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Developing a questionnaire to measure nursing students' perceptions on learning in clinical laboratories and simulations

Metropolia University of Applied Sciences

Bachelor of Health Care

Degree Programme in Nursing

Thesis Report

15.4.2021

Author(s) Title Number of Pages Date	John Blanz, Paulino Haivio Reales, Matti Vainionpää Developing a questionnaire to measure nursing students' perceptions on learning in clinical laboratories and simulations 34 pages + 2 appendices 15 April 2021
Degree	Bachelor of Health Care
Degree Programme	Degree programme in Nursing
Instructor(s)	Anna-Kaisa Partanen, MNsc, RN, Senior Lecturer

Clinical nursing skills are an essential part of the nursing profession. The Finnish Ministry of Education has enacted learning of these skills as half of the nursing degree. Nursing students practice their skills in clinical laboratory settings, apply their knowledge in simulations and receive feedback about their competence. In this study a questionnaire was developed to measure nursing students' perception on clinical laboratory and simulation learning.

The Delphi technique was applied in the questionnaire development process. An expert panel of nursing teachers and 3rd year nursing students (n=7) was assembled. The expert panelists assessed the relevancy and clarity of statements related to learning in clinical laboratories and simulations and provided written feedback. The first expert panel round consisted of four (n=4) panelists and the second expert panel round consisted of three (n=3) panelists.

The questionnaire prototype had 64 statements that were reduced to 39 after the first panel round. The number of statements were then reduced to 29 after the second panel round, and an open-ended statement for respondent's optional feedback was added. The outcome of the data collection showed that statements revolving around themes such as learning outcome, quality of learning and learning environment were considered as most relevant. The overall consensus level of the final statements was 92%, with relevancy rating of 94% and clarity rating of 90%. The results are valid.

The developed questionnaire consists of 14 statements related to clinical laboratories and 15 statements related to simulations that are answered by a four-point Likert scale, including an open-ended statement for respondent's optional feedback. The developed questionnaire can be utilized in gathering knowledge to further develop the education methods and study modules of nursing. Additionally, it can be used as a part of a future study focusing on measuring the perspectives on learning in clinical laboratories and simulations.

Keywords	Instrument development, questionnaire, clinical laboratory, simulation, nursing student, learning

Tekijä(t) Otsikko	John Blanz, Paulino Haivio Reales, Matti Vainionpää Kyselylomakkeen kehittämistyö sairaanhoitajaopiskelijoiden näkemyksistä oppimisesta kliinisissä laboratorioissa ja simulaatioissa
Sivumäärä Aika	34 sivua + 2 liitettä 15. huhtikuuta 2021
Tutkinto	Sairaanhoitaja (AMK)
Tutkinto-ohjelma	Sairaanhoitotyön tutkinto-ohjelma
Ohjaaja(t)	Anna-Kaisa Partanen, TtM, SH, Hoitotyön lehtori

Kliinisen hoitotyön taidot ovat olennainen osa sairaanhoitajan ammattia. Suomen opetusministeriön säädöksen mukaan puolet sairaanhoitajakoulutuksesta koostuu näiden taitojen oppimisesta. Sairaanhoitajaopiskelijat harjoittelevat taitoja kliinisissä laboratorioissa, soveltavat tietämystään simulaatioissa, sekä saavat palautetta osaamisestaan. Tässä tutkimuksessa kehitettiin kyselylomake, jolla voidaan mitata sairaanhoitajaopiskelijoiden näkemyksiä oppimisesta kliinisessä laboratoriossa ja simulaatiossa.

Delphi-metodia sovellettiin kyselylomakkeen kehittämistyön prosessissa. Eksperttipaneeli koostui sairaanhoitotyön opettajista ja kolmannen vuoden sairaanhoitajaopiskelijoista (n=7). Eksperttipanelistit arvioivat esitettyjen väittämien tärkeyttä ja selkeyttä liittyen oppimiseen kliinisissä laboratorioissa ja simulaatioissa, ja antoivat kirjallista palautetta. Ensimmäinen eksperttipaneelikierros koostui neljästä (n=4) panelistista ja toinen eksperttipaneelikierros koostui kolmesta (n=3) panelistista.

Kyselylomakkeen koemalli sisälsi 64 väittämää, mitkä vähenivät 39 väittämään ensimmäisen paneelikierroksen jälkeen. Lukumäärä väheni 29 väittämään toisen paneelikierroksen jälkeen, ja yksi avoin väittämä vastaajan vapaaehtoiselle palautteelle lisättiin. Aineistokeruun mukaan väittämiä, jotka liittyivät oppimisen tuloksen, opetuksen laadun ja oppimisympäristön teemoihin, pidettiin eniten tärkeinä. Kokonaisyhteisymmärryksen aste lopullisista väittämistä oli 92%, josta tärkeyden lukemaprosentti oli 94% ja selkeyden lukemaprosentti oli 90%. Tulokset ovat luotettavia.

Kehitetty kyselylomake koostuu 14 kliiniseen laboratorioon liittyvistä väittämistä ja 15 simulaatioon liittyvistä väittämistä, mihin vastataan neliosaisella Likert-asteikolla, sekä yhdestä avoimesta väittämästä vastaajan vapaaehtoiselle palautteelle. Kehitettyä kyselylomaketta voisi hyödyntää tiedonkeruuseen, millä voisi enemmän kehittää hoitotyön opetusmenetelmiä ja opintokokonaisuuksia. Lisäksi sitä voisi käyttää myöhemmin osana tutkimusta, mikä keskittyisi mittaamaan näkemyksiä oppimisesta kliinisissä laboratorioissa ja simulaatioissa.

Avainsanat	Mittarin kehittäminen, kyselylomake, kliininen laboratorio, simulaatio, sairaanhoitajaopiskelija, oppiminen

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1 Introduction

Clinical nursing skills are the most visible part of the nurses' work and the basis of nurses' professionalism and competence (Ranta 2011: 89). It must be secured in nursing education that graduating nursing students have the required competence in providing high-quality health services and patient safety. The nursing education must solidify the knowledge and skills required in decision making in nursing. (Eriksson, Korhonen, Merasto & Moisio 2015: 19).

The importance of nurses' clinical skills is evident on the education program. The nursing degree is defined by the Directive 2013/55/EU of the European Parliament and of the Council, on the recognition of professional qualifications. The degree should include at least 4600 hours of theoretical and clinical education of which the minimum of one third is required to be theoretical education. The extent of the degree is required to be at least 3 years or the corresponding amount of ECT's. (EUR-Lex 2005/36/EY.) According to the Finnish Ministry of Education (2006), the minimum duration of clinical education is 90 ECT's. Studying the clinical nursing skills is half of the nursing degree. One third of the education consists of clinical practices at various working environments dealing with health care nursing and social welfare (Metropolia 2020).

Nonetheless, the nursing education program has received feedback and criticism. The Union of Health and Social Care Professionals in Finland (TEHY) reported about nursing students' perceptions of clinical practice placements and preparedness to perform in practice. 31% (n=244) of the survey participants reported their acquired preparedness from the nursing education program before clinical practice placements as "extremely poor" or "somewhat poor". They perceived that there is not enough hands-on clinical skills training as learning is obtained by watching peer-students' performance or video clips from YouTube. Also, crowded group sizes were criticized by nursing students. (Lindgren 2020.) Similarly, Vuorikallio (2020) reports nurses who participated in her study (n=12) feeling that the nursing education program was too theory-based and did not prepare nurses' practical skills enough for work life. In addition, the lack of contact teaching was criticized. A survey conducted by the Finnish Nurses Association (2019) reports similar findings as nursing students' competence level was discussed and more practice in clinical nursing skills was demanded.

The feedback must be considered, as Ranta (2011) stated in the beginning of this chapter that clinical nursing skills are the basis of professionalism and competence of nurses. However, competence is affected by stress factors, and in Finland the main stress factor in nursing students is the feeling of lack of professional knowledge and skills. It is necessary to gain a better understanding here for nursing curriculum development. To improve the clinical learning environment, health care managers should consider the influence of the clinical learning environment which has a strong effect on nursing students' learning. (Bhurtun 2020: 31, 58.)

The perspectives of clinical education from the nursing students' point of view have not been explored immensely, and there has not been any past studies centered on the subject by Metropolia University of Applied Sciences. Thus, presenting nursing students' knowledge and opinions of their learning would offer insight to administrators of Metropolia UAS for future quality development of study modules. In this thesis, a questionnaire was developed to measure nursing students' perspectives on clinical laboratory and simulation learning. The developed questionnaire can be used to assess simulation-based learning implementations, and clinical laboratories from the nursing students' perspectives. Furthermore, the questionnaire can be utilized as a part of a future study that could measure nursing students' views on learning in simulations and clinical laboratories.

2 Background

In this thesis, a nursing student is referred to as a student of university of applied sciences. A nursing student is a student of health care enrolled in a registered nurse education program (Metropolia 2020). In this chapter, the definition of a registered nurse is explained, followed by an array of clinical nursing competencies according to the Finnish Ministry of Education (2006). The clinical nursing skills are learned and practiced in clinical laboratories and simulations that are further defined in their respective sub-chapters. Learning from these study environments is further explored by reviewing past studies related to our study. Findings from the past studies prompted and supported the creation of a questionnaire, as the findings formed a basis in further determining learning in clinical laboratories and simulations.

2.1 Definition of a registered nurse

In Finland, registered nurses are highly educated in the field of health care (Sairaanhoitajaliitto 2014). To practice as a registered nurse, a degree in nursing is required additionally to a licence admitted by Valvira, the National Supervisory Authority for Welfare and Health. (Valvira 2020). The nursing profession in Finland is studied at a university of applied sciences and takes approximately 3,5 years to complete and the degree itself comprises of 210 credits. All degrees of the universities of applied sciences have been regulated by Finnish law. (Sairaanhoitajaliitto 2020.) Around 180 nurses graduate annually from Metropolia UAS's nursing programmes implemented in both Finnish and English (Metropolia 2020).

A registered nurse is an expert of the nursing field, whose task in society is to treat patients. Nurses support communities, families and individuals to define, achieve and maintain their health in various circumstances and environments. These working environments include primary and speciality health care in the public, private and third sector areas. Nurses carry out and develop nursing skills that promote and maintain health, rehabilitation, and prevention of illnesses. (Ministry of Education 2006: 63.)

