Clinical education

Nursing students' experiences of nurse teacher mentoring and beneficial digital technologies in a clinical practice setting

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ABSTRACT

Due to educational reforms in Finland, the nurse teacher's role is being reduced in mentoring of nursing students in the clinical practice. Students reported experiencing a lack of instruction and feeling abandoned in the clinical practice. The aim of this study was to describe nursing student experiences of mentoring by nurse teachers in clinical practice, as well as the benefits of digital technology in this context. Qualitative study design was used with semi-structured focus group interviews. Nursing students (n = 15) who had completed at least one clinical placement during their nursing education. Data were collected in autumn 2017 from two universities of applied sciences in northern Finland. The data were analyzed using inductive content analysis. Mentoring by nurse teacher was perceived as a key part of learning evaluation, integrating theoretical and practical knowledge, understanding the student's role and emotional support. The results also revealed that mentoring can be improved by using digital technology. However, technology cannot completely replace face-to-face mentoring. The mentoring provided by nurse teachers plays an important role in the success of a nursing student's clinical practice. Digital technology can be leveraged to enhance the learning experience when easy-to-use and ubiquitous applications are integrated into the clinical learning setting.

1. Introduction

The clinical competence of nursing students is important from societal, healthcare system and patient care perspectives (Pahkala et al., 2013). Nursing education includes a theoretical component, which is taught in the academic environment, and practical teaching, which occurs in the clinical learning environment. Clinical practice accounts for up to 50% of nursing studies (EEC 77/452/EEC, EEC 89/595/EEC), and affords students unique learning experiences in an authentic clinical environment (Henderson et al., 2012). During the clinical practice, nursing students are guided by nurse teachers, who represent higher education institutions (Price et al., 2011), and clinical mentors who represent healthcare staff (Pitkänen et al., 2018). In the latest systematic review of health science teacher competence areas, a teacher's capability to teach healthcare students was defined by the teacher's professional education, years of working experience in the clinical setting and possessing a higher educational degree (Mikkonen et al., 2018). Changes in the European higher education system have reduced the amount of nurse teachers in clinical placements (Warne et al., 2010)

and have modified the role of clinical staff by entrusting them with more responsibilities (Jokelainen, 2013; Mikkonen et al., 2017, 2019; Tuomikoski et al., 2018). Because of lack of resources, nurse teachers have often used group mentoring instead of individual mentoring during reflection of learning and students' assessment in clinical practice (Ronkainen et al., 2019). Previous studies have also shown mentoring by nurse teachers to be important to pedagogical and psychological support (Price et al., 2011) as well as student counseling, all of which facilitate a student's professional and clinical practice development (Luhanga et al., 2008). The recent reduction in nurse teacher participation within the clinical learning environment has been accompanied by the introduction of digital technology as a tool for maintaining communication between nurse teachers and students (Strandell-Laine et al., 2018). Earlier research has shown that innovations in digital technologies have significantly changed higher education teaching and learning (Report of European Commission, 2014). For this reason, it was important to further examine nursing students' experiences of mentoring by nurse teachers, as well as describe their perceptions of how the utilization of digital technology benefits

mentoring.

2. Background

Mentoring involves a co-operative process between the mentor and student which supports and promotes student learning, problem-solving skills, critical thinking, clinical reasoning and professional competence (Pitkänen et al., 2018). Mentoring requires the clinical education to focus on what is sought from learning outcomes (Löfmark et al., 2012). The mentoring provided by nurse teachers and clinical mentors differs in that nurse teachers are familiar with the students' degree program curriculum and actively help students integrate their theoretical knowledge into clinical competence development (Carnwell et al., 2007). Nurse teachers participate in the mentoring of students according to their own professional expertise and the student's clinical learning outcomes (Hallin and Danielson, 2009; Mikkonen et al., 2019); in this way, they can act as a contact person, adopt the role of a co-ordinator, and/or support the student (Dimitriadou et al., 2015). Nurse teachers support students while clinical mentors provide time for reflection and common discussion (Price et al., 2011). Contact with nurse teachers allows students to set their own learning goals and helps guide the development of their professional competence (Dimitriadou et al., 2015).

