

Development of an Australian nursing critical thinking tool using a Delphi process

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Abstract

Aim: To develop a critical thinking assessment tool for Australian undergraduate nurses.

Background: Critical thinking is an important skill but difficult to assess in nursing practice. There are often many responses a nurse can make to a clinical problem or situation. Some responses are more correct than others and these decisions have an impact on a patient's care and safety. Differences in a response can relate to the depth of knowledge, experience and critical thinking ability of the individual nurse.

Design: This study used a Delphi process to develop five clinical case studies together with the most appropriate clinical responses to 25 clinical questions.

Method: The Delphi technique was undertaken using the Qualtrics survey tool between October 2016–January 2017. A panel of 13 nursing experts from various geographical locations in Australia participated in the study to review the case scenarios and answers to questions posed. Four rounds of participation were required to achieve a minimum of 80% agreement between participants. Participants were asked to rank answers for 25 multi-choice questions based on the correct nursing management of case scenarios provided and provide feedback as to the accuracy and relevance of the scenarios and answers.

Results: Four rounds of Delphi questions were required to reach consensus on the correct wording and answers for the scenarios. Five case studies have been developed with nursing responses to patient management in rank order from most correct to least correct.

Conclusion: Use of the tool should provide confidence that a nurse has met a certain level of critical thinking ability.

KEYWORDS

assessment, critical thinking, Delphi technique, instrument development, nurse

1 | INTRODUCTION

With the increasing number of complex patients admitted to health services, the importance of nurses picking up on deterioration by recognizing changes in health status is more crucial than ever (Beck, 2009; Castledine, 2010). To detect early signs of complication, nurses require advanced critical thinking skills. Critical thinking skills

are an essential part of a nurse's role. They must pick up what are often subtle changes in patients' conditions in a timely and efficient manner to improve patient outcomes (Carter, Creedy, & Sidebotham, 2015; Castledine, 2010; Clarke & Aiken, 2003; Kutney-Lee, Lake, & Aiken, 2009; Perez et al., 2015). The ability to understand patient assessments and recognize subtle changes indicating deterioration requires advanced critical thinking skills (Carter et al., 2015; Perez

et al., 2015). Acquisition of this skill is based on professional nursing knowledge, expertise and experience (Kutney-Lee et al., 2009). A priority for preparing undergraduate nurses for practice is the development of critical thinking skills (Carter et al., 2015). Indeed, there is an expectation from employers that students will graduate with the critical thinking skills required to enable safe nursing practice (Jacob, McKenna, & D'Amore, 2014). The national standards for practice in Australia state that a Registered Nurse will "Think critically and analyse nursing practice" (NMBA, 2016, p.1). It is important that employers can rely on educational providers to prepare graduating nurses with these skills. A tool that can be used nationally and relied on by employers to provide evidence of the level of critical thinking would be beneficial in recruiting staff and determining professional development needs of current staff.

1.1 | Background

National accreditation of courses leading to registration as a Registered Nurse in Australia requires that "Teaching and learning approaches encourage the application of critical thinking frameworks and problem-solving skills" (ANMAC, 2012). How critical thinking and problem-solving skills are taught and assessed is left to the discretion of the educational facility. To assess the critical thinking ability of student nurses, reliable and valid methods for assessment need to be developed. International tools currently used for assessment of critical thinking, such as the "California Critical Thinking Disposition Inventory" (CCTDI), "Californian Critical Thinking Skills Test" (CCTST) (Facione & Facione, 1996), "Content Analysis Method" (Newman, Webb, & Cochrane, 1995), "The Scale of Judgmental Ability in Nursing" (Seidl & Sauter, 1990) and the "Watson-Glaser Critical Thinking Appraisal" (WGCTA) (Watson & Glaser, 2002) have been criticized for a lack of reliability, inconsistency of results and limited focus on validity (Carter et al., 2015; Landis, Swain, Friehe, & Coufal, 2007). Difficulties in using the above tools include: a large time commitment, inconsistencies between evaluators, limited choice in evaluation method, difficulty assessing off-campus students and inconsistencies in comparisons between groups (Landis et al., 2007). Recommendations have been made for the refinement of existing tools or the development of new ones to overcome these issues (Landis et al., 2007). Critical thinking assessment tools are required to be specific to the nursing discipline and relevant to the specific context for them to be considered reliable and valid (Carter et al., 2015; Feng, Chen, Chen, & Pai, 2010; Newton & Moore, 2013; Perez et al., 2015; Robert & Petersen, 2013; Walsh & Seldomridge, 2006). Some context-specific information for the nursing discipline would include catering for differences in terminology, workforce structures, role expectations and nursing standards particular to a specific country (Jacob, Duffield, & Jacob, 2017). Currently, tools in use are generic and not specific to the nursing discipline (Perez et al., 2015). One way of ensuring that assessment tools are context-specific is to provide experts with an opportunity to determine the best nursing responses to specific clinical scenarios in a particular country using the Delphi technique.

