions were presented and the panellists were asked to predict in which time interval they would occur. The time intervals had been defined by the investigators as 1972–1980, 1980–1990, 1990–2000, 2000–2020, later, and never. Results were tabulated and reported for each statement in terms of number and predictions in each time interval.

Round III. Panellists received feedback of their Round II predictions plus the corresponding response from the total group for each statement. If a panellist's prediction differed from the group response, she was requested to revise her prediction or to support her position. The results were again tabulated and reported for each statement. Statements achieving consensus were announced. Reasons for dissenting opinions were incorporated into the next questionnaire.

Round IV. Panellists were asked to reconsider their predictions in view of the dissenting opinions and to revise them if they so desired. The additional predictions that achieved consensus were identified. A description of events that would occur in the future, as predicted by the consensus of the panel of experts, was composed and sent to the panellists.

Reactions to the Delphi Technique were also obtained from the panellists. These were categorized and compared with reactions to the Delphi Technique reported in the literature.

Results

The data are presented in two sections for each round: part (a) describes panellists' reactions to each questionnaire and part (b) describes the results of each questionnaire regarding events, timing, and consensus.

Round I

- (a) Of 16 panellists selected two did not respond; one refused to participate, saying that it would be too time-consuming; two accepted dubiously, one questioning the time factor and one questioning her own expertise. The remaining 11 accepted without comment, for a total of 13 panellists.
- (b) Of a total number of 120 statements submitted by panellists, 31 were rejected because they were not directly concerned with nursing education. The remaining 89 were grouped by the investigators with assistance in interpretation from an arbiter on statements that were unclear to the investigators. The state-

ments were then combined to form a total of 38 statements for Questionnaire II. This combining and grouping was possible due to repetition and similarity of predictions. Statements that were selected included words and phrases used by panellists so that the original intent could be transmitted and so that panellists would recognize their own contributions. The following 38 statements comprised Questionnaire II.

1. Teacher's role will be that of resource person and counsellor to aid the student towards maximum personal growth.
2. Students will progress through the curriculum as slowly or as rapidly as they are individually able.
3. Students will apprentice with skilled nursing practitioners, who are actively practising and who will serve as role models.
4. There will be a return of an internship for specialty services and nursing service will again become involved in the education of nurses.
5. Nursing education will not be as popular to high school graduates.
6. There will be an increased enrolment in basic baccalaureate programs.
7. An increase in the male student population will occur.
8. Nursing educators will be expected to maintain their clinical competence by a return to the practice of nursing.
9. All levels of nursing, diploma and higher, will be exposed to nursing research in their courses of study.
10. Students will learn to give care wherever there are health programs, in space, under water, in the north or in another country. (Electronic translators will permit conversation in any language.)
11. Students will learn to give care in a variety of communities and cultures with persons of all age groups.
12. Nurse educators will become more knowledgeable about social, medical, and economic problems in the developing countries and their effect on nursing care and will communicate this to their students.
13. All education programs will become future-oriented because even now, as they exist, they are obsolete.
14. There will be very few nursing administrative positions available in departments of nursing, freeing nurse educators to teach.

15. Clinical specialization at the doctoral level will develop rapidly.
16. Clinical specialization at the master's level will develop rapidly.
17. Increasing numbers of nurses will seek graduate education including post-doctoral education.
18. There will be a high percentage of interdisciplinary (core) programs offered to nursing students enrolled in both community college and university programs.
19. There will be a health sciences faculty, multidisciplinary in nature, which will develop the overall health worker concept.
20. Through co-operative effort, students in the health disciplines will develop community studies and projects.
21. Nursing assistant programs will be upgraded to eventually replace the present diploma nursing programs.
22. All nurses will be prepared in a two-year core program (diploma) at the community college level with ready access to university study — baccalaureate — master's — doctoral levels. (Ladder concept.)
23. Certification courses in all clinical specialties will be offered to graduates of core programs (diploma) and degree programs, through both the community college and university faculties of nursing.
24. All nurses will be required to return to school for refresher courses every three to five years in order to ensure that their knowledge is current.
25. Nurse educators in Canada will try to develop programs for graduate students from underdeveloped countries.
26. University schools of nursing will have to give more attention to developing clinical competence in their graduates, e.g. internship.
27. Nursing curricula will consist of a series of problem areas, gradated according to depth of clinical judgement required for assessment and nursing intervention.
28. Schools of nursing as they exist will pass away and with them will pass the rigidly imposed structure for nursing education.
29. There will be no classrooms, no classes, no group clinical experience. There will be an enormous resource centre at each centre for nursing education using, in common with other disciplines, computer banks of information, instructional programs, and simulated people.