In a study examining social and healthcare educators' competence, the educators' shared their challenges in recognizing the high responsibility of students in work related practice and in not being provided enough resources to mentor students in their learning (Mikkonen et al., 2019). Several suggestions have been made and tools have been developed to support nurse teachers to guide students in their clinical practice. For instance, nurse teachers can keep in contact with students via mobile devices (Mackay and Harding, 2009), versatile digital communication tools (Saarikoski et al., 2013), and/or digital discussion forums (Hulkari and Mahlamäki-Kultanen, 2008). Digital technology solutions are considered to be an important communication channel among nurse teachers (Saarikoski et al., 2013; Strandell-Laine et al., 2018), and earlier reports suggest that innovative technologies could enhance the communication between students and nurse teachers.

Healthcare education, among others, has benefited from digital technology since technology will be an important part of the future nursing environment (Levett-Jones et al., 2009). Within nursing education, digital technology can be leveraged to help students reach certain learning outcomes (Knudson, 2013). The global trend in healthcare education includes modernizing learning environments as well as recognizing digitalization as an opportunity to improve current pedagogical approaches. Digital technology offers tremendous opportunities for making educational changes and considering the individual needs of students (Männistö et al., 2019a, 2019b). Furthermore, novel technologies can provide alternatives to how information has traditionally been exchanged; for example, virtual environments can mimic real-world face-to-face encounters. Recognizing the value of digital technology opens up opportunities for collaboration and the efficient sharing of resources. It can also improve communication, mentoring and the way in which students receive feedback (Report of European Commission, 2014). In the context of nursing education, digital technology has been recognized as a useful way to develop students' reflection skills and gather information on student experiences from clinical practice.

3. Methods

3.1. Research aim and research questions

The presented research aimed to describe nursing student experiences of mentoring by nurse teachers in clinical practice, as well as the benefits of digital technology in this context.

The research questions were:

1. What kinds of experiences did nursing students have regarding mentoring by nurse teachers in clinical practice?
2. What types of benefits did nursing students experience when digital technology was used in conjunction with mentoring by nurse teachers?

3.2. Research design

The qualitative research method was used to investigate a broad and poorly understood research area situated within the rapidly changing health sciences education sphere (Elo and Kyngäs, 2008). The trustworthiness of the study was strengthened by following the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist (Tong et al., 2007).

3.3. Participants and settings

The presented research included 15 nursing students who had completed at least one clinical placement during their nursing studies. The participants were invited to take part in the study by a first author through university of applied sciences or by the nurse teachers. Purposeful sampling was used to recruit volunteer participants to the study (Polit and Beck, 2010). The participants (n = 15) included six male and nine female nursing students. The average age was 37 years, with the youngest student being 25 years old and the oldest being 49 years old. The participants' background education spanned high school, vocational education, university of applied sciences and university degree. All of the students included in this study had experiences of mentoring by nurse teachers during their clinical practice.

Clinical practice in Finland is conducted by students in primary and/or specialized healthcare sector. Students select their clinical practice according to their curriculum and their own level of competence in nursing. Nurse teacher is a responsible person to guide students in making a correct choice of their clinical practice, to mentor students in their process of learning and to conduct a final evaluation of the students' learning at the end of their practice. Once students enter clinical practice, they receive a clinical mentor, who is a staff nurse responsible of students' mentoring in their own learning context. (Jokelainen, 2013).

3.4. Data collection

The data were collected in autumn 2017 from two universities of applied sciences in Finland. The students who met the inclusion criteria and voluntarily responded to the invitation participated in five semi-structured focus group interviews. The five focus groups included 3–5 students per group, 15 students in total. The interview process and the interview questions were tested. The pre-test interview did not differ from the main interviews and, for this reason, was included in the final data analysis. (Polit and Beck, 2010). The data were collected during school days in focus groups in quiet classrooms, which were run by the first author (A-TH) of this study. The authors conducting the study did not have previous involvement with the participants and represented a research group in healthcare education from a university different from that of the participants. The researchers involved in the study have a background in nursing science with an educational level of a Master degree and/or a Doctoral degree. Interviews lasted an average of 77 min.