The nurse works independently in treating patients and implementing patient care according to the doctor's medical instructions. Nurse's actions are guided by principles, values and enactments of nursing. The basis of their professional actions are the current legislation and health policies of Finland. Nurses are responsible for developing their professional skills. Their expertise is formed from competence that includes, for instance, ethical actions and decision making in nursing, health promotion, cooperation skills, pharmacotherapy and clinical nursing skills. (Ministry of Education 2006: 63.)

2.2 Clinical nursing competencies

Competence in clinical nursing skills is based on strong theoretical knowledge that is comprised of the knowledge in modern nursing science, anatomy and physiology, pharmacology and essential specialties in medicine. Decision making skills, management in overall patient care and flawless implementation of pharmacotherapy are required in evidence-based nursing. (Ministry of Education 2006: 68.) Ensuring patient safety is based on competence in clinical nursing. The essence of competence in patient safety is safe

management in nursing procedures and methods, together with nursing ethics. (Eriksson et al. 2015: 19.)

Education of pharmacotherapy is implemented under the current instructions provided by the Ministry of Social Affairs and Health. Management in pharmacology and drug calculus is required in this implementation. During the clinical practices, nursing students are practicing their skills in pharmacotherapy based on their phase of their studies, under the immediate surveillance and guidance of their supervisor. Universities of applied sciences oversee implementing nursing education and must ensure that the nursing students have the required knowledge and skills to manage the drug calculus and pharmacotherapy skills prior to clinical practice periods. (Ministry of Education 2006: 69.)

In this study, the pharmacotherapy skills are included as being part of the clinical nursing skills. The Finnish Ministry of Education presents these two as separate entities, but the current nursing curricula of Metropolia UAS (2021) provide practical education of both under the same clinical laboratories and simulations due to these entities being strongly connected to each other.

Examples of competencies in clinical nursing skills that are required from a post-graduate nurse are listed in Table 1. The skills are listed according to the Ministry of Education (2006: 68, 69).

Table 1. Examples of clinical nursing competencies, according to the Ministry of Education (2006: 68, 69).

Clinical nursing competencies	
Examining, maintaining and assessing the vital signs, such as breathing, blood circulation and consciousness levels	Insertion of cannulas
Management of essential nursing and examination procedures and the proper, safe use of equipment related to them, for instance catheterization	Management of intravenous infusion and medical treatments
Utilization of the examination results in patient care and monitoring the care	Management of blood transfusions
Prevention of infections, for instance wound care and maintenance of aseptic approach	Management of automated infusion pumps
Providing first aid in various circumstances and managing tools used in basic resuscitation	Providing oxygen
Management of assistive tools according to patient safety and ergonomy	Administration of injections subcutaneously, intramuscularly and intravenously
	Pain management and alleviating pain of the patient in various circumstances, also in palliative care for example
	Observation of patients during and after administration of a medical procedure

The above listed clinical nursing competencies are practiced in clinical laboratories and simulations. In Metropolia UAS these skills are taught in different courses such as in courses of Acute Nursing, and Nursing of Chronically Ill Patients. The courses are further presented in Table 2 under the sub-chapter 2.4. Before taking part in the practical training periods students attend the required clinical laboratories and simulations to practice the clinical skills learnt from previous theory classes in a safe and controlled environment. (Metropolia 2020.) Learning in clinical laboratories and simulations are described more in the next sub-chapters.

2.3 Clinical laboratory learning

A clinical laboratory is a learning environment where nursing students learn clinical skills before patient contact. It is a non-threatening environment where nursing students can have hands-on learning experiences to practice essential clinical skills. In clinical laboratories, mannequins, simulated patients or even patient volunteers are used to help to

practice clinical skills. Clinical laboratories are essential in ensuring all students can gain learning opportunities and feedback before real patient contact. (Sebiany 2003: 1043.)

In Metropolia UAS, clinical laboratories are implemented by the teachers in specially designed clinical laboratory classrooms. The laboratory classroom includes the required equipment similar to what is used in the nursing field. During a clinical laboratory session, nursing students pair up to practice the clinical skill that was learnt in previous theory classes. The teacher supervises and gives feedback on how these skills are performed.

All curricular courses containing clinical laboratory learning in Metropolia UAS from the academic year 2018-2019 are as follow: Acute Nursing, Clinical Nursing, Clinical Nursing Skills, Maternity Care, Nursing of Children and Young Persons, Nursing of Chronically Ill Patients, Nursing of Critically Ill Patients and Working with the Disabled, Pharmacotherapy 1, Pharmacotherapy 2, and Safety in Health Care. In addition, the deepening studies in which the nursing student further increases their knowledge on a particular field of specialization in nursing, have clinical laboratory learning. (Metropolia 2021.) The curricular courses are listed and presented in Table 2 in more detail, at the end of the next sub-chapter.

2.4 Simulation-based learning

The definition of a “simulation” means a representation of a real-world patient replicating symptoms. Nursing students are to observe, analyse and to respond with proper nursing interventions and actions to the cues and stimulis given by the simulating patient. Simulations can be divided into three different levels: high fidelity, mid or moderate fidelity, or low fidelity simulations according to their level of technological applications, level of realistic settings and interactivity. (Momentum 2019: 22-24.)

“High fidelity” simulations provide a high level of realism and interactivity to the nursing students using computerized patient simulators, very realistic patient settings or even virtual reality. “Mid or moderate fidelity” simulations refer to technologically sophisticated experiences such as realistic mannequins who have, for instance, a heart sound and a pulse and are more interactive mannequins compared to the ones at low fidelity simulations. “Low fidelity” simulations mean the use of roleplay, case studies, use of static mannequins to provide students experiences and opportunities to practise a specific clinical nursing skill. (Momentum 2019: 22-24.)

The simulation is not a new approach as a teaching and learning method in nursing education. Teachers can create clinical tasks and scenarios in controlled situations that allow direct practical training of students. (Janse van Vuuren, Seekoe & Goon 2018: 2.) The clinical simulation serves as a teaching and learning method which allows students to encounter simple and elaborate health care related situations before the real-life practice in the field (Bortolato-Major et al. 2019: 789). Results show that learning and teaching through simulation led to a significant increase in knowledge and skills acquisition among student nurses who took part in a study. (Janse van Vuuren, Seekoe & Goon 2018: 3.)

Metropolia UAS simulation teachers plan and implement simulation learning using equipment, mannequins and students to simulate real-life scenarios. In simulations the group size varies, but usually involves student volunteers to act or simulate a role in a case that the teacher instructs and guides. Simulations are performed at the end of a course and are utilized to evaluate and practice the practical skills often learnt in clinical laboratories in a realistic environment. All curricular courses containing simulation learning in Metropolia UAS from the academic year 2018-2019 are as followed: Clinical Nursing Skills, Maternity Care, Nursing of Children and Young Persons, Nursing of Chronically Ill Patients, Nursing of Critically Ill Patients and Working with the Disabled, and Pharmacotherapy 2. Moreover, the deepening studies also include simulations. (Metropolia 2021.)

The courses from the first three study years in nursing education of Metropolia UAS that include simulations, as well as clinical laboratories, are presented in Table 2. It is also presented how many lectures for clinical laboratories or simulations are reserved per course. In addition, table 2 shows the recommended study year in which to attend the equivalent course. However, nursing students can influence their own personal study plans, meaning that the timing and order of attending the courses may vary individually.

Table 2. Compulsory nursing courses containing clinical laboratory and simulation learning from Metropolia UAS 2018/19 curricula (Metropolia 2021).

Compulsory Nursing courses in Metropolia UAS	Clinical laboratories	Simulations	1st year	2nd year	3rd year
Acute Nursing	2	0	x		
Clinical Nursing	6	0	x		
Clinical Nursing Skills	2	1	x		
Maternity Care, Nursing of Children and Young Persons	2	1		x	
Nursing of Chronically Ill Patients	3	1	x		
Nursing of Critically Ill Patients and Working with the Disabled	5	1			x
Pharmacotherapy 1	2	0	x		
Pharmacotherapy 2	3	1	x		
Safety in Health Care	1	0	x		

Moreover, the deepening studies have clinical laboratories and simulations too, but are not included in Table 2. This is because nursing students select their preferred nursing specialty study courses and take part in the deepening studies during the last phase of their studies, after the third study year. The content and number of clinical laboratories and simulations vary between the different deepening courses. It should be considered that the CoVid-19 pandemic has had a noticeable impact in implementing clinical laboratories and simulations beyond the spring of 2020. Therefore, Table 2 is according to the latest curricula courses under the normal circumstances outside the CoVid-19 pandemic.

To better understand how the nursing students perceive learning in clinical laboratories and simulations, a research of the past studies related to these learning settings was done. The research and findings are presented and discussed in the next sub-chapter.

2.5 Past studies of learning in clinical laboratories and simulations

Nursing students' perceptions, experiences and learning outcome studies in clinical skills laboratories and simulations were researched to obtain knowledge on past studies that aided the development of the instrument. Searches in CINAHL and MEDLINE databases

were done by using search words “nursing student simulation”, “nursing student simulation learning”, “nursing AND skills AND laboratory, “nursing students learning”, “nursing students' perception clinical skills”, “undergraduate nursing students”.

A total of 19 studies about nursing students’ perceptions or experiences in clinical skills laboratories and simulations were found. Nursing students’ perceptions towards their clinical skill abilities and knowledge were studied in a variety of contexts, such as how ready nursing students are experienced to perform those skills in the work life (Newton, Billett, Jolly & Ockerby 2009: 315). An overview of five different studies is presented in Table 3.

Table 3. Examples of previous studies on learning in clinical laboratory settings and simulations.