Why is this research needed?

- Measuring critical thinking is important as it is directly linked to patient outcomes and assessment of patient deterioration.
- Assessment of changes in critical thinking ability across a program of study will enable validation of current teaching methods or identify need for improvement.
- What are the key findings?
- A standardized assessment tool which is context-specific and relevant to Australian nurses will provide a consistent method of measuring critical thinking skills for undergraduate Bachelor of Nursing programs.
- A Delphi study is an effective method of determining the correct answers to nursing case scenarios.

How should the findings be used to influence education?

- Assessment of critical thinking using a validated tool will enable employers of new graduates to have confidence that nurses have appropriate skills to ensure patient safety.
- Nursing education can be enhanced using a tool to determine the development of critical thinking.

This paper reports on the results of a Delphi process which was used for the study. The overarching aim of the study was to determine consensus on the relevance and accuracy of the case scenarios provided and the most correct/rank order of answers to multiple-choice questions supplied. The protocol for this study has been previously reported (Jacob et al., 2017).

1.2 | Delphi studies

A Delphi study is a widely accepted method of using a group process to gain a consensus on a specific issue (Bowling, 2014; Hsu & Sandford, 2007; Keeney, Hasson, & McKenna, 2011) and is based on the premise that the opinion of a group is more valid than individual opinions (Keeney et al., 2011). Delphi studies do not produce correct or incorrect answers, but a valid expert opinion that cannot be proved with any current evidence (Keeney et al., 2011). A Delphi study consists of several rounds of surveys with experts responding and considering their own responses in light of the results of the group as a whole on each iteration until consensus is reached (Keeney et al., 2011). Recognized experts in the field are chosen to be members of a Delphi panel (Townsend, Hofer, Hanick, & Brunetti, 2016), hence the participants are not random, but chosen as informed individuals who have specialist knowledge about the specific subject being investigated (Keeney et al., 2011). There is no consensus on the required number of panel members for a Delphi study (Hsu & Sandford, 2007) and using the minimum number of participants required to balance representativeness and the likelihood of participants completing all survey rounds is recommended (Hsu & Sandford, 2007).

Delphi studies have the identifiable features of the use of; experts in the field; written answers; a moderator; a feedback process and repetition through “rounds” (Townsend et al., 2016). The different “rounds” used in a Delphi study encourage participants to review and reassess their initial decisions from early rounds based on the feedback provided from other anonymous participants (Hsu & Sandford, 2007).

Consensus can be determined by a numerical value, such as a percentage where participants agree, a number on a scale, or by determining how respondents agree with each other. Consensus is typically assessed by measures of average and dispersion (Jones & Hunter, 1995). The number of rounds required is determined by how quickly the panel reaches a consensus. The percentage required for consensus is set prior to the research, with the consensus level determined by the importance of the topic. Life-threatening decisions require higher consensus levels than other areas (Keeney, Hasson, & McKenna, 2006). Research on consensus provides few clear guidelines on what consensus level is appropriate (Keeney et al., 2006) although the aim is often for 70% consensus (Keeney et al., 2011).