Interviews were guided by semi-structured themes formed based on previous studies, including topics of mentoring by nurse teachers in the clinical learning environment and utilization of digital technology in mentoring. More precisely, the students were asked: what kind of mentoring do students need during clinical practice; what kind of experiences do they have relating to the role of a nurse teacher in clinical practice; has digital technology been used in mentoring students' clinical practice; what digital technologies have been implemented; and

what kind of experiences did students have with digital technology.

The interview themes were given to participants prior to data collection. The questions were open-ended, which gave participants freedom to share their broad experiences on the topic. The data collection process concluded once no more new information was provided. Data were transcribed into the Microsoft Office word processing program for further data analysis.

3.5. Data analysis

The data were analyzed using inductive content analysis, which helped structure and categorize observed phenomena and provide consistent descriptions (Elo and Kyngäs, 2008). The analysis was carried out manually according to the two research questions without using any software program. The interview transcripts were read through several times until meaning units corresponding to the research purpose and questions were identified. The experiences of mentoring by nurse teachers concept was defined by 150 codes, 23 sub-categories, seven categories and two main categories (Elo and Kyngäs, 2008). The benefits of digital technology concept was defined by 95 codes, 16 sub-categories, four categories and two main categories. To ensure that the analysis is trustworthy, the authors (A-TH, MK, JJ, KM) returned to the raw data several times to check that no relevant information was lost during the analytical process.

3.6. Ethical considerations

The researchers ensured that good scientific practice was followed at all stages of the research. Research permission was requested and granted by two universities of applied science in accordance with their practices. Participating students were informed about the study, and the interviewees indicated their willingness to participate in the research. A form of informed consent was provided to all participants prior to the interviews. Participation in the study was voluntary and conscientious, and participants were given the opportunity to suspend the research if they desired. All of the researchers understood their ethical responsibility to correctly represent the data by allowing the voice of the students to be heard (Stang, 2015).

4. Results

4.1. Student experiences of mentoring by nurse teachers

Nursing students' experiences of mentoring by nurse teachers in the clinical practice setting were defined by two main categories: competent pedagogical mentoring and organizational guidance (see Table 1). Competent pedagogical mentoring was explained by continuous nurse teacher support during mentoring, targeting and supporting student needs during mentoring, building the student - nurse teacher mentoring relationship, adaptability of mentoring and professional role of the nurse teacher. Students expressed a need for continuous guidance from mentors before the start of the training as well as at the beginning, middle and end of the clinical practice. One of the participants shared: "*I would say that the midpoint evaluation is an important part of mentoring. It guides me to consider what I can do with the remaining time to reach my own goals. (Interviewee, nr 14)*". The category of targeting and supporting student needs during mentoring emerged from evaluation of learning, guidance in setting learning outcomes, support in the integration of theory and practice, and directing students to find their own role in learning. Students hoped that nurse teachers would guide them in self-evaluation and learning evaluations.

In terms of integration of theory and practice, preliminary knowledge of the future clinical placement was considered useful. Students considered both the practical work experience of the nurse teacher and their knowledge of the clinical placement to be important factors in the integration of theory and practice. Nurse teachers' guidance in helping

students understand their own role in learning was also identified as an important part of developing clinical competence. The building of a student - nurse teacher mentoring relationship was defined by trustworthiness, collaboration, a valuable relationship, and emotional support. The confidentiality to share experiences with the nurse teachers was revealed to be a special feature of the student – mentor relationship. In contrast, the student – mentor relationship was challenged and/or strained if the student had any feelings of inadequacy.

The adaptability of mentoring was described as a mentor's competence in responding to diversity, focusing on student needs, and being able to offer mentoring discussions. Students hoped that the nurse teacher would guide them through their learning process. Furthermore, students expressed a desire for flexible student-centered mentoring that could be adjusted to the student's progress and needs during clinical practice. The interviews revealed that students would prefer mentoring discussions to include only nurse teachers and clinical mentors. Students did not want group reflections with other students because they felt that this would halt them from saying what they are really thinking about. However, group reflections were commonplace in clinical practice settings.