Title, Authors, year, country	Aim of study, sample size and instrument	Findings related to this study
Students Learning in a Skills Laboratory Strand, Nåden & Slettebø 2009, Norway	To gain knowledge about students' learning in a skills laboratory n=224 nursing students Survey, a semi-structured questionnaire	• Feeling of security was seen by students as the most important aspect of learning. • Students felt that a well-equipped laboratory had a positive influence on the learning outcome. • Students criticized the lack of time and crowded skills laboratories; Enough time must be reserved for demonstrating practical nursing skills complexity. • Students valued teamwork and communication as an important part of practising nursing skills.
Lost in translation: barriers to learning in health professional clinical education. Newton, Billett, Jolly & Ockerby 2009, Australia	How nursing students' learning in university clinical laboratories transfer into the reality of clinical environment. n=28 2nd and 3rd year nursing students Individual interviews	• Students felt a lack of authenticity in skill laboratories decreased learning experiences. • Students reported not having enough hands-on time in the clinical laboratories as a negative. • Teachers detailed explanations of clinical practises were recounted positively by students.
Stress of nursing students in clinical simulation: a randomized clinical trial Boostell, FelixI, Bortolato-Major, PedroloI, VayegoI & MantovaniI 2017, Brazil	Evaluate and compare the perception of stressors by nursing students before and after a high-fidelity clinical simulation or conventional laboratory practice class. n=54 1st year nursing students Survey, an application of KEZKAK questionnaire	• Simulation increased students' awareness of their responsibility to learn required skills for patient care. • Lack of competence and relationship difficulties were main stressors for nursing students.
Third-Year Undergraduate Nursing Students' Perceptions of High-Fidelity Simulation Wotton, Davis, Button & Kelton 2010, Australia	To examine nursing students' perceptions about the high-fidelity simulation implementation into a clinical course n=300 3rd year nursing students Survey, a questionnaire	• Nearly all students thought the learning outcome from simulations can be applied to real clinical settings. • High degree of fidelity in simulations was perceived by students as important. • Students felt more time in debriefing would help to fully analyse key concepts of the scenario.
Learning in simulation: Ready? Steady? GO! Crafford, Kilian, Moore-Saayman, Dreyer & Rossouw 2019, South Africa	To explore first-year basic nursing students experiences of their learning in simulated environments n=61 1st year nursing students Survey, open-ended questionnaires	• Students reported simulation as a great learning method to prepare students for the real clinical environment. • All students valued simulation as a positive experience. • Learning in simulation made nursing students feel more confident.

Studies presented in Table 3 revealed nursing students' perceptions of learning in clinical laboratories and simulations. Nursing students' responses to learning can be sorted into four categories: interactive teamwork, training of practical skills, sensing and kinaesthetic involvement and modern minded teacher (Strand, Nåden & Slettebø 2009). Students

benefited collaborating with other students in clinical laboratories to practise nursing skills (Strand et al. 2009; Crafford, Kilian, Moore-Saymaan, Dryer & Rossow 2019) and peer teaching was reported as a positive learning method (Crafford et al. 2019).

Competent teachers help students to reach their learning goals (Strand et al. 2009; Newton et al. 2009) but more time should be reserved for guidance (Strand et al. 2009). Hands-on experiences of nursing skills were reported as valuable; however, students criticized the lack of time to practise. The quality of the clinical laboratory environment was reported to be important as the lack of authenticity decreased nursing students' learning experience. (Strand et al. 2009; Newton et al. 2009.) These studies had three main themes that can be distinguished from the findings. These were quality of teaching, learning outcome and environment.

Based on the findings of the studies, it could be concluded that students value learning in clinical laboratories and simulations (Strand et al. 2009; Crafford et al. 2019; Wotton et al. 2009). High degree of fidelity in simulations was perceived as important by nursing students, but it was not possible to identify if high degree fidelity had positive impact on learning (Wotton et al. 2010). Students reported simulations as a great learning and teaching method and felt the learning outcome could be applied in the real clinical environment (Crafford at al. 2019; Wotton et al. 2010). Clinical laboratories were perceived as a great opportunity to learn nursing skills (Strand et al. 2009). However, it was reported students did not actively take part in the learning opportunities in clinical laboratories (Newton et al. 2009). According to the findings of the past studies, combined with earlier criticism presented in the Introduction chapter, there is a need to further develop learning in clinical nursing skills of the nursing students.

3 Purpose, aim and study questions

The purpose of this thesis is to contribute to the development of learning in clinical laboratory settings and simulations in Metropolia UAS. The aim was to develop a questionnaire that investigates nursing students' perceptions on learning in clinical laboratory settings and simulations to further develop the education methods in clinical laboratories and simulations.

The developed questionnaire aims to provide answers to the following questions:

1. What are the nursing students' perceptions on learning in clinical laboratory settings?

2. What are the nursing students' perceptions on learning in simulations?

4 Implementation

In this chapter, the development process of our questionnaire is explained. To develop our questionnaire, the Delphi technique method was chosen and applied in this thesis. The Delphi technique is explained in more detail in its' own sub-chapter. Lastly, the data collection process according to the Delphi technique is presented at the end of this chapter and continued further in the Results chapter.

4.1 Developing a questionnaire

A questionnaire is a beneficial instrument that can be applied to data collection when it is well created. Open and closed questions are the basic forms for survey questionnaires. The closed questions grant wider response, and different categories can be matched to the areas of interest. (Leggett, 2017: 568.) The benefit of the questionnaire is that it can be used in collecting a significant amount of research data. It can reach many respondents as it can be sent online to hundreds, even thousands of people. Another benefit to be considered is that there have been developed statistical analysing methods for examining the data. In this case, the researcher does not have to create new methods to analyse the findings. (Hirsjärvi, Remes & Saarijärvi 2009: 195.)

Designing, producing and testing a questionnaire is important in assisting the progress of a study. Commonly this is done for instance in the form of individual interviews or group discussions to better understand the context, language and details related to the design of a questionnaire. When evaluating the suitability of a questionnaire, several topics are considered. These revolve around questions such as is it equal to the outcome of interest, are the criteria meaningful and theoretically valid in evaluating the questionnaire and if there is proof that the measure is reliable. (Gerrish & Lathlean 2015: 376, 464.)

A questionnaire is developed according to the instrument development. Instrument development is explained as gathering qualitative data for the foundation of a formal instrument. The intention is to create and write plenty of questions that are then later subjected to accurate testing. (Polit & Beck 2018: 214.) In instrument development it is crucial that the overall structure of the instrument and its properties are based on defined assumptions, purposes or ideas that originate from theory or experimental studies (Andermo et al. 2018: 1322). In addition, the flow of items, such as statements and questions should be clear and easy to comprehend and to collect precise data. Paying attention to the purpose of the questionnaire is critical during the process of instrument design. It is necessary to observe if the questionnaire measures what it is intended to measure (Song, Son & Oh 2015: 323, 328.)

To create an effective, structured questionnaire that can be used as a part of a survey, the wording of each question must be observed carefully for clarity, absence of bias and reading level in the questionnaire. The arrangement of questions must be in an appropriate order that encourages the cooperation and sincerity of the respondent. (Polit & Beck 2018: 169.) In this thesis, the developed questionnaire will have closed statements that are measured by Likert scale to obtain the perception of students on learning in clinical laboratory settings and simulations. The developed questionnaire has a four-point Likert scale (strongly disagree – disagree – agree – strongly agree). The Likert scale is a common and well-known scale that is generally applied in five points. Likert scales measure the level of agreement, generally ranging from “strongly disagree” to “strongly agree”, and the typical structure of the scale includes a neutral answer option, placed in the centre of the scale. (Gerrish & Lathlean 2015: 420; Vehkalahti 2008: 35.)

Due to the Likert scale being a familiar measure in previous studies, it was chosen as a measurement scale for our developed questionnaire. For instance, Wotton et al. (2010)

measured nursing student's perceptions about the high-fidelity simulation implementation into a clinical course by applying 11 standardized questions on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) and three open-ended questions. In a similar manner, the Likert scale was utilized as a measurement scale for our developed questionnaire in this thesis.

Lastly, as referred to Polit and Beck earlier in this chapter, in order to create a questionnaire according to the instrument development, the gathered data related to our study must be tested accurately. The data collection process for our questionnaire prototype is done by applying the Delphi technique method, which is commonly used in nursing and health research (Keeney, Hasson & McKenna 2011: 5). The Delphi technique is defined in detail in the next sub-chapter.

4.2 Delphi technique

The Delphi technique method was chosen and applied in this thesis to develop a questionnaire. In Delphi technique, the general agreement of a certain matter is acquired by assuming the group opinion being more valid than an individual opinion (Gerrish & Lathlean 2015: 268). The classic Delphi process consists of two or more questionnaire rounds by using an expert panel. In the first round, the expert panel is asked for their opinions in an open-ended manner on a presented topic. The replies are then examined and analysed by the researchers and given back to the panellists in the form of questions or statements. The panellists evaluate or score the questions or statements in this second round based on their expertise on the subject. These rounds continue until a consensus is achieved on all or some of the presented items as requested. The aim is to achieve agreement among the selected group of panellists on a certain matter in which none existed before. (Keeney, Hasson & McKenna 2011: 4.) The Delphi process is shown in detail in Figure 1.

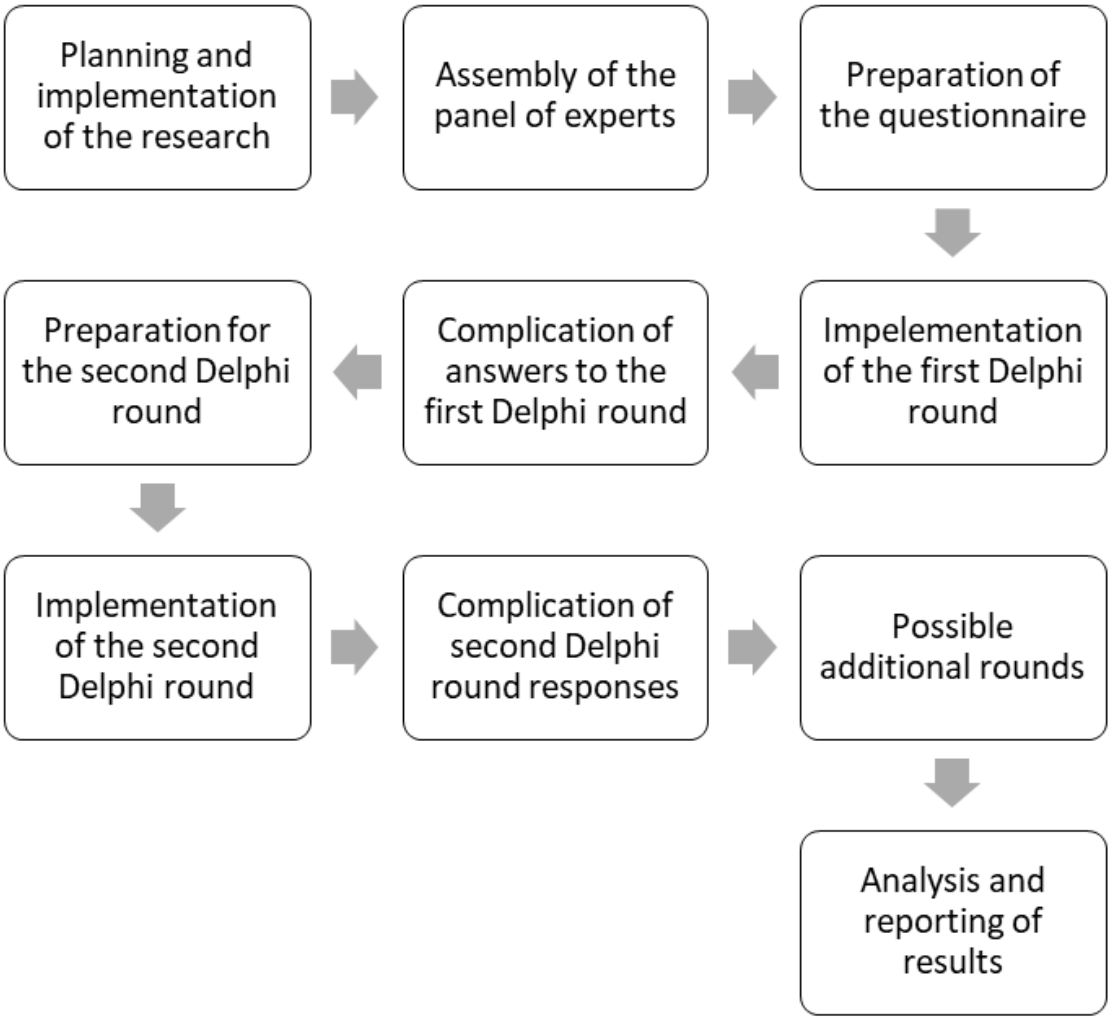

Figure 1 Flowchart representing the Delphi technique process (Ojasalo, Moilanen & Ritalahti 2009: 133-135).