Strengths of the use of Delphi studies for research include; the ability to decrease problems with dominant personalities and group pressure that may be found when using focus groups; the ability to gather information easily from diverse geographical areas using electronic media; anonymity of responses to other participants enabling participants to fearlessly express their opinions; and the use of a controlled feedback process to enable reassessment of previous responses (Haji et al., 2015; Hsu & Sandford, 2007; Keeney et al., 2011; Townsend et al., 2016). Limitations of Delphi studies include the loss of live discussion and interaction and possible slow response times that may delay the rate of discussion.

2 | THE STUDY

2.1 | Aim

The overall purpose of the study was to develop a valid critical thinking assessment tool for Australian undergraduate nurses.

2.2 | Methodology

This study used a Delphi process to determine relevance and accuracy of five clinical case studies and to then develop consensus on the most appropriate clinical responses to 25 clinical questions. The study followed the protocol published by Jacob et al. (2017).

2.3 | Participants

Positive sampling was used to identify participants from three universities and five health services in two states in Australia. Participants were considered experts in the area if they had postgraduate qualifications in an acute nursing area, experience in nurse education (either clinically or at a higher education institution) and had more than 5 years clinical nursing experience. The initial request to participate in

the study was emailed to 16 recognized experts along with an explanatory statement regarding the study and a link to the survey.

2.4 | Instrument

In accordance with the Delphi technique (Hsu & Sandford, 2007), the authors developed an initial list of case scenarios and questions with suggested answers for the panellists to consider. The case scenarios were developed using an expert working group of two practising clinicians and one academic and were based on government data reflecting the most common types of presentations to acute health services in Australia. They included scenarios on cardiovascular disease, mental health issues and respiratory disease. The case studies were based around potential clinical situations faced by an undergraduate nurse and included specialized information such as diagnosis, vital signs, family support and background to the current situation to enable the students to correctly answer the questions. The scenarios were then peer reviewed to ensure they were realistic and contained sufficient data to enable completion of the questions by two different practising nurse clinicians and two academics currently teaching undergraduate nursing degree programs.

The multiple-choice questions and responses for the case scenarios were developed to determine critical thinking ability, which requires reasoning and analysis. Four multiple-choice responses were provided for each question, with one question the correct answer with the correct reasoning, one question having a correct answer but incorrect reasoning, one question having an incorrect answer but correct reasoning and the final answer being incorrect with incorrect reasoning. A sample question is included as Figure 1. Prior to the study, 80% consensus was set. The panel was asked to rank order the suggested answers from most correct to least correct answer. Panellists were able to provide comments to enable them to explain their response. Participants were asked to respond to each round within 2 weeks of being provided with the scenarios.

2.5 | Ethical considerations

Ethical approval for the study was obtained from Edith Cowan University. Anonymity was maintained and none of the participants were provided with details of the other participants in the study.

3 | RESULTS

Thirteen nurses agreed to participate in the Delphi study. Six of the participants were lecturers involved in undergraduate nurse education and the remaining seven were experienced registered nurse clinicians who also had teaching responsibilities in clinical practice. The participants were recruited from two states (Victoria and Western Australia), with clinicians from four different health services in both metropolitan and rural areas and from two different universities. Four rounds of Delphi were conducted over 3 months as outlined in Figure 2.

Mrs Cross is an 89 year old lady from a nursing home who has been admitted after numerous episodes of coffee-ground vomiting. She has an extensive past medical history including Alzheimer's disease. She is very thin and has not been eating well lately. As she is unable to ambulate she has developed numerous pressure areas. Her observations are; temperature 36.3 Celsius, heart rate 68 bpm, oxygen saturation 94% on room air, respiratory rate 18 bpm, blood pressure 157/92 mmHg.

What would be your priority of care for Mrs Cross?

- Aim to keep her comfortable as she is from nursing home and likely to die.
- Her oxygen saturations are low so she needs oxygen administered.
- Ensure that her medications are charted, as she will have a significant number to take.
- Commence IV fluids and medications as ordered.