The professional role of nurse teachers was explained by the teacher's professional skills, clinical expertise, competence in student-centered mentoring, and motivation to act as a mentor. The professional role of a nurse teacher was visible in the teacher's professional skills, which both helped the teacher strengthen the direction of the student's work and served as a role model for professionalism. One students expressed: "*At least for me, it was important that I in some way knew the teacher from before, that they had taught me previously, as this would help me be brave enough to express my true experiences (Interviewee, nr 6).*" Student-centered mentoring emerged from interaction, a student orientation and the teacher's focus on student affairs. It was important for students to be heard and for them to find answers to their questions. A motivated mentor had a genuine interest and desire to help. These types of teachers also encouraged students to make contact and do not share their work issues and/or stress with students.

The organizational guidance concept included clinical practical guidance and mentoring students through challenging situations. Clinical practical guidance comprised guidance on various practical issues, such as filling in forms, making assignments, clarifying practical matters, completing the number of hours in clinical placement, and reimbursing absent hours in practice. Guidance was also needed if the student did not experience enough learning situations during their practice. In connection with the clinical placement, guidance enabled students to provide feedback to both the clinical mentor and clinical placement site, as well as take part in rescheduling the clinical placement. Students observed that nurse teacher mentoring was less important when sufficient information was provided prior to the clinical placement and no further unexpected challenges occurred during the clinical practice.

In challenging situations, students saw nurse teachers as a support, or "back wall", as well as a guardian of students' rights. In such situations, teachers were supportive, conscious of the responsibilities of students and clinical mentors, and able to guide students to focus on their professional growth. When discussing challenging situations, students felt that it is essential to develop an action plan and for nurse teachers to consider students' requests when handling the situation. One student shared: "*If you think that you would not be the problem, then the role of the teacher is very important, as they act as a mediator and will intervene if the situation arises (Interviewee, nr 3).*" Students felt that the teacher should have the ability and courage to intervene and mediate the conversation in such situations.

4.2. Benefits of digital technology

The second concept identified through the inductive content analysis, benefits of digital technology, was described by the following

Table 1

Nursing student experiences of mentoring by nurse teachers in clinical practice.

Sub-category	Category	Main category
Support provided at different times during the clinical practice	Continuous nurse teacher support during mentoring	Competent pedagogical mentoring
Active participation in students' clinical practice		
Evaluation of learning	Targeting and supporting student needs during mentoring	
Guidance in setting of learning outcomes		
Integration of theory and practice		
Directing students in finding their own role in learning		
Trustworthy relationship	Building the student - nurse teacher mentoring relationship	
Collaborative relationship		
Valuable relationship		
Emotional support		
Adapting to diversity	Adaptability of mentoring	
Focusing on student needs		
Providing mentoring discussions when needed		
Teacher's professional skills	Professional role of the nurse teacher	
Teacher's clinical expertise		
Teacher's competence in student-centered mentoring		
Nurse teacher motivation to mentor		
Providing practical instructions	Clinical practical guidance	Organizational guidance
Mentoring students in specialized patient care		
Highlighting the need of mentoring		
Nurse teacher's role	Mentoring students through challenging situations	
Taking responsibility in challenging situations		
Finding solutions to challenging situations		

Table 2

Benefits of digital technology in mentoring.

Sub-category	Category	Main category
Experiences of using phones in mentoring	Digital technology experiences in the field of mentoring	External aspects influencing digital technology utilization
Experiences of using email in mentoring		
Digital technology usage requirements	Encounters that should be considered in the utilization of digital technology	
Aspects influencing increased technology use		
Challenges affecting technology utilization		
Advantages of discussion forums	Various methods of integrating digital technology into mentoring	Digital technology to support mentoring
Advantages of video calls		
Use of recording in mentoring		
Use of mobile phone applications in mentoring		
Use of new innovative digital technologies in mentoring		
Ubiquitous mentoring		
Gap between digital solution and reality	Outcomes of integrating digital technology into mentoring	
Virtual mentoring		
Student evaluation		
Following student performance		
Communication source		

categories: external aspects influencing digital technology utilization and digital technology to support mentoring (see Table 2). The external aspects influencing digital technology utilization included digital technology experiences in the field of mentoring and encounters that should be considered in the utilization of digital technology. Digital technology experiences in the context of mentoring stemmed from the use of phones and emails. The phone was found to be useful, especially during the final evaluation discussions, as the student could hear the voice and tone of the nurse teacher. However, the weakness of phone mentoring is that it needs to be prepared in advance and a timetable has to be agreed.