30. Diploma nursing programs as such will cease to exist and will be replaced by highly skilled technologists in varieties of sub-specialties emerging out of specialized institutions.
31. Psychomotor skills will cease to be emphasized in nursing programs to be replaced by theory in the principles of care particularly related to mental health aspects.
32. Students will gather information and test their knowledge in their homes, using individual computer consoles for information retrieval and computer assisted instruction.
33. With computer assistance in manipulating patient data for purposes of diagnosing and prescribing treatment, educational programs will focus on prevention, psychological support, and adaptation to environment.
34. Audio-visual devices (video-phone, video-tape, closed circuit TV) will be used to demonstrate and to evaluate nursing care performance.
35. Simulated people with responses programmed by computer will provide laboratory experience for beginning physical and social skills to permit the student to see the effects of nursing intervention.
36. Basic university programs for the preparation of the high school graduate in nursing education will be considered uneconomical and will be phased out.
37. Basic preparation of the registered nurse will no longer include hospital maternity nursing. This will become a continuing education specialty.
38. Standards in nursing education will be set by persons who are not nurses.

Round II

- (a) Thirteen panellists indicated in which time interval predicted events would occur. Six panellists qualified their responses and six panellists edited some of the statements.
- (b) Consensus was reached on one statement — number 6.

Round III

- (a) Panellists reconsidered their predictions in view of what other panellists had predicted and gave reasons for opinions which differed from the majority. One panellist commented on the ambiguity of the statements, and of 13 respondents, 12 stated reasons for dissenting opinions.

Table 1 *Consensus Reached by Panellists on Future Events in Nursing Education, by Round and Time Interval*

Round in which consensus reached	Future events in nursing education	Time of Occurrence					
		1972–1980	1980–1990	1990–2000	2000–2020	Later	Never
II	There will be an increased enrolment in basic baccalaureate programs.	X					
III	Nursing educators will be expected to maintain their clinical competence by a return to the practice of nursing.	X					
III	All levels of nursing, diploma and higher, will be exposed to nursing research in their courses of study.	X					
III	There will be very few nursing administrative positions available in departments of nursing, freeing nurse educators to teach.		X				
III	There will be a high percentage of interdisciplinary (core) programs offered to nursing students enrolled in both community college and university programs.		X				
III	There will be a health sciences faculty, multidisciplinary in nature, which will develop the overall health worker concept.		X				
III	Through co-operative effort, students in the health disciplines will develop community studies and projects.	X					
III	All nurses will be prepared in a two-year core program (diploma) at the community college level with ready access to university study – baccalaureate – master's – doctoral levels. (Ladder concept.)		X				

Round in which consensus reached	Future events in nursing education	Time of Occurrence					
		1972–1980	1980–1990	1990–2000	2000–2020	Later	Never
III	All nurses will be required to return to school for refresher courses every three to five years in order to ensure that their knowledge is current.		X				
III	University schools of nursing will have to give more attention to developing clinical competence in their graduates, e.g. internship.	X					
III	Nursing curricula will consist of a series of problem areas, gradated according to depth of clinical judgements required for assessment and nursing intervention.	X					
III	Schools of nursing as they exist will pass away and with them will pass the rigidly imposed structure for nursing education.		X				
III	Audio-visual devices (video-phone, video-tape, closed circuit TV) will be used to demonstrate and to evaluate nursing care performance.	X					
IV	Certification courses in all clinical specialties will be offered to graduates of core programs (diploma) and degree programs, through both the community college and university faculties of nursing.	X					
IV	Simulated people with responses programmed by computer will provide laboratory experience for beginning physical and social skills to permit the student to see the effects of nursing intervention.			X			

- (b) Consensus was reached on 12 additional statements (see Table 1).

Round IV

- (a) Reactions to the Delphi Technique were, for the most part, positive, e.g., "Stimulated thinking and discussion about nursing in the future," "forced one to think by self about difficult and complex nursing issues," and "encouraged futures planning." One panellist felt that the tool had some validity because consensus was reached on a number of events.

Negative responses included "frustrated by the lack of discussion with colleagues," "would have preferred direct interchange," and "insufficient time for reflection" (mentioned by several panellists). One panellist recommended that the study be conducted on a larger scale with a specific purpose for application of findings.

Panellists suggested that the Delphi Technique could be used in the following ways: to solve problems and make decisions in nursing service administration, to make manpower predictions, to stimulate discussion groups, to determine the ability of a group to reach consensus, and to determine future-oriented objectives.

- (b) Consensus was reached on two additional statements (see Table 1), for a total of 15 out of 38 statements, all occurring between the years 1972 and 2000.