The Delphi technique is typically used within nursing and health research for two reasons. Firstly, the technique is frequently used to set priorities such as the recognition of nursing research. Professionals of this field could arrange an expert panel to recognize research precedence for the current time of the nursing profession. This could be beneficial for the panellists or for funding purposes to prioritise which areas of research should be funded in the short or long term. Secondly, another reason to use Delphi technique is to achieve consensus which can be applied in various presented matters or ideas. The consensus level can be set according to the researchers' desire. The consensus is achieved once the predetermined percentage of the expert panel has come to common understanding on the importance of the presented matter. (Keeney, Hasson & McKenna 2011: 5.)

The adaptability of the Delphi technique can be utilized in a broad range of topics and applications within the nursing field, making it a considerable method. Benefits here include confidentiality of responses, having no geographic restrictions and it being cost-effective. (Gerrish & Lathlean 2015: 275, 276.) However, it is considered that some of the benefits of the Delphi technique are also its disadvantages. For instance, there are not official guidelines regarding the size or selection of panellists in the expert panel and not a clear definition for an acceptable level of consensus (Keeny, Hasson & McKenna 2011: 30). Whereas the flexibility in applying the technique can be seen as a key benefit, it has also significant repercussions for scientific respectability of the technique (Keeny, Hasson, Mckenna 2011: 23, 24). Criticisms that must be considered include the potential for lack of methodological rigour, uncertain anonymity and lack of universally agreed guidelines. (Gerrish & Lathlean 2015: 275, 276.)

In addition to the presented criticisms of the Delphi technique, there are a few challenges associated with the selection of panellists and subjective definition of an expert. Knowledge may not be consistent with expertise, as for instance a nurse may not be aware of how to recognize nursing research priorities but may well know the practical challenges of delivering care on a ward. (Keeney, Hasson & McKenna 2011: 20, 23, 24.) However, those who are willing to take part in the process are more likely influenced directly by the results and are additionally more likely motivated to stay in the study. Thus, the panellists' dedication is related to their interest and involvement with the presented issue. Anonymity of the panellists promote honesty about their views on the presented matter, consecutively providing perceptive data for the researcher. (Gerrish & Lathlean 2015: 269, 273.)

There are various benefits and disadvantages of the Delphi technique presented in this sub-chapter that must be considered for the questionnaire development process. The development process is further explained in the next sub-chapter. Additionally, in the next sub-chapter it is shown how the Delphi technique was applied in this thesis.

4.3 Data collection

The data for the questionnaire prototype was collected by applying the Delphi technique. The questionnaire development process is presented in Figure 2.

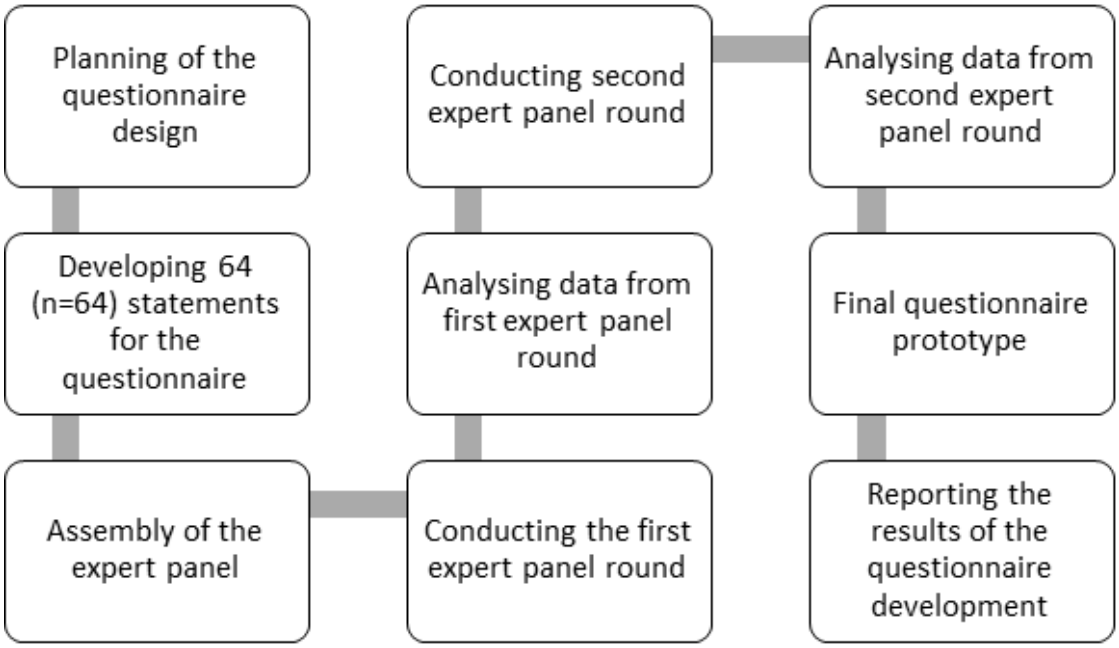

Figure 2 A flowchart of the questionnaire development process.

After the questionnaire design was decided, statements were created. These were created to answer the study questions and have resemblance to the past studies. All statements were based on the themes formed from previous studies that were presented in the sub-chapter of Past studies of learning in clinical laboratories and simulations. The original 64 statements were then presented to the panellists for analysis. The panellists' feedback further guided the formulation of the statements for the questionnaire prototype.

The experts for the panel were teachers from Metropolia UAS with expertise and experience in running clinical laboratories and simulations. Third year nursing students were also included, as they have gathered knowledge and experience of the clinical laboratories and simulations from the first two years of studies. The questionnaire prototype along with an introduction letter was sent through email to the selected four teachers and three students (n=7) of Metropolia UAS. The emails were sent separately to everyone in order to maintain the panellists' anonymity. The introduction letter for the first expert panel round is shown as Appendix 1 and for the second expert panel round as Appendix 2, respectively.

The panellists were given four days' time to reply in both panel rounds. For the first expert panel round two teachers and two students (n=4) replied, forming our expert panel

with answer rate being 57%. For the second expert panel round, the improved prototype was sent to three teachers and two students. Two teachers and one student (n=3) replied, forming our expert panel with the answer rate being 60%.

The panellists determined the relevancy and clarity of the 64 statements. The statements were in Finnish and in English. Panellists were given an opportunity to give written feedback to each statement where they could reason or comment it. Additionally, they could suggest their own statements.

The statistical data collected from the expert panel rounds were transferred into a data processing programme Microsoft Excel. These results are presented in detail in the next sub-chapter and also in the Results chapter. Statements regarding clinical laboratories were coded as “A”, and statements regarding simulations were coded as “B”, both given a running number value. The written feedback was transferred into a separate Microsoft Word document.

Prior data collection, the consensus level was established as generally it may prove challenging to achieve 100% agreement on all statements. The consensus level is qualified by subjective will, as there are only few clear guidelines regarding this matter. (Ger-rish & Lathlean 2015: 273, 274.) Exclusion criteria for a statement in the expert panel rounds was that if the relevancy percentage of a statement is lower than 50%, the statement is automatically excluded.

The results of these expert panel rounds showed whether the statements were approved, in need of improvements or if other ideas were suggested. The results of the expert panel rounds are presented in detail in the next chapters.

4.4 The expert panel rounds

As stated in the previous chapter, the consensus level of the questionnaire prototype and statements must be calculated in order to assess the validity and reliability. In this chapter the relevancy and clarity consensus percentages after the expert panel rounds are shown in the Table 4 and Table 5. For instance, number value of 100 in relevancy in statement A1 meaning that the panellists were unanimous of the statement being relevant. Number value of 50 in statement B3 of clarity indicates that 50% of the panellists

perceived the statement as clear. Furthermore, examples of statement rejection and improvement process are presented in this chapter and continued in chapter 5. The collected data from the panellists in the first expert panel round is shown in Table 4.

Table 4. Consensus percentages of each statement (n=64) in the expert panel round one.

Statement #	Relevancy %	Clarity %	Statement #	Relevancy %	Clarity %
A1	100	100	B1	100	100
A2	100	75	B2	100	75
A3	75	75	B3	50	50
A4	75	50	B4	75	75
A5	100	75	B5	75	100
A6	75	100	B6	75	75
A7	75/100*	25	B7	75	75
A8	75	75	B8	100	75
A9	100	100	B9	100	100
A10	75	100	B10	100	100
A11	100	100	B11	100	100
A12	100	100	B12	100	75
A13	100	50	B13	100	50
A14	75	100	B14	50	25
A15	100	75	B15	50	75
A16	100	100	B16	100	100
A17	100	100	B17	100	100
A18	75/100*	100	B18	100	100
A19	75	75	B19	100	100
A20	100	100	B20	75	75
A21	100	100	B21	100	100
A22	100	75	B22	100	75
A23	75	100	B23	100	100
A24	100	50	B24	50	75
A25	75	50	B25	50	100
A26	75	25	B26	75	50
A27	50	75	B27	75	100
A28	75	75	B28	100	100
A29	100	100	B29	100	100
A30	100	75	B30	100	75
A31	75	75	B31	50	100
A32	75	100			
A33	100	100			

The four (n=4) panellists replied to all presented statements as instructed. One panellist responded to statements A7 and A18 as undecisive towards relevance. Initially the results showed that no statements had to be automatically excluded based on the exclusion criteria.