Students felt that the utilized programs must be accessible on different devices and, if necessary, offline use should be possible. Furthermore, students shared that the connection must be pre-encrypted, the size of the font should be sufficient for the size of the screen, the connection should be functional, the use of a digital technology solution should also be possible without logging in, and multiple installations over different devices are not desired. Students noted that they had better experiences of technology if they are comfortable using similar digital technology solutions and existing software. One student shared: *"If there is such a program that can be easily accessed, I only click*

and log in, so that is it. As simple as possible and easy to use (Interviewee, nr 5)." Students identified the lack of digital technology skills or nurse teachers having difficulties with the equipment and software as challenges to the effective use of technology. Students also reported that learning facilities were sometimes inconsistent, difficult to find, and the platforms used were too often exchanged at university. Students wanted the teachers to use the same technological solutions.

Digital technology to support mentoring was divided into various methods for integrating digital technology into mentoring and outcomes of integrating digital technology into mentoring. Various forums, such as Facebook, Whatsapp, Messenger, email and learning platforms, were utilized to support mentoring. The use of videoconferencing in mentoring was considered important because this allowed students to see their nurse teachers. The utilization of Adobe Connect, FaceTime, and various other video-calling applications was required. As one student shared: *"Skype would be so good, then I would not necessarily have to be there at any stage, but I would see the faces and gestures and I would know that I am there (Interviewee, nr 13)"*. Several students mentioned that the ability to leverage technological solutions for face-to-face communications could enhance interaction between mentor and student. As one interviewee (nr.15) shared: *"Just digital technology contact -*

there's that proximity to normal interaction with the person … so I guess the teacher's meaning disappears altogether." The implementation of digital technology was seen as a possibility, except when students had to deal with challenging clinical practice situations. Students also perceived a gap between the digital technology solution and the reality they were experiencing. For example, when using certain technological solutions, the students could give their teachers the false picture that everything is going well. Moreover, some students felt that the guidance they received from the nurse teacher was lost if interactions occurred solely through digital technology.

5. Discussion

Regular mentoring by a nurse teacher can improve the student's clinical experience and simultaneously ensure that they achieve their learning outcomes. From a student's point of view, the mentoring nurse teacher should be present and available at regular intervals (Price et al., 2011; Pitkänen et al., 2018), starting at the beginning of clinical practice and continuing until the final evaluation (Immonen et al., 2019). This study revealed that certain students desire mentoring before the start of clinical practice to get an introduction to the upcoming clinical practice. In order to succeed in learning and future professional development, nursing students need good preparation for clinical placement, which includes setting their own learning outcomes, taking accountability for their own learning and the development of an interest in the profession, and commitment towards learning (Jokelainen, 2013). In the latest review of reviews (Immonen et al., 2019) relating to clinical assessment of nursing students' clinical practice, it was found that the focus of assessment needs to be on students' continuous learning instead of their final evaluation and grading, with reflection and constructive feedback from the clinical mentor and nurse teacher.

It has been found that students feel abandoned if there is a lack of nurse teacher visits (Price et al., 2011; Mikkonen et al., 2017). This study showed that the nurse teacher's clinical expertise, as well as their familiarity with the clinical placement, are important to nursing students. It was also shown that students perceive the integration of theory and practice by mentors as meaningful support. Previous research found that students with insufficient theoretical knowledge and clinical practice are more likely to experience challenging situations in the workplace (Killam and Heerschap, 2013). Additionally, clinical mentors' responsibility is to ensure growth in learning outcomes during students' clinical practice despite the fact that most of clinical mentors do not have any previous education in mentoring students (Tuomikoski et al., 2018).

