THE DELPHI TECHNIQUE AS A TOOL TO EVALUATE A CONCEPT CPD FRAMEWORK TO BE IMPLEMENTED BY MEDICAL TECHNOLOGISTS IN SOUTH AFRICA

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Abstract

A concept CPD framework, to be implemented by medical technology workers, was compiled and needed to be evaluated by professionals. The aim of this survey was therefore to use the Delphi technique as a research tool to evaluate the concept CPD framework by a widely distributed group of medical technology workers.

The Delphi technique is a research tool organizing group communication in gaining consensus among a panel of experts. A monitoring team co-ordinated and evaluated the Delphi process in response to the feedback received by a panel of experts. Panellists are selected for their contribution to the topic under investigation. They do not normally interact with one another during the Delphi rounds.

Fifteen panellists, distributed throughout South Africa, participated. The panellists were knowledgeable about medical technology and CPD. During the three Delphi rounds, statements were added, moderated, rephrased and rated. This resulted in a final CPD framework that consisted of 71 statements, completed within the three months scheduled time frame with a very high percentage co-operation of the panellists. The Delphi technique was an ideal tool for evaluating the concept CPD framework among a widely distributed group of medical technology workers.

Key words: CPD, Delphi technique, medical technologists

1. INTRODUCTION

The compulsory continuing professional development (CPD) programme for medical technologists and medical technicians was implemented in April 2002[1]. The researcher conducted a survey to determine the status of medical technology in South Africa[2] and utilized a mailed questionnaire to medical technologists and technicians throughout South Africa to gather information regarding the general perception of CPD as well as obstacles and possible solutions foreseen to being credited for participation in CPD activities[3]. Results from this questionnaire led to the compilation of a structured interview questionnaire. Structured interviews were conducted with 50 medical technologists and technicians covering urban and rural areas throughout South Africa[3]. Information obtained from these two questionnaires, plus information obtained from the literature led to the compilation of a concept CPD framework to be implemented by medical technologists and technicians to assist South African medical technology workers in participating in CPD activities.

This framework needed to be evaluated by experts in the field of medical technology as well as those knowledgeable about CPD. It was therefore important to select a widely representative group of medical technology workers to evaluate the concept framework. The Delphi technique was identified as a research tool that could be used.

The aim of this survey was therefore to use the Delphi technique as a research tool to evaluate the concept CPD framework by a widely distributed group of medical technology workers.

2. CONCEPTUALISATION OF THE DELPHI TECHNIQUE

The Delphi technique is a qualitative research method[4,5]. It includes the collection of primary data which can be analysed statistically in order to reach consensus or stability[5,6]. The principle use of the Delphi technique was, for several years, to make predictions and forecasts for the future[7]. The Delphi technique is valued for its ability to structure and organize group communication in gaining consensus among a panel of experts[8,9]. It is an appropriate method for decision-making in a political and emotional environment, or strong feelings of opposing preferences[10]. It has also been proved to be an effective way of identifying strategies for developing staff and team building[11]. By using this technique problems have been identified that otherwise would not have been identified[7]. This technique is extensively used in the social sciences and described particularly by the nursing profession[8,12].

The Delphi technique entails the communication of two different groups of individuals. The one group is the monitoring team that consists of one or more person(s) co-ordinating and evaluating the Delphi process[6,10]. The second group is the panel of experts who must have the necessary background knowledge to analyse the specific problem under investigation[13]. The selected panellists should be a sample of broadly representative practitioners with heterogeneity that assures the validity of the results[5,6]. The sample size of the panellists is not very important but the quality of the expert panel is critical[14].

Panel members should not interact with each other during the Delphi process[9,13, 15]. This is needed to safeguard objectivity in the process. Anonymity among the panel members facilitates the expression of true opinions and excludes the over-dominant "loudest voice" within a group[5,7,10]. The opportunity for individuals to comment anonymously enables less confident members to express their views and needs without fearing criticism[11]. It gives people who might at times feel isolated from a group the opportunity to have their opinions heard first hand and to know how others react to their opinions[11].