Discussion and Conclusion

The present study explored the potential use of the Delphi Technique in predicting future events in nursing education. The technique, as described in the literature and as used in this study, has a number of limitations. Simon (1969, p. 274) has questioned the use of expert opinion, suggesting that expert opinion is better used as guidance rather than as final data. The procedure for selecting experts to function as panel members has not been adequately delineated. Helmer and Rescher (1959) gave two requirements for panel selection, knowledge in the field and degree of accuracy in predictions. The first criterion was followed in this study in that rank at the university and position in the agency were considered. It was not possible to measure for accuracy of past predictions due to lack of developed methods of measurement.

Not enough is presently known about thought processes that are involved when attempts are made to conceptualize the future (Weaver, 1971). How much are predictions based upon rational judgement, background knowledge, past experience, intuition, and/or wishful thinking? At the present time there is no reliable method for differentiating between objective and subjective predictions. In other words, it is difficult to separate the "will happen" from the "should happen" (Weaver). It may also be argued that personal bias could invalidate judgements and/or the rationality of decision-making, particularly when only those with dissenting opinions are asked to support their position. Finally, even though the predictions are made by experts, consensus is reached, and arguments are rationally supported, unforeseen events such as scientific breakthroughs may render the predictions inaccurate.

The predicted events about which consensus was achieved were similar to those suggested by Mussallem (1970) and Burnside and Lenburg (1970), with the exception of those relating to a systems approach and open enrolment. These were not predicted by panellists in this study.

In spite of limitations, the response from panellists was positive (no attrition, expression of interest, and suggestions for potential uses). This suggests that the Delphi Technique merits further study and use in other contexts. Weaver states that the Delphi Technique seems to have promising application as a tool for teaching persons "...to think about the future in a more complex way than they ordinarily would" (Weaver, 1971, p. 271). This suggestion was supported by the panellists in this study.

In summary, the investigators would recommend: replicating this study with a larger and more geographically representative sample, combining the Delphi Technique with other future-oriented methodologies, and using the technique for purposes other than prediction.

References

- Anderson, D.P. (1970, March). Clarifying and setting objectives on an intermediate school district's objectives utilizing the Delphi Technique. In *Exploring the potential of the Delphi Technique by analyzing its application*. Symposium conducted by AERA in Minneapolis, Minnesota, USA.
- Applund, B. (1966). The nurse's role tomorrow. *International Nursing Review*, 13(Nov./Dec.), 25-33.
- Boehm, G.A.W. (1970). Futurism: Not oracles, planners. They're working to shape tomorrow. *Think*, 36(July/Aug.), 16-20.

- Burnside, H., & Lenburg, C.E. (1970). Nursing in the decade ahead. *American Journal of Nursing*, 70(10), 2118-2119.
- Campbell, R.M., & Hitchin, D. (1968). The Delphi Technique: Implementation in the corporate environment. *Management Science*, 15(Nov./Dec.), 37-42.
- Clarke, S.C.T., & Coutts, H.T. (1970). *The future of teacher education*. Edmonton: Faculty of Education, University of Alberta.
- Cyphert, F.R., & Gant, W.L. (1970, March). The Delphi Technique: A tool for collecting opinions in teacher education. In *Exploring the potential of the Delphi Technique by analyzing its application*. Symposium conducted by AERA in Minneapolis, Minnesota, USA.
- Doyle, F.J., & Goodwill, D.Z. (1971). *An exploration of the future in educational technology*. Bell Canada.
- Enzer, S. (1971). Delphi and cross-impact techniques. *Futures*(March), 48-61.
- Helmer, O. (1966). *Social technology*. New York: Basic.
- Helmer, O. (1970, May). *Long-range forecasting: Role and methods*. Paper presented at the conference on Forecasting the Future, Harrogate, England.
- Helmer, O., & Rescher, N. (1959). On the epistemology of the inexact sciences. *Management Science*, 5(June), 25-52.
- Jacobsen, J.A. (1970). *Forecasting future development in education*. Mimeograph. Dept. of Educational Administration, Utah State University.
- Mussallem, H.K. (1970). 2020: Nursing fifty years hence. In M.Q. Innis (Ed.), *Nursing education in a changing society* (pp. 209-224). Toronto: University of Toronto Press.
- Seyffer, C. (1965). Tomorrow's nurse in a changing world. *International Nursing Review*, 12(July/Aug.), 66-72.
- Simon, J.L. (1969). *Basic research methods in social science*. New York: Random House.
- Toffler, A. (1971). *Future shock*. New York: Bantam.
- Weaver, T.W. (1971). The Delphi forecasting method. *Phi Delta Kappan*, 52(5), 267-271.