In this study students listed emotional support and empathetic guidance as important facets of mentoring. Mikkonen et al. (2015) showed that a nursing teacher's empathy positively influences student learning and professional development. The results of this study further showed that a teacher's empathy positively influences communication, which gave students courage to ask questions from the teacher, express their concerns and clarify issues that had emerged during their clinical practice. The positive mentoring relationship provides students with a higher motivation for their professional development and helps students recommend clinical practice to their fellow students (Pitkänen et al., 2018). A challenge highlighted in this study - nurse teachers' lack of involvement with student learning during both clinical assignments and the final evaluation – has recently been reported elsewhere (Teuho et al., 2017). In this study, the students envisioned nurse teachers to provide support and act as the conflict manager in accordance with student wishes when they experienced a demanding situation. According to Juntunen et al. (2016), when the student faced a challenge, the teacher specified the curricular learning outcomes, discussed with the student, gave advice and prepared the student for evaluation. However, in a study with mentors and staff nurses, the challenging situations remained to be resolved within the team of clinical staff with minimal or no involvement by nurse teachers (Tuomikoski et al., 2018).

There has been a clear decrease in the amount of nurse teachers participating in clinical placements during recent years in Europe (Warne et al., 2010). In this study, students were asked to consider the importance of face-to-face mentoring and the impact of digital technology-oriented mentoring. Students felt that the use of only digital technology-based mentoring was not enough as it created a student – nurse teacher relationship that felt distant if face-to-face mentoring was missing. Higher education institutions have been recommended to adopt new, innovative digital technologies and digital content to improve quality and efficiency in clinical placements (Report of European Commission, 2014). Mobile devices are considered a valuable tool for increasing cooperation between nurse teachers and students (Wu, 2014). When asked about digital technology utilization, students mentioned challenges linked to connection problems, device management and software compatibility. In order to ensure successful use, it is important to educate students in the technology and familiarize them with the selected equipment (Martyn et al., 2014). In a study with social and healthcare educators (Männistö et al., 2019c) it was reported that educators implemented digital technology in their daily work but did not have high enough competence to support students pedagogically via the digital technology.

In addition to face-to-face meetings, most of the students also use digital technology (i.e. e-mail, phone or other virtual learning environments) to communicate with their nurse teacher during clinical practice (Saarikoski et al., 2013). In this study, using phones in conjunction with mentoring was perceived positively in terms of text messaging, as this was a quick and easy way to connect. The use of text messages was considered beneficial if the messages were short, the issue was relatively simple and the teacher could answer in message form. Students did not wish to resolve problem situations via text messages (Young et al., 2010). Earlier research has shown that the possibility of communicating with nurse teachers via the phone increases the sense of support, motivation, and encouragement, as well as makes cooperation with nurse teachers more flexible (Mackay and Harding, 2009; Strandell-Laine et al., 2018).

5.1. Study limitations

This study has some limitations. First, the interviews were conducted using a thematic interview structure. In this way, the data depth could have been limited by how the themes chosen for the study were formulated. However, despite the chosen themes, the researcher encouraged participants to share their experiences by modifying interviews questions in an open-ended manner, and this should have offset the potential lack of data depth (Rabionet, 2011). Furthermore, the results should be generalized with caution since the participants were from two universities of applied sciences (Polit and Beck, 2010). Only a small group participated in the study, but they were able to provide descriptive data by answering research questions in a qualitative study (Elo and Kyngäs, 2008). The study was further strengthened by rigid and careful data analysis, which included detailed reporting of the data.

6. Conclusion

Mentoring provided by nurse teachers plays an important role in nursing students' clinical development. Hence, this unique component of nursing education should be given more attention in future clinical learning environments despite the recent organizational changes. Furthermore, the utilization of digital technology can improve mentoring when it takes into account the individual needs of nursing students. In addition, student-centered mentoring supports students' clinical learning processes, with a nurse teacher's professionalism, competence in mentoring, as well as knowledge and interest regarding student needs contributing to successful mentoring. Students especially value mentoring when exposed to challenging situations. Future research should study the effectiveness of digital technology-driven

mentoring, particularly in the context of demanding clinical practice situations, as well as evaluate the technology competence of nurse teachers.

Authors' contribution

Antti-Tuomas Heinonen: conception and design, acquisition of data and analysis, interpretation of data, drafting the article by revising it critically for important intellectual content, and final approval of the version submitted.

Maria Kääriäinen and Jonna Juntunen: drafting the article by revising it critically for important intellectual content, and final approval of the version submitted.

Kristina Mikkonen: conception and design, data analysis, interpretation of data, drafting the article by revising it critically for important intellectual content, and final approval of the version submitted.