Statements A7, A26 and B14 received clarity percentage of 25%. None of the statements were excluded based on low clarity percentage of the panellist. Low clarity percentage (25%) paired with high relevancy percentage (≥ 75%) in statement A26 indicated the

panellist's perceiving statement as relevant, but in order to fit it in the final questionnaire the statement should be improved. However, statement A26 "The provided clinical equipment were functional" received written feedback from two panellists arguing it being a repetitive statement compared to other similar statements. Further analysis of the statement showed that it does not answer the study questions of this thesis. To conclude of the panellists' perceptions and the study question relevancy, statement A26 was rejected for the second expert panel round.

The collected data from the panellists in the second expert panel round is shown below in Table 5. There was a total of 39 statements presented to the panellists.

Table 5. Consensus percentages of each statement (n=39) in the expert panel round two.

Statement #	Relevancy %	Clarity %	Statement #	Relevancy %	Clarity %
A1	100	100	B1	100	100
A2	100	100	B2	100	33
A5	66	100	B4	66	100
A6	66/100 *	100	B5	100	100
A8	100	66	B6	33	66
A9	100	100	B9	100	100
A10	66	100	B15	66	66
A11	100	66	B16	100	33
A12	100	100	B17	66	66
A13	100	66	B19	100	100
A17	100	100	B20	100	66
A18	100	100	B21	100	66
A19	66	66	B22	100	100
A20	100	100	B23	100	66
A22	100	100	B24	100	66
A24	100	100	B25	66	100
A27	100	100	B26	66	33
A29	100	100	B28	66	100
A30	100	66	B30	100	100
A33	100	100			

The three (n=3) panellists replied to all presented statements as instructed, with an exception of one panellist responding to the statement A6 as undecisive towards relevancy. This response was not counted. Statement B6 "Communicating in the group was challenging during the simulation" received 33% relevancy percentage response. Based on the exclusion criteria, it was automatically excluded.

Relevancy consensus percentages for statements regarding clinical laboratories were higher than in expert panel round one. Statements A5, A10 and A19 received 66% consensus, whereas the rest of the clinical laboratory statements were perceived as unanimously relevant by the panellists. Consequently, statements A5, A10 and A19 were rejected from the final questionnaire prototype. Statement A5 “At the beginning of the clinical laboratory, the theory behind the nursing skill was revised before practicing it” was cut as it received written feedback by a panellist (n=1) as an irrelevant statement. After further analysis, it was deemed as not answering the study questions specifically enough.

A total of seven (n=7) statements from original statements in English and Finnish to the final questionnaire were not edited. Example of this kind of a statement is shown in Table 6. The panellists’ written open feedback is explained in the next chapter with further statistical presentations of the questionnaire development.

Table 6. An example of an untouched statement.

Statement (FI)	Statement (ENG)	Round 1 relevancy	Round 1 clarity	Round 2 relevancy	Round 2 clarity
Ennakkotehtävät ovat hyödyllisiä oppimisen kannalta ennen kliiniseen laboratorioon osallistumista.	The pre-assignments before participating in the clinical laboratories are beneficial for learning purposes.	100%	100%	100%	100%

5 Results

The written feedback of the expert panel rounds is presented in the next sub-chapters. Furthermore, a flowchart of the data collection process according to the Delphi technique is presented in Figure 3. A summary of the results is described at the end of the chapter.

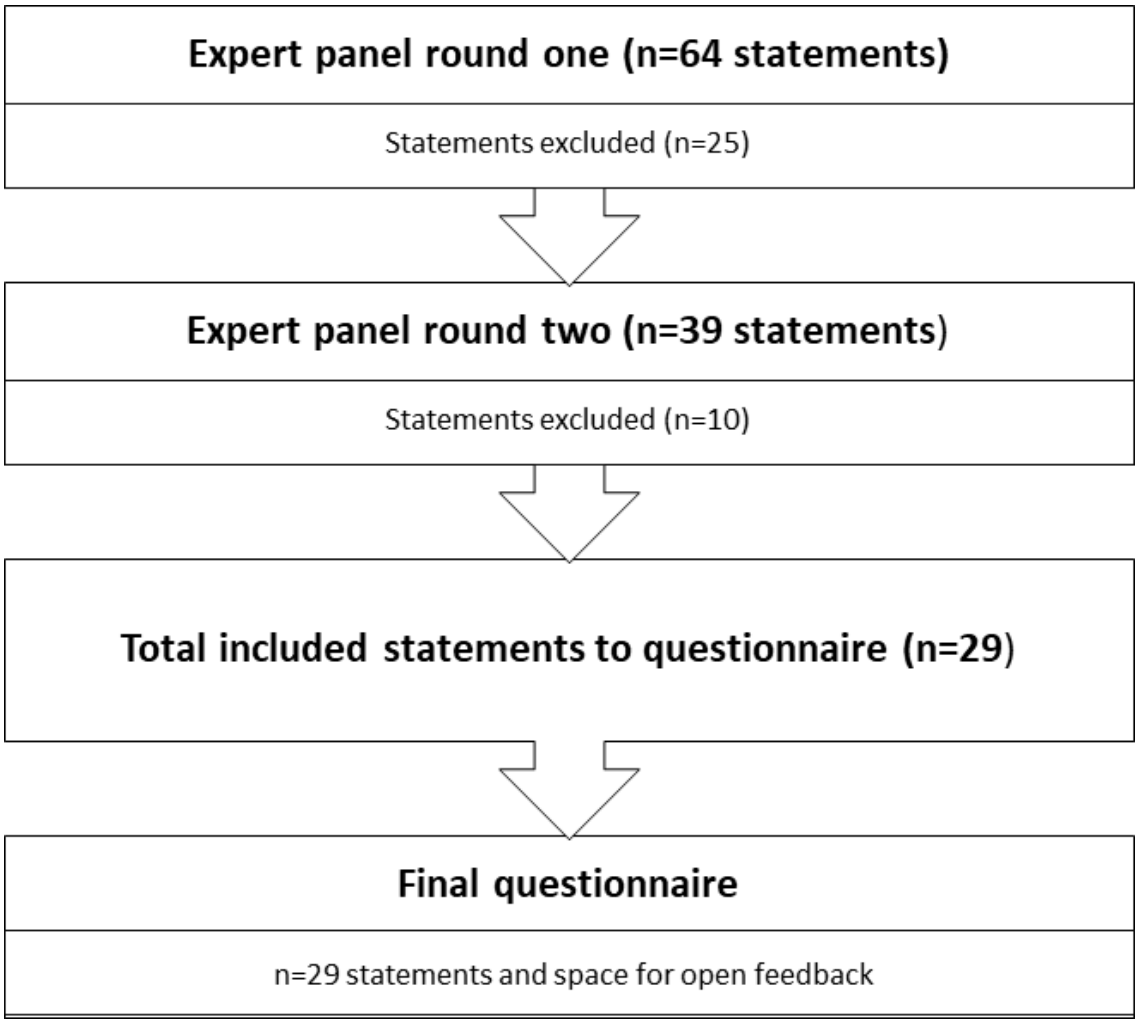

Figure 3 A flowchart of the data collection process from the expert panel rounds.

5.1 Feedback of the first expert panel round

Written feedback was received (n=50) of the total of 64 statements from one or more of the panellists. The written feedback revolved around certain themes such as relevance, clarity, repetition, grammar consistencies between Finnish and English and the order of the statements.

The most common feedback from panellists was the quality of the language, regarding statements both written in Finnish and English as statements (n=16) got marked for correction. Statement accuracy of translation was given for six (n=6) statements. Panellist did not suggest completely new statements, but eight (n=8) statements received feedback to change words and terminology to be more precise. Grammatical tense was met with criticism in two (n=2) of the statements.

Another common reason panellists marked statements as not relevant was similarity or unnecessary repetition. Additionally, feedback questioned the reason for stating almost the same statement twice or even multiple times in statements (n=14). Seven (n=7) of the statements were directly advised to remove due to repetition, but five (n=5) statements received feedback to remove either of the overly similar statements, respectively.

Questionnaire design raised an observation by one of the panellists. A panellist suggested to include an open-ended space in the questionnaire. The implementation of both positive and negative statements was also addressed. Feedback was received questioning Likert scale as the appropriate scale to use in the survey and panellist suggested to replace Likert scale format to a simpler yes or no – type of a scale. Reasoning for such a proposal was the fear of the questionnaire being too long for nursing students to complete. One panellist emphasized the fact that in the questionnaire, statements should be thematically organized. The summary of reasons that reduced 64 statements to 39 is shown in Figure 4.

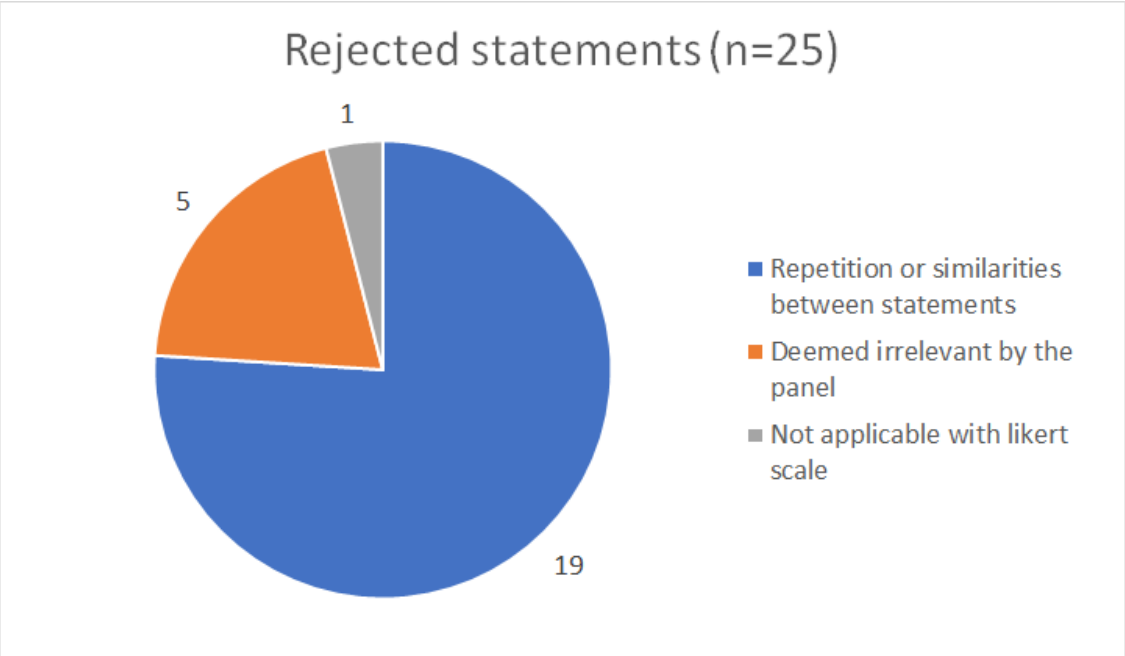

Figure 4 A summary of reasons why statements got reduced after the first expert panel round.