Not all Delphi techniques are conducted in the same way[8,16]. The panel members are invited as participants to the Delphi technique by means of an invitation letter[17]. In the letter the purpose and method of the study, ethical issues and benefits of being a participant are explained and information needed from the panellists is requested[17]. The Delphi survey is achieved through a series of sequential questionnaires or rounds with feedback to the panel members[8,14]. Traditionally round one is used to generate ideas through brainstorming and panel members are asked for their responses to or comment on an issue[8,9,13]. This round usually consists of open-ended questions to broaden the data collection[8,14]. The follow-up rounds take the form of structured questions incorporating feedback to each panel member[8]. During these rounds panellists are asked to rank, to edit, to modify and to add to the initial set of responses[13]. The purpose of iterate rounds is to rethink the original rating and to provide an opportunity for alternatives to the data with the key objective of reaching consensus on a statement[7,9].

The time schedule is determined by the periods between rounds[13]. When using e-mail to perform the Delphi technique, the turnaround time is much faster and the process is more cost effective[18].

The most common rating of the statements is usually a 5 point Likert scale[11,15,19]. Consensus to a statement is usually reached on prescribed statistical analyses[17,20]. Currently consensus to statements is reached when from 55% to 100% of the panellists agreed to a statement as predetermined in that specific survey[14,19,20]. In the Delphi context a majority symbolises consensus.

3. METHODOLOGY

In the present study the Delphi technique was used to evaluate a concept CPD framework to be implemented by medical technologists and technicians in South Africa.

4. APPLICATION OF THE DELPHI TECHNIQUE

It was decided that the draft CPD framework would be evaluated in three Delphi rounds. In order to gather more information two open-ended questions were included in the first round.

The monitoring team consisted of two members, the researcher and a moderator / supervisor, involved in the survey. When panellists suggested changes to the statements it was the responsibility of the monitoring team to rephrase and / or redesign those statements. The team members confirmed consensus to statements when 80% or more of the panellists agreed to the rating of a statement[21].

Thirty-four medical technologists and technicians registered with the Health Profession Council of South Africa (HPCSA) and one HPCSA employee were approached to participate in the panel of experts. They were requested to sign an agreement form and to indicate whether they would prefer to interact *via* postal correspondence or e-mail or both. Those invited to participate were assured of their anonymity and that their names would only be made known to the researchers involved in the survey.

The survey was conducted over three Delphi rounds. Three rounds are accepted as normal practice in concluding the Delphi process. In the first round the concept framework was drafted in seven categories with 72 statements and ended off by including two open ended questions. The concept framework included the involvement of listed role players and organisations in the CPD programme, proposed CPD activities and suggestions for measuring the outcomes of CPD. The role players included were: the HPCSA, employers, the Society of Medical Laboratory Technologists of South Africa (SMLTSA), the individual, higher education institutions, pharmaceutical companies and other health professionals.

In response to the first round some statements were combined, removed or rephrased, as suggested by the panellists *via* the monitoring team. Answers to the open-ended questions were rephrased into statements. Percentage agreement on a statement was calculated according to the results obtained and rated as consensus reached or not reached. Before distributing the second and third rounds, those statements were rephrased and rated as suggested by the panellists.

The framework packet distributed to the panel of experts contained the concept framework, a cover letter and a self-addressed postage paid return envelope. The framework packets were posted or sent by e-mail as requested by the panellists and they were requested to return their results within 12 days. Panellists were reminded telephonically four days prior to the deadline if no feedback had, as yet, been received.

The cover letter to the first round informed the panellists of the Delphi procedure and the time schedule. The cover letters to the second and third rounds gave feedback on statements that reached consensus and thanked the panellists for their co-operation in the Delphi process.

The panel members were requested to reply on a three point Likert scale, ranking the observations as essential, useful or unnecessary. When consensus was reached on a statement, the outcome of those results was made available during the follow-up round. Statements that did not reach consensus at the end of round three were calculated as follows: the ratings for essential and useful were combined and when the combination reached ≥80%, the statement reached consensus as essential-useful and when the combination was ≤79%, the statement was rated unnecessary. The calculation used for this study was based on that of Boendermaker, Conradi, Schuling, Meyboom-deJong, Zwierstra, and Metz[20], who combined the ratings “important” and “very important” because of the small difference between the two ratings.

5. RESULTS

Excellent participation was experienced by the two members of the monitoring team. The necessary rephrasing, compiling of new statements and rating was done within the scheduled time period.