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Declaration of competing interest

None.

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Appendix A. Supplementary data

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References

Carnwell, R., Baker, S.A., Bellis, M., Murray, R., 2007. Managerial perceptions of mentor, lecturer practitioner and link tutor roles. Nurse Educ. Today 27, 923–932.

Dimitriadou, M., Papastavrou, E., Efstathiou, G., Theodorou, M., 2015. Baccalaureate nursing students' perceptions of learning and supervision in the clinical environment. Nurs. Health Sci. 17, 236–242.

Elo, S., Kyngäs, H., 2008. The Qualitative content analysis process. J. Adv. Nurs. 62 (1), 107–115.

European Commission, 2014. High Level Group on the Modernisation of Higher Education. New Modes of Learning and Teaching in Higher Education. European Commission, Brussels, Belgium.

Hallin, K., Danielson, E., 2009. Being a personal preceptor for nursing students: registered nurses' experiences before and after introduction of a preceptor model. J. Adv. Nurs. 65 (1), 161–174.

Henderson, A., Cooke, M., Creedy, D.B., Walker, R., 2012. Nursing students' perceptions of learning in practice environments: a review. Nurse Educ. Today 32 (3), 299–302.

Hulkari, K., Mahlamäki-Kultanen, S., 2008. Reflection through web discussions: assessing nursing student's work-based learning. J. Workplace Learn. 20 (3), 157–164.

Immonen, K., Oikarainen, A., Tomietto, M., Kääriäinen, M., Tuomikoski, A.M., Kaucic, M.K., Filej, B., Riklikiene, O., Vizcaya-Moreno, F.V., Perez-Cañaveras, R.V., De Raeve, Pl, Mikkonen, K., 2019. Assessment of nursing students' competence in clinical practice: a systematic review of reviews. Int. J. Nurs. Stud. https://doi.org/10.1016/j.ijnurstu.2019.103414.

Jokelainen, M., 2013. The elements of effective student nurse mentorship in placement learning environments. In: Systematic Review and Finnish and British Mentors' Conceptions. Doctoral dissertation. University of Eastern Finland, Kuopio, Finland.

Juntunen, J., Ruotsalainen, H., Tuomikoski, A.M., Kääriäinen, M., 2016. Mentors' perceptions of unsafe student situations and dealing with them in clinical practice (in Finnish). Hoitotiede 28 (2), 123–136.

Killam, L.A., Heerschap, C., 2013. Challenges to students learning in the clinical settings: a qualitative descriptive study. Nurse Educ. Today 33 (6), 684–691.

Knudson, L., 2013. Integrating simulation into student learning experiences. AORN J. 97 (4), 5–6.

Levett-Jones, T., Kenny, R., Van der Riet, P., Hazelton, M., Kable, A., Bourgeois, S., Luxford, Y., 2009. Exploring the information and communication technology competence and confidence of nursing students and their perception of its relevance to clinical practice. Nurse Educ. Today 29 (6), 612–616.

Luhanga, F., Yonge, O., Myrick, F., 2008. Precepting an unsafe student: the role of the faculty. Nurse Educ. Today 28 277-231.

Löfmark, A., Thorkildsen, K., Råholm, M.B., Natvig, G.K., 2012. Nursing students' satisfaction with supervision from preceptors and teachers during clinical practice. Nurse Educ. Pract. 12 (3), 164–169.

Mackay, B., Harding, T., 2009. M-support: keeping in touch on placement in primary health care settings. Nurs. Prax. N. Z. 25 (2), 30–40.

Männistö, M., Mikkonen, K., Kuivila, H., Virtanen, V., Kyngäs, H., Kääriäinen, M., 2019a. Digital collaborative learning in nursing education: a systematic review. Scand. J. Caring Sci. https://doi.org/10.1111/scs.12743.

Männistö, M., Mikkonen, K., Vuopala, E., Kuivila, H., Virtanen, V., Kyngäs, H., Kääriäinen, M., 2019b. Effects of a digital educational intervention on collaborative learning in nursing education: a quasi-experimental study. Nord. J. Nurs. Res. https://doi.org/10.1177/2057158519861041.