5.2 Feedback of the second expert panel round

Written feedback was received (n=21) of the total of 39 remaining statements from all three of the panellists. New statements were not offered in the responses, but the written feedback revolved around relevance, clarity and how these were represented grammatically.

One reason panellists marked statements as unclear was when opinions differed on how a statement should be presented regarding the affirmation or negation tense of the statement in five (n=5) statements. Seven (n=7) statements received feedback on their relevancy to the subject.

The most common feedback was grammar related in Finnish. Fourteen (n=14) statements received suggestions to change terminology to be more accurate, even if the statement was marked as clear by the respective panellist but it was followed with written feedback to change the grammar. Four (n=4) English statements received suggestions to change specific words to ensure translation was exact.

Questionnaire design feedback by a panellist recommended that statements (n=3) were to move to a different place in the questionnaire. There was increased feedback from the panellists to implement an open-ended question or space into the final questionnaire. The summary of reasons that reduced 39 statements to 29 is shown in Figure 5.

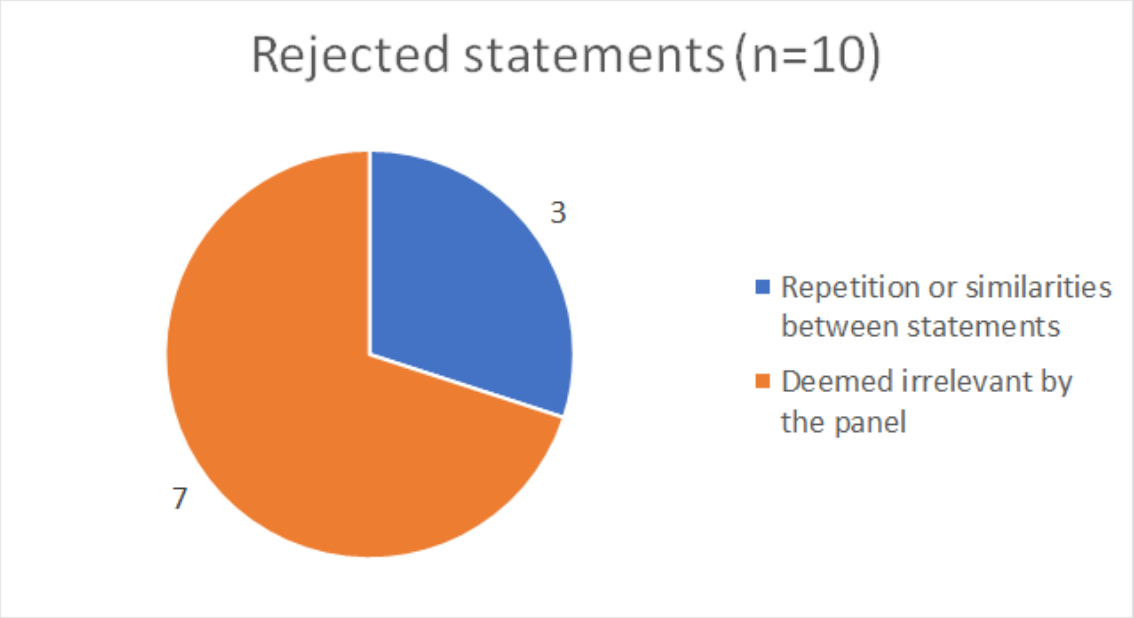

Figure 5 A summary of reasons why statements got reduced after the second expert panel round.

5.3 Summary of the results

The results after two expert panel rounds yielded 29 statements and one open ended feedback space. These final statements had a total consensus level of 92% with relevancy rating 94% and clarity 90%, respectively.

The final 29 statements are divided into the following three categories that were formulated based on the themes of findings from past studies (presented earlier in Table 3). These reflect the aim of the data required to respond to this study's questions which were "what are the nursing students' perceptions on learning in clinical laboratory settings?" and "what are the nursing students' perceptions on learning in simulations?". These themes were quality of teaching, learning outcome and environment.

Statements related to quality of teaching (n=11) reflect the methods of teaching in simulations and clinical laboratories. Examples include class preparation, time management, clarity and understanding of instructions. These included statements A1, A2, A3, A4, A5,

A6, B1, B2, B3, B4 and B5. Twelve statements (n=12) are related to the learning outcome. For instance, expectations from students, participation, learning results and feedback are recurring concepts in this category and these included statements A7, A8, A9, A10, A11, B6, B7, B8, B9, B10, B11 and B12. Lastly, other statements (n=6) are based on environment that reflect factors about the environment in simulation settings and clinical laboratories. Examples here are group size, equipment and workspaces and these are included in statements A12, A13, A14, B13, B14 and B15. The division of the statement themes are presented in Figure 6.

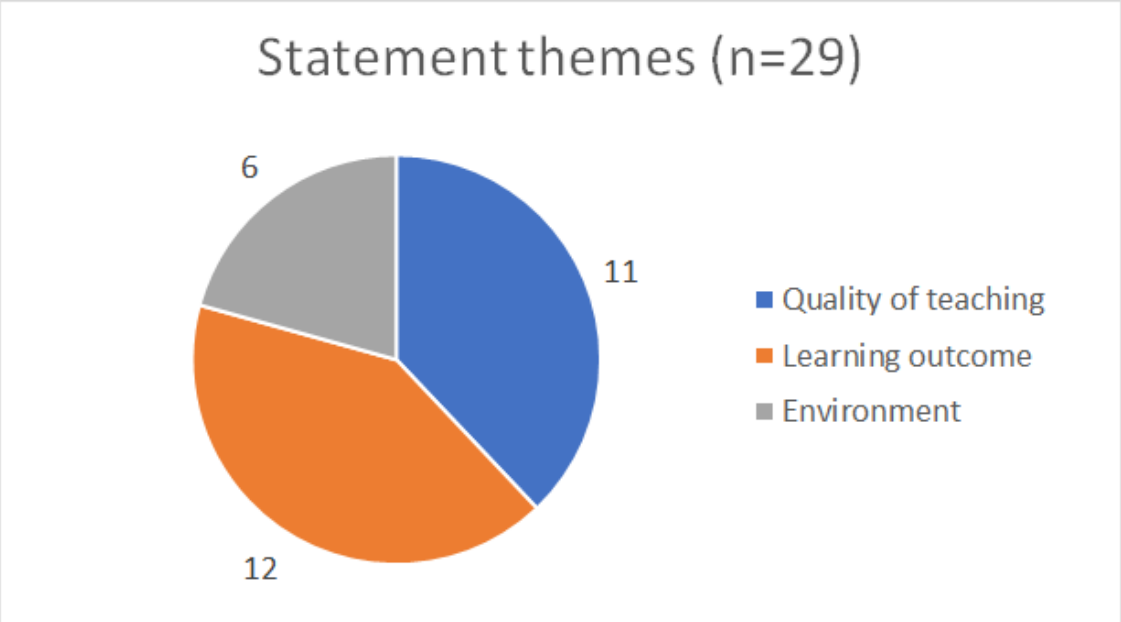

Figure 6 The division of the statement themes.

Few examples of the final statements are presented in Table 7. For the developed questionnaire, the respondent can answer according to the Likert scale as seen below.

Table 7. An example of statements and the Likert measurement scale from the developed questionnaire.

Statement (FI)	Statement (ENG)	Likert Scale			
		Strongly Disagree	Disa-gree	Agree	Strongly Agree
Sain riittävästi yksilöllistä ohjausta opettajalta kliinisen laboratorion tunneilla.	I received enough direct guidance from the teacher in the clinical laboratories.	1	2	3	4
Palautteen antamiselle oli varattu tarpeeksi aikaa kliinisen laboratorion tunneilla.	There was enough time for feedback in the clinical laboratories.	1	2	3	4
Simulaation jälkipurkukeskustelu oli oppimisen kannalta tärkeä.	The debriefing of simulation was important for learning.	1	2	3	4
Simulaatiotuntien ryhmäkoot olivat sopivia.	Group sizes were suitable in simulation classes.	1	2	3	4

6 Discussion

The purpose of this thesis was to develop a questionnaire that can be used to measure the views of nursing students on the learning of clinical laboratories and simulations. Using the Delphi technique, a questionnaire was developed to answer the study questions.

The developed questionnaire for the four-point Likert scale as a measurement tool was found to be credible in the literature, as well as in previous studies measuring nursing students' views. However, the neutral, often used as “I cannot say” option is not as clear in information value. If there are many “I cannot say” answers in the response form, subjectively viewed, it may be because the form is too tedious to fill out or the options are too difficult. Nonetheless, without a neutral answer option, the statement may go unanswered, and it can be argued that “I cannot say” is more valuable in the answer than completely missing information. Should a neutral “I cannot say” option be included on the scale, the placement could be outside the full scale instead of the middle of the scale. In this case, it would not break the continuum of the scale. (Vehkalahti 2008: 35, 36.) Due to these issues with the neutral answer option, it was omitted from the developed questionnaire. The statements are formulated in a simple and clear way that the student can answer effortlessly.

Feedback from the expert panel rounds of the addition of open-ended questions were justified. For instance, when a student did not learn what was taught in a clinical laboratory or simulation, it would be valuable to know more about the reasons for not learning. The purpose through the expert panel rounds was to develop a structured questionnaire without open questions. However, referring to the purpose of the questionnaire which is to contribute in developing these learning methods, and to compare the methods used in previous studies, an open-ended question of respondents' open feedback was included into the questionnaire. It has been stated that researchers have been divided whether they prefer open-ended or structured questions in their social science research, but also recall that there are numerous studies that apply both types of questions (Hirsjärvi et al. 2009: 200).

The results showed that three different themes were strongly recurring. Themes revolved around the quality of teaching, learning outcome and environment. These were highlighted, because past studies reflected them, and additionally the panellists deemed statements related to these themes as relevant. Based on the outcome of the expert panel rounds, the consensus level, and the themes explored from past studies, the statements developed are deemed reliable.