FIGURE 1 Sample case scenario questions and answer

3.1 | Round one

The initial survey request was completed by 13 participants. Participants ranked the order of suggested answers from most correct to least correct and provided suggestions for the wording of questions they felt were incorrect, ambiguous or confusing. Following receipt of the participants' responses, the answers and comments provided were collated to determine agreement amongst participants. In the first round of surveys, variation was found in results with six questions reaching 100% agreement for the correct answers, one question had 88% agreement, six questions had 77% agreement and 12 questions had less than 70% agreement. As per the protocol, participants were sent a report after each round outlining their individual response and the mean group response for each question.

3.2 | Round two

The mean results for the answers were collated and returned to participants, along with copies of their individual answers and the group mean scores. Participants were asked to complete the survey again, considering their previous responses and the group's responses and provide comments if they wished. All 13 panellists completed round 2. Agreement for the correct answers again varied with seven questions obtaining 100% agreement, two questions had 88% agreement, eight questions had 77% agreement and eight questions achieved less than 70% agreement. Suggested changes from respondents to answers where agreement had not reached a consensus of 80% were incorporated into third round case scenarios.

3.3 | Round three

Results from the surveys were again collated to determine agreement amongst participants. Comments from participants for individual questions were reviewed and where there was less than 80% agreement, scenarios and answers were modified as suggested by participants. Nine participants (94%) completed round 3. This round resulted in much closer agreement between participants, with ten questions having 100% agreement, 13 questions obtaining 80% agreement and two questions having less than 70% agreement.

3.4 | Round four

The scenarios and answers were again returned to participants. Round 4 was completed by seven participants. The third and final

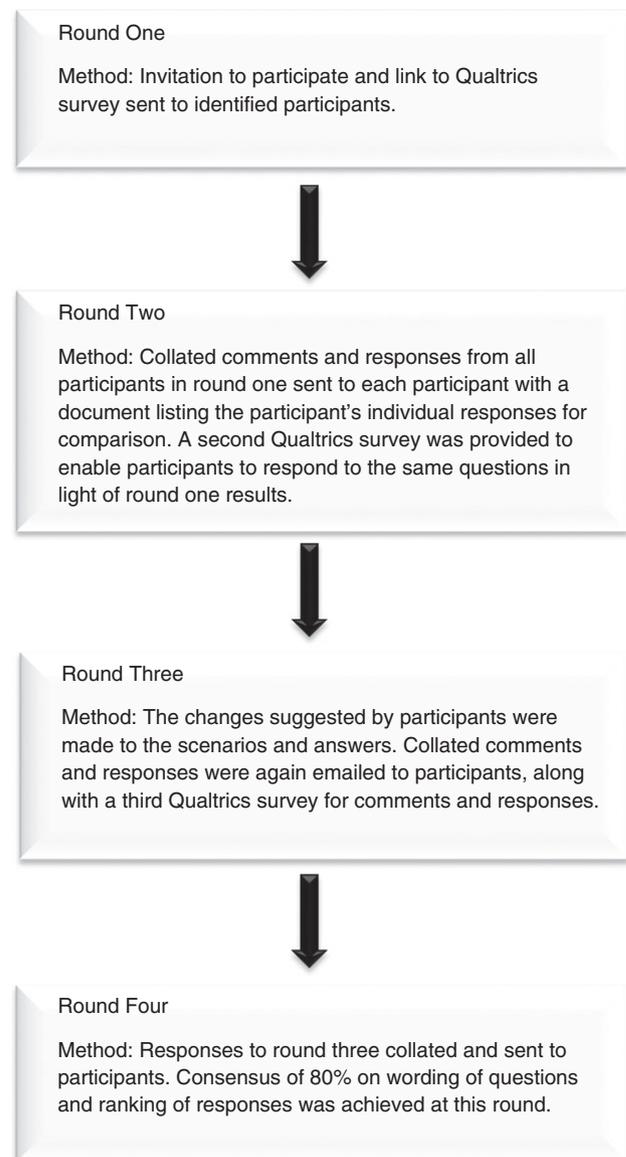


FIGURE 2 Design of Delphi study

rounds ran into the Christmas shut down period for many universities and health services (December/January) which may be the reason for the low return rate. The final participants included four clinical nurses and three academics. A consensus of 80% was achieved for all questions, with 12 questions achieving 100% agreement and 13 questions obtaining 80% agreement. This led to the decision not to continue with any further rounds. The results confirmed the ranking of answers from most correct to least correct.