Eighteen of those panellists who were invited signed and returned their agreement forms. Only fifteen panellists responded to the first round with a 100% response throughout the remaining rounds. Fourteen were medical technologists and one panellist was an employee of the HPCSA. Seven medical technologists were employed by the National Health Laboratory Service (NHLS), three by PathCare, one by AmPath, one by the South African National Blood Service (SANBS) and two by provincial laboratories. The panellists represented eight provinces, nine cities and / or towns throughout South Africa. The composition of the panellists was therefore geographically very diverse. Unfortunately neither a representative from the Eastern Cape nor a medical technician responded to the invitation. The fourteen medical technologists were therefore homogeneous in occupation, though employed by five of the main employers of medical technologists in South Africa. One panellist represented the HPCSA. One former member of the Professional Board for Medical Technology and one current member served on the Delphi panel of experts.

The results obtained on feedback from the panel members on the three Delphi rounds are summarised in Table 1. The major changes were made after the first round. After feedback from the second and third rounds minor changes to the statements were made as well as changes to those statements that did not reach consensus after the previous round(s). The statements rated by ≥80% of the panellists to reach consensus, were all classified as essential. In those statements that did not fall in this group, the ratings essential and useful were combined and reported as essential-useful when ≥80% of the panellists rated them as such[20]. Only one statement was rated unnecessary and eliminated from the framework.

In response to feedback after round one, statements were modified and / or rephrased as suggested by the panellists. In response to the two open-ended questions in category 7, four statements by which the impact of CPD on the individual, the workplace and the outputs from the laboratory could be measured were added. Another six statements were compiled with reference to the goals that could be reached by individuals and the workplace within the next five years by means of CPD. The total number of statements in the framework in the last two rounds was 73. In category 2 one statement was eliminated because it was

rated as unnecessary and in category 3 one statement was eliminated even though it was rated as essential-useful. The reason for eliminating this statement, which in theory was a wonderful concept, was that it was clear from past experience that it was very expensive to offer and therefore the panellists considered that it was not appropriate to the framework. The final framework therefore consisted of 71 statements.

The Delphi process was completed within the three month scheduled time frame. This gave the panel members only 12 days to reply to a specific round and the monitoring team 18 days to finalise the framework / statements for the next round.

6. DISCUSSION

After 50 years of evolution the Delphi technique is still considered an objective, inexpensive and non-threatening method to assess a group of peoples' needs[22]. It is particularly useful for seeking data and reaching consensus among diverse groups[7,11,14]. Participants are committed to respond because they are interested and involved with the question or issue that is addressed[8].

Negativity to the Delphi method has been raised as stated by Fry and Burr[9] that consensus levels in the Delphi studies are often vague and therefore heavily criticised for failure. When a statement has reached consensus it does not mean that the correct answer has been found[8]. Furthermore the researcher cannot be sure whether the participants completed the Delphi themselves[8]. The Delphi technique has been criticised as a method which forces replies in those instances where the participants were contacted by telephone[8]. According to Stuter[23] the Delphi technique is an unethical method of achieving consensus and oneness of mind does not occur. There is only the illusion of oneness of mind. This is a subjective view. The objective of the Delphi technique is to gain the view of a large group of people. In addition the technique is based on consultation and inputs. The fact that a majority of at least 55% support cannot be reason enough to say that there is not oneness of mind. In this study 80% was regarded as the basis for consensus. In spite of the above negative perceptions regarding the Delphi technique it is still widely used as a research tool.

The monitoring team managed to complete the Delphi process within the three months scheduled period. This was possible because the members were available during that period for rating and finalising the individual Delphi rounds before distributing the following round to the panel of experts. Completing the whole process within a short period was also attributed to the fact that panellists responded promptly.

The 15 panellists who completed the first round were very committed and gave 100% feedback during the rest of the rounds. This is not always achieved. Schell[21] reported that 28 members of the original 30 continued till the third round

and Duplantie, Gagnon, Fortin and Landry[24] reported that 50% responded till the last round in the two surveys where the Delphi technique was used. In those cases where it was necessary to contact the participants telephonically a good spirit prevailed which bonded the interaction between the panellists and the researcher. These telephonic conversations were made to remind the panellists to respond within the scheduled time frame and in no way were the panellists influenced in their decision-making regarding the rating of the statements.

An attempt was made to include participants from different regions to obtain wide representation, as suggested in the literature[17,19]. The regional diversity meant that the panellists would have experienced CPD differently and therefore would have diverse attitudes to the concept. It has been stated that the more heterogeneous the panel of experts, the wider the spectrum of opinions and therefore the less biased the inputs to the final product[6,8]. This was strengthened by the fact that panel members were employed by five of the main employers of medical technologists and technicians in South Africa and included an employee from the HPCSA. The fact that the Eastern Cape was not represented could have alerted to specific needs by the fact that it represents 11% of the target group though this would not have statistically influenced the consensus factor. No response from medical technicians was a disappointment, because of their specific role fulfilled in pathology laboratories in South Africa. Their inputs could have added value to the framework from their specific viewpoints.