As the study questions were "What are the nursing students' perceptions on learning in clinical laboratory settings?" and "What are the nursing students' perceptions on learning in simulations?", the development of themes to understand the factors in clinical laboratories and simulations were important to highlight. Furthermore, this was important in developing relevant statements for the questionnaire but also in some form presented in past studies. This is justified because statements such as "Teacher's instructions were clear in the clinical laboratory class" and "The provided clinical equipment supported the realistic setting of the simulation" can provide insight to the teacher whether the learning outcomes are achieved by the respondent, and if not, it may indicate how these learning outcomes can be achieved.

Beside the expert panel rounds, the final statements may be seen as relevant and valid because the findings in the past studies reflect similar themes in their respective questionnaires and data collection methods. For instance, in the study of Newton et al. (2009) it was found out that there was not enough "hands-on" time in the clinical laboratories, as well as that there was a lack of authenticity in these settings, thus decreasing helpful

learning experiences. Based on this, the statement “The provided clinical equipment supported the realistic setting of the simulation” can help measure students' perspectives on the current state of fidelity in the simulations, thus providing knowledge on the desired simulation environment.

However, it is not possible to define a precise criterion for a good questionnaire. It is said that developing a good questionnaire is a form of art. (Hirsjärvi, Remes & Sajavaara 2009: 202.) Validity, reliability and ethical considerations in this thesis are discussed more in the next sub-chapter.

6.1 Validity, reliability and ethical considerations

Validity as a concept expresses the accuracy of what is believed when measuring the gathered data and what was intended to measure. This can be divided further into internal validity. This focuses on the reasons for the results of the research, also helping in reducing other surprising reasons for these results. (Roberts, Priest & Traynor, 2006: 43.) To certify internal validity, the questionnaire must be systematic, regulated and piloted prior to use (Bloomfield & Fisher, 2019: 29).

Developing and piloting the statements for the questionnaire prototype was carried out diligently. This was done to secure the statements reflect the key concepts presented in the study questions. The results showed that the total consensus level of the final statements was 92%, indicating that validity can be considered significant here. The consensus level in relevancy of the results was 94%, meaning that the questionnaire has valid statements presented. Although the final results showed the consensus level with clarity being 90%, there were many written feedbacks from both expert panel rounds regarding the wording or grammar of the statements. The spelling format of statements were carefully examined and edited according to the feedback.

It is essential that methods used to collect data are securely reliable and valid (Bloomfield & Fisher 2019: 29). Reliability indicates an inspection of stability and similarity of the research conditions and methods. It is presumed that the Delphi technique increases reliability in two manners. Firstly, in the decision making process as the participants do not meet directly, thus avoiding group bias and thinking solutions as a group. Secondly, an increase in reliability corresponds with the size of the expert panel. (Keeney, Hasson & McKenna 2011: 96, 97.) On account of our results and the high consensus level, there

was not a significant division between panellists' responses which implies our results being reliable.

This study abided by research ethical principles; self-determination, as participation was voluntary, and participation could have been terminated by the panellist at any time. Privacy and anonymity were respected. (Townsend et al., 2010: 619.) Additionally, all parties within the thesis process agreed on the researchers' obligations and rights. Other principles to comply during the study process included integrity, meticulousness and accuracy, as well as in recording, presenting and assessing the study results. (Finnish Advisory Board on Research Integrity, 2012: 30.) The panellists were all given proper instructions how to reply before the start of the expert panel rounds. The questionnaire prototype contained the same statements for everyone participating and the expert panel rounds also started and concluded by a set date. All responses were made anonymously and were used for research purposes and the data has been disposed accordingly post-analysis.

During this thesis process, we have achieved professional growth and gained more understanding of the researcher's role through various discussions of our thesis subject and of analysis phase. Discretion was used in an ethical manner in avoiding to include statements in panel rounds that are too similar (Keeney, Hasson & McKenna 2011: 109). In addition, decisions in forming the final statements to the questionnaire were not influenced by our own preferences, but by objectively examining the outcome of the panel rounds.

6.2 Limitations

This thesis had its' limitations. Firstly, a pilot study should be conducted to fully assess the effectiveness of this questionnaire, to increase its' validity and reliability (Song, Son & Oh 2015: 328). Secondly, in the Delphi technique process, the assembled expert panel was small in both panel rounds, consisting of four panellists in the first expert round and three panellists in the second expert round, respectively. Although solid results were produced, validity could have been increased further with more panellists. Replying time for the panellists was also tight, as in both panel rounds the replying time was four days due to the thesis' time schedule. It should also be considered that completing this thesis is our very first time, meaning that our abilities as writers of a study and as potential researchers were significantly enhanced during this process.

6.3 Conclusions

The developed questionnaire can be utilized as a part of a study focusing on measuring the nursing students' perspectives on learning in clinical laboratories and simulations. However, a pilot study must be conducted first to assess the feasibility of the developed questionnaire. With this method, it can be seen whether the developed questionnaire is serving its' purpose and if it is applicable. This potential survey can be conducted not only in Metropolia UAS, but also in other similar universities of applied sciences. Furthermore, some parts or the whole questionnaire itself can be modified to match the views or needs of potential survey administrators.

Additionally, nursing teachers implementing clinical laboratories and simulations can use the questionnaire in order to design their courses or classes based on the provided feedback. The results collected with the questionnaire can help further develop the study courses in nursing, as well as help the nursing student to reflect and contemplate the competence of their nursing skills.

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The introduction letter for the expert panel round one

Nursing students' perceptions on clinical laboratory learning and simulations - tool

Ohjeistus suomeksi:

Arvoisa paneelin jäsen,

Olemme tekemässä opinnäytetyötä englanniksi aiheesta ***Developing a questionnaire to measure nursing students' perceptions on learning in clinical laboratories and simulations***. Tässä arvioitavan kyselyn tarkoitus on kuvailla opiskelijoiden näkemyksiä oppimisestaan kliinisissä laboratorioissa sekä hoitotyön simulaatioissa. Olemme laatineet väittämiä, mitkä käsittelevät näitä aiheita. Väittämät on esitetty sekä suomeksi, että englanniksi. Väittämiä on yhteensä 64.

Väittämien asianmukaisuuden ja selkeyden arviointi

Pyydämme Teitä arvioimaan kunkin väittämän kohdalla asianmukaisuutta ja selkeyttä. Asianmukaisuudella tarkoitamme sitä, onko väittämä tärkeä, eli relevantti kyselyymme. Selkeydellä tarkoitamme sitä, onko väittämä selkeästi ilmaistu ja helposti ymmärrettävä. Pyydämme teitä vastaamaan asteikolla 1 = relevantti, 2 = ei relevantti, kun väittämän asianmukaisuutta kysytään, sekä asteikolla 1 = selvä, 2 = epäselvä, kun väittämän selkeyttä kysytään. Mikäli vastauksesi on väittämän kohdalla 2, esitäthän halutessasi perustelun tai parannusehdotuksen väittämään siihen varatulle kohdalle.

Voit myös tämän lomakkeen lopussa halutessasi esittää muita kommentteja tai vaihtoehtoisia väittämiä kyselyyn.

Tarkoituksena on luoda palautteenne pohjalta selkeä mittari, tässä tapauksessa kysely, johon vastataan Likert-asteikon mukaisesti asteikolla 1–4 (vastausvälillä "Olen täysin samaa mieltä" - "Olen täysin eri mieltä"). Valmiin kyselyn tuloksia voitaisiin hyödyntää myöhemmin esimerkiksi opintokokonaisuuksien suunnitteluun.

Vastaamme mielellämme lisäkysymyksiinne.

Nursing students' perceptions on clinical laboratory learning and simulations – tool

Instructions in English:

Dear member of the panel,

We are writing a thesis on the subject ***Developing a questionnaire to measure nursing students' perceptions on learning in clinical laboratories and simulations***. The aim of this assessable questionnaire prototype is to describe the nursing students' perceptions on learning in clinical laboratories and nursing simulations. We have developed statements related to the subject. The statements are presented in Finnish and in English. There are 64 statements.

Assessing the relevancy and clarity of the presented items

We kindly ask you to evaluate the relevancy and clarity of each presented statements. By relevancy we mean to ask if the statement is important, as relevant in our questionnaire. By clarity we mean to ask if the statement is written clearly and in an easily understandable form. We kindly ask you to evaluate in a scale of 1 = relevant, 2 = irrelevant when the relevancy is asked, and in a scale of 1 = clear, 2 = unclear when the clarity is asked, respectively. If your answer is 2 on a certain statement, you are free to leave a comment or a suggestion for your answer.

You can also leave other comments or alternative statements in the end section of the prototype.

The purpose here is to develop an effective measure, a questionnaire, based on your feedback. The respondent would answer according to the Likert scale, ranging from 1 to 4 (by "I strongly agree" to "I strongly disagree"). The results of the completed questionnaire could be utilized for instance in designing future study modules.

Should you have any questions, feel free to contact us.

Statements related to clinical laboratories

#	Finnish	English	Relevant (1) / Irrelevant (2)	Clear (1) / Unclear (2)	Comments
A1	Ennakkotehtävät ovat...	The pre-assignments before...			
A2	Ennakkotehtävät olivat...	The pre-assignments were...			

Statements related to simulations

#	Finnish	English	Relevant (1) / Irrelevant (2)	Clear (1) / Unclear (2)	Comments
B1	Ennakkotehtävät ovat...	The pre-assignments before...			
B2	Sain osaamisestani...	I received...			

Ehdotukset vaihtoehtoisiksi väittämiksi ja/tai kommentit:

Vaihtoehtoiset väittämät	Kommentit

Suggestions for alternative statements and/or comments:

Alternative statements	Comments

The introduction letter for the expert panel round two

Nursing students' perceptions on clinical laboratory learning and simulations - tool

Ohjeistus suomeksi:

Arvoisa paneelin jäsen,

Olemme tekemässä opinnäytetyötä englanniksi aiheesta ***Developing a questionnaire to measure nursing students' perceptions on learning in clinical laboratories and simulations***. Tässä arvioitavan kyselyn tarkoitus on kuvailla opiskelijoiden näkemyksiä oppimisestaan kliinisissä laboratorioissa sekä hoitotyön simulaatioissa. Olemme laatineet väittämiä, mitkä käsittelevät näitä aiheita. Väittämät on esitetty sekä suomeksi, että englanniksi. Väittämiä on yhteensä 39. Valmiissa kyselylomakkeessa on arvioimme mukaan väittämiä noin 25-30.
Sovellamme tässä asiantuntijapaneelin palautteen keruussa Delphi -menetelmää, jossa tyypillisesti kuullaan vähintään kahdelta tai useammalta kierrokselta asiantuntijoiden mielipiteitä ja palautetta tutkittavasta aiheesta. Jokaisen paneelikierroksen jälkeen kerätty aineisto analysoidaan ja referoidaan. Edellisen kierroksen asiantuntijoiden palautteiden yhteenveto annetaan seuraavan kierroksen asiantuntijoiden käyttöön, jota panelisti voi halutessaan hyödyntää. Teidän palautteen avulla kehitämme ja muokkaamme kyselylomaketta, ja haluamme kiittää arvokkaista vastauksistanne.
Osallistut nyt aineiston keruumme toiselle kierrokselle.