4 | DISCUSSION

This study developed a tool to assess critical thinking skills which are directly linked to patient outcomes and safety for Australia nurses (Robert & Petersen, 2013). Increasingly, nurses are required to be more alert than ever before to changes in patients' conditions as patients admitted to hospital are more complex with shorter lengths of stay (Beck, 2009; Castledine, 2010). Nurses' surveillance, a skill that requires critical thinking, has been attributed to differences in patient outcomes (Kutney-Lee et al., 2009). Registered nurses are expected to have developed the necessary critical thinking skills to ensure safe nursing practice on completion of their undergraduate course (Jacob et al., 2014).

The results discussed here provide several benefits for the Australian community accessing nursing services. The development of a context-specific assessment tool to assess individual undergraduate nurses' critical thinking skill level will ensure that on graduation, nurses have an acceptable level of skill. This ensures that the national registered nurse standards for practice have been met and provides employers with the confidence that graduate nurses have the required skills to recognize patient deterioration and maintain patient safety. As Australia has a national set of competencies/standards, the tool can be used nationally.

This tool was developed with the use of a Delphi study. Delphi studies have been used by other researchers to gain a "generalized expert opinion" on scenarios (Haji et al., 2015) and the technique is well suited to gathering expert opinion to obtain an informed group consensus on a complex issue. It can harness knowledge held within professions but often not verbalized (Haji et al., 2015). The use of the Delphi technique for assessing the relevance and accuracy of the scenarios and questions enabled expert clinician-educators to generate consensus on the recommended actions for registered nurses in the situations provided for the Australian context. This process of designing assessment material for student learning is ideally suited for use in a range of other educational situations. The Delphi technique decreased a major limitation of developing assessments—a single individual's opinion to determine the correct course of action for a nurse when confronted with a particular situation.

Using a manageable sample size enabled follow-up of participants to encourage completion of the survey. Undertaking four rounds of surveys provided detailed feedback from each round. The use of an online format for the survey assisted with data analysis, reduced cost and provided timely feedback. This has been found to be an advantage of online surveys by Helms, Gardner, and McInnes (2017).

4.1 | Limitations

Limitations to this study include the sampling strategy, which has the potential to create a "halo" effect as panellists were selected on the subjective impressions of the researchers. To mitigate the potential sources of bias associated with Delphi surveys, we used a purposive sampling strategy to target panellists who possessed the required clinical expertise and who would most likely be motivated to participate in all rounds of the study (Haji et al., 2015; Hsu & Sandford, 2007). The resulting panel included experts from different states and educational providers, decreasing the risk of "groupthink" that might occur if the panellist had a similar clinical experience and educational background. Undergraduate nurses were not included as panellists and so perceptions of students may have assisted in the wording and comprehension of questions.

The final consensus agreement between panellists may not necessarily reflect true "consensus". Panellists were aware of their deviation from the group mean to facilitate discussion and encourage consensus without group pressure, but this may have resulted in panellists choosing to comply with the average opinion to speed up the process without a true change in opinion (Haji et al., 2015). The high drop-out rate for the final rounds of the study may be due to the timing of the study over recognized holiday periods. Further testing of the tool on students will need to be undertaken to determine the quality of the tool.

5 | CONCLUSION

A nursing-specific critical thinking tool was developed to overcome the lack of a nursing-specific critical thinking tool available to measure this important attribute of a nurse's practice in the Australian context. This tool is aimed at being used on newly graduated nurses working in the acute hospital sector to assess their critical thinking skills, a critical aspect of a nurse's development, as it has an impact on patient safety and patient outcomes. Use of the tool that has been developed should provide both educators and hospitals with confidence that a nurse has met a certain level of critical thinking ability.

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CONFLICT OF INTEREST STATEMENT

No conflict of interest has been declared by the authors.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE [<http://www.icmje.org/recommendations/>]):

- substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;
- drafting the article or revising it critically for important intellectual content.

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