It was possible to conduct the Delphi process over three rounds only, as sufficient information was already available before the onset of the process to compile the draft framework in statements. This information was obtained from the questionnaires[2,3] and the literature. According to the literature the first round is usually a brainstorming to gather information[8,9,13], which was not necessary in this instance.

In the first round 21 statements reached consensus with ≥80% of the participants agreeing that the statements were essential. In the second round panellists were informed of the statements that reached consensus after the first round. However, they were not informed of the results of the statements where no consensus was reached, to prevent them from being influenced by results from co-panellists.

At the end of round two an additional 12 of the statements reached consensus with ≥80% of the panellists who agreed that the statements were essential. Five statements were from those drafted in response to the open-ended questions. The same procedure was followed in that the panellists were informed of the statements that reached consensus, but they were not informed of the ratings of the remaining statements in order not to influence them in the last round of the remaining statements.

At the end of round three, another 11 statements reached consensus with ≥ 80% of the panellists who rated them as essential. Two of the statements were drafted from the open-ended questions. In the remaining statements ratings essential and useful were combined[20]. Twenty-eight of these statements reached consensus with ≥80% on the combined essential-useful grading. One statement in category 2 was ranked as unnecessary and therefore eliminated from the framework. Another statement in category 3 was rated as essential-useful, but was eliminated on the advice of the panellists. They believed that in the past the activity was too costly to offer.

Consensus on a draft CPD framework was reached by using the Delphi technique. It was an inexpensive method incorporating a widely distributed group of people with a common interest all over South Africa. Each participant could express his / her own opinion and was in no way threatened by those who did not agree on his / her opinion.

7. CONCLUSION

The Delphi technique was an ideal tool for evaluating this concept CPD framework. Inputs were obtained from a regionally widely distributed group, diversely employed panel of experts, knowledgeable about medical technology and CPD. By means of the Delphi technique a CPD framework for implementation by the profession of medical technology was finalised.

8. ACKNOWLEDGEMENT

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Table 1: Statements' status of the draft framework rated by the panellists

Response after rounds	Number of statements	Consensus reached	Consensus not reached	Statements rephrased	Statements eliminated	Statements added
***Category 1: The role of the HPCSA (The Professional Board for Medical Technology)**						
Round 1	5	1 essential	2	2	0	0
Round 2	5	2 essential	2	1	0	0
Round 3	5	3 essential 2 essential-useful	0	0	0	0
***Category 2: The role of the employer (NHLS, Private Pathologists, SANBS) / manager / supervisor**						
Round 1	18	3 essential	5	9	0	1
Round 2	18	5 essential	13	0	0	0
Round 3	17	10 essential 7 essential-useful 1 unnecessary	0	0	1	0
***Category 3: The role of SMLTSA**						
Round 1	14	6 essential	2	6	3	0
Round 2	14	6 essential	8	0	0	0
Round 3	13	8 essential 6 essential-useful	0	0	1	0
***Category 4: The role of the individual (Medical Technologist / Medical Technician)**						
Round 1	7	6 essential	1	0	0	0
Round 2	7	6 essential	1	0	0	0
Round 3	7	6 essential 1 essential-useful	0	0	0	0
***Category 5: Other organisations involved in CPD (Pharmaceutical companies, other health professionals, higher education institutions)**						
Round 1	4	1 essential	2	1	0	0
Round 2	4	1 essential	3	0	0	0
Round 3	4	3 essential 1 essential-useful	0	0	0	0
***Category 6: Proposed CPD activities**						
Round 1	12	3 essential	6	3	6	0
Round 2	12	7 essential	5	0	0	0
Round 3	12	7 essential 5 essential-useful	0	0	0	0
***Category 7: Measure outcomes of CPD / Measure impact of CPD / Goals CPD achieved over a five year period**						
Round 1	13	1 essential	0	2	0	10
Round 2	13	6 essential	7	0	0	0
Round 3	13	8 essential 5 essential-useful	0	0	0	0

*The framework covers seven categories relevant to CPD of medical technologists.
(The final CPD framework is available from the corresponding author.)