Väittämien asianmukaisuuden ja selkeyden arviointi

Pyydämme teitä arvioimaan kunkin väittämän kohdalla asianmukaisuutta ja selkeyttä. Asianmukaisuudella tarkoitamme sitä, onko väittämä tärkeä, eli relevantti kyselyymme. Selkeydellä tarkoitamme sitä, onko väittämä selkeästi ilmaistu ja helposti ymmärrettävä. Pyydämme teitä vastaamaan asteikolla 1 = relevantti, 2 = ei relevantti, kun väittämän asianmukaisuutta kysytään, sekä asteikolla 1 = selvä, 2 = epäselvä, kun väittämän selkeyttä kysytään. Mikäli vastauksesi on väittämän kohdalla 2, esitäthän halutessasi perustelun tai parannusehdotuksen väittämään siihen varatulle kohdalle.
Voit myös tämän lomakkeen lopussa halutessasi esittää muita kommentteja tai vaihtoehtoisia väittämiä kyselyyn.

Tarkoituksena on luoda palautteenne pohjalta selkeä mittari, tässä tapauksessa kysely, johon vastataan Likert-asteikon mukaisesti asteikolla 1–4 (vastausvälillä “Olen täysin samaa mieltä” - “Olen täysin eri mieltä”). Valmiin kyselyn tuloksia voitaisiin hyödyntää myöhemmin esimerkiksi opintokokonaisuuksien suunnitteluun.

Yhteenveto ensimmäisen kierroksen palautteesta:

- Väittämiä ensimmäisellä kierroksella oli yhteensä 64. Nyt niitä on yhteensä 39.
- Väittämien hylkäämiseen, kehittämiseen ja muokkaamiseen liittyviä syitä olivat muun muassa:
    - Asiantuntijat eivät kokeneet väittämää relevantiksi (esim. <51% panelisteista mielsi väittämän x relevantiksi).
        - Huom.: Matala asianmukaisuuden prosentti ei automaattisesti tarkoittanut väittämän hylkäämistä. Myös vapaa kirjoitettu palaute huomioitiin; asianmukaisuus ja selkeys ovat sidoksissa toisiinsa. Jos väittämä oli huonosti muotoiltu ja epäselvä, sen asianmukaisuus ja mitattavan asian tarkkuus kärsivät.
    - Väittämän selkeys (eli mitä kysytään, keneltä kysytään, ja väittämän sanavalinnat) eivät korreloineet väittämän asianmukaisuuden kanssa.
    - Tärkein yksittäinen hylkäämisperuste väittämälle oli turha toisto: Samaa asiaa oli jo kysytty toisessa väittämässä, esimerkiksi samaa asiaa mittaava väittämä oli muotoiltu toisen kerran, mutta vain hieman eri näkökulmasta. Myös samaan teemaan liittyviä väittämiä (esim. hoitotyön välineistä) karsittiin turhan toiston vuoksi.
    - Kieliopilliset virheet: Väittämä oli epäselvästi muotoiltu mittaamaan haluttua asiaa.
        - Suomenkielinen ja englanninkielinen sama väittämä eivät kysyneet täydellisesti samaa asiaa.
        - Osa väittämistä oli preesens-muodossa (esim. Opetus on....), mitkä vaihdettiin menneeseen aikamuotoon (esim. Opetus oli...).
    - Väittämä koettiin osan asiantuntijoiden mielestä tärkeäksi, mutta se ei mitannut selkeästi tutkimukseemme liittyviä teemoja (esim. opiskelijan jännitykseen simulaatioissa liittyvät teemat).
    - Väittämään ei pystynyt vastaamaan Likert-asteikoilla.
    - Väittämässä kysyttiin kahta eri asiaa: tällöin vastauksen täsmällinen informaatioarvo jää vähäiseksi.

- Palautteessa tuotiin esille myös mahdollisuutta vaihtaa vastausasteikko Likert-asteikoista yksinkertaisempaan Kyllä/ei -tyyppiseen asteikkoon, perusteluina kyselylomakkeen pituus opiskelijalle. Tätä vaihtoehtoa punnitsimme ja tulimme lopputulokseen, jossa pidämme Likert-asteikon kyselylomakkeemme vastausasteikkona, sillä se on yleisesti käytetty ja mittaa nimenomaan mielipiteitä. Pyrimme pitämään kyselylomakkeen kompaktina ja selkeänä, jolloin opiskelija jaksaa vastata kyselyymme täsmällisesti. Jos kuitenkin haluat ehdottaa vaihtoehtoista vastausasteikkoa, otamme palautteesi ehdottomasti huomioon.
- Avoimien kysymysten mahdollisuutta lomakkeessa tuotiin esiin. Kyselyymme ei suunnitella avoimia kysymyksiä, sillä haluamme pitää kyselyn selkeästi strukturoituna. Haluamme kuitenkin korostaa, että jos mielestäsi avoimet kysymykset ovat tärkeitä kyselyssämme, kuulemme mielellämme aiheesta lisää.
- Asiantuntijapanelistimme toivat esiin tärkeän asian: Samaa aihetta lähellä olevat väittämät tulisi järjestää temaattisesti yhteen.

Vastaamme mielellämme lisäkysymyksiinne.

Nursing students' perceptions on clinical laboratory learning and simulations – tool

Instructions in English:

Dear member of the panel,

We are writing a thesis on the subject ***Developing a questionnaire to measure nursing students' perceptions on learning in clinical laboratories and simulations***. The aim of this assessable questionnaire prototype is to describe the nursing students' perceptions on learning in clinical laboratories and nursing simulations. We have developed statements related to the subject. The statements are presented in Finnish and in English. There are 39 statements. In the ready, final questionnaire the amount of statements will be around 25-30.

In collecting the data from the expert panel, we are applying the Delphi method in which the panellists' opinions and feedback of the studied subject is heard atleast in two or

more rounds. After each panel round, the collected data will be analyzed and summarised. The summary of the experts' feedback from the previous round is given to the experts' use if they would like to utilize it. With the help of your feedback we improve and edit the questionnaire, and we would like to thank you for your valuable replies.
You are now taking part in the second round of our data collection.

Assessing the relevancy and clarity of the presented items

We kindly ask you to evaluate the relevancy and clarity of each presented statements. By relevancy we mean to ask if the statement is important, as relevant in our questionnaire. By clarity we mean to ask if the statement is written clearly and in an easily understandable form. We kindly ask you to evaluate in a scale of 1 = relevant, 2 = irrelevant when the relevancy is asked, and in a scale of 1 = clear, 2 = unclear when the clarity is asked, respectively. If your answer is 2 on a certain statement, you are free to leave a comment or a suggestion for your answer.
You can also leave other comments or alternative statements in the end section of the prototype.
The purpose here is to develop an effective measure, a questionnaire, based on your feedback. The respondent would answer according to the Likert scale, ranging from 1 to 4 (by "I strongly agree" to "I strongly disagree"). The results of the completed questionnaire could be utilized for instance in designing future study modules.

The summary of the feedback from the first panel round:

- For the first panel round, there were 64 statements. Now there are 39 statements altogether.
- Reasons to discard, improve or edit a statement are listed here below:
  - Experts did not find a statement being relevant (eg. <51% of the panellists found a statement x being relevant).
  - Note: Low percentage in relevancy did not automatically indicate in discarding a statement. The freely written feedback was also considered; relevancy and clarity are connected to each other. If a statement was badly phrased and unclear, the relevancy and accuracy of the matter intended to measure suffered.
  - The clarity of a statement (meaning what is asked, from whom is asked and the wording of the statement) did not correlate with the relevancy of the statement.

- The most crucial reason for discarding a statement was unnecessary repetitiveness: the same subject was asked already in another statement, eg. the same matter intended to measure was rephrased for a second time, but only from different perspective. Also, statements under the same theme (eg. nursing equipments) were reduced due to repetitiveness.
- Grammar mistakes: The statement was written unclearly to measure a subject. To add, the Finnish and English statement counterparts did not precisely ask the same question.
- Some of the statements were written in present form (eg. Teaching is...) which were then changed into past tense (eg. Teaching was...).
- Some of the experts found a statement being important, but it did not ultimately measure clearly the themes of our study (eg. Themes revolving around the student's nervousness in simulations).
- A statement could not be replied in Likert scale format.
- A statement had two different subjects in it, meaning that the exact information value would be ambiguous.

- The feedback also brought up a possibility to switch the Likert scale format into a more simplified yes/no scale format that was justified with the length of the questionnaire for a student. We weighed on this option and came into conclusion that the Likert scale format will be kept in our questionnaire as it has been used frequently and it measures precisely opinions. We intend to keep the questionnaire short and clear so the student can reply to it carefully. However, if you would like to suggest an alternative answer format, we absolutely take your feedback into consideration.
- Additionally, a possibility for open questions structure was brought up. There are no intentions to design open question format statements into our instrument due to us wanting to keep the questionnaire clearly structured. However, we do want to underline that should you consider the open questions format being important in our instrument, we would gladly hear more about this matter.
- The expert panellists brought up a crucial fact: The statements revolving around a certain theme should be sequenced accordingly.

Should you have any questions, feel free to contact us.

Statements related to clinical laboratories

#	Finnish	English	Relevant (1) / Irrelevant (2)	Clear (1) / Unclear (2)	Comments
A1	Ennakkotehtävät ovat...	The pre-assignments before...			
A2	Ennakkotehtävät olivat...	The pre-assignments were...			

Statements related to simulations

#	Finnish	English	Relevant (1) / Irrelevant (2)	Clear (1) / Unclear (2)	Comments
B1	Ennakkotehtävät olivat...	The pre-assignments before...			
B2	Opettajan ohjeistus...	Instructions for...			

Ehdotukset vaihtoehtoisiksi väittämiksi ja/tai kommentit:

Vaihtoehtoiset väittämät	Kommentit

Suggestions for alternative statements and/or comments:

Alternative statements	Comments