Männistö, M., Mikkonen, K., Kuivila, H., Koskinen, C., Koivula, M., Sjögren, T., Salminen, L., Saaranen, T., Kyngäs, H., Kääriäinen, M., 2019c. Health and Social Care Educators' Competence in Digital Collaborative Learning: a Cross-Sectional Survey. Manuscript.

Martyn, J., Larkin, K., Sander, T., Yuginovich, T., Jamieson-Proctor, T., 2014. Distance and devices – potential barriers to use of wireless handheld devices. Nurse Educ. Today 34 (3), 457–461.

Mikkonen, K., Kyngäs, H., Kääriäinen, M., 2015. Nursing students' experiences of the empathy of their teachers: a qualitative study. Adv. Health Sci. Educ. 20 (3), 669–682.

Mikkonen, K., Elo, S., Miettunen, J., Saarikoski, M., Kääriäinen, M., 2017. Clinical learning environment and supervision of international nursing students: a cross-sectional study. Nurse Educ. Today 52, 73–80.

Mikkonen, K., Ojala, T., Sjögren, T., Piirainen, A., Koskinen, C., Koskinen, M., Koivula, M., Sormunen, M., Saaranen, T., Salminen, L., Koskimäki, M., Ruotsalainen, H., Lähteenmäki, M.L., Wallin, O., Mäki-Hakola, H., Kääriäinen, M., 2018. Competence of health science teachers – a systematic review of quantitative studies. Nurse Educ. Today 70, 77–86.

Mikkonen, K., Koskinen, M., Koskinen, C., Koivula, M., Koskimäki, M., Lähteenmäki, M.L., Mäki-Hakola, H., Wallin, O., Salminen, L., Sormunen, M., Saaranen, T., Kuivila, H.M., Kääriäinen, M., 2019. Qualitative study of social and health care educators' perceptions of competence in education. Health Soc. Care Community. https://doi.org/10.1111/hsc.12827.

Pahkala, T., Lukkarinen, H., Kääriäinen, M., 2013. Clinical competence of nursing students (in Finnish). Hoitotiede 25 (1), 12–23.

Pitkänen, S., Kääriäinen, M., Oikarainen, A., Tuomikoski, A., Elo, S., Ruotsalainen, H., Saarikoski, M., Kärsämänoja, T., Mikkonen, K., 2018. Healthcare students' evaluation of the clinical learning environment and supervision – a cross-sectional study. Nurse Educ. Today 62, 143–149.

Polit, D., Beck, C., 2010. Generalization in quantitative and qualitative research: myths and strategies. Int. J. Nurs. Stud. 47 (11), 1451–1458.

Price, L., Hastie, L., Duffy, K., Ness, V., McCallum, J., 2011. Supporting students in clinical practice: preregistration nursing students' views on the role of the lecturer. Nurse Educ. Today 31, 780–784.

Rabionet, S.E., 2011. How I learned to design and conduct semi-structured interviews: an ongoing and continuous journey. Qual. Rep. 13 (1), 4–12.

Ronkainen, S., Mikkonen, K., Ruotsalainen, H., Kääriäinen, M., 2019. Nursing students' experiences of group mentoring organized by nurse teacher during clinical practice (in Finnish). Nurs. Sci (in press).

Saarikoski, M., Kaila, P., Lambrinou, E., Perez Canaveras, R.M., Tichelaar, E., Tomietto, M., Warne, T., 2013. Students' experiences of cooperation with nurse teacher during their clinical placements: an empirical study in a Western European context. Nurse Educ. Pract. 13, 78–82.

Stang, J., 2015. Ethics in action: conducting ethical research involving human subjects: a primer. J. Acad. Nutr. Diet. 115 (12), 2019–2022.

Strandell-Laine, C., Saarikoski, M., Löyttyniemi, E., Meretoja, R., Salminen, L., Leino-Kilpi, H., 2018. Effectiveness of mobile cooperation intervention on students' clinical learning outcomes: a randomized controlled trial. J. Adv. Nurs. https://doi.org/10.1111/jan.13542.

Teuho, S., Roto, H., Sulonen, T., Vikberg-Aaltonen, P., Sankelo, M., 2017. The negative experiences of healthcare students during clinical training (in Finnish). Tutkiva Hoitotyö 15 (1), 10–17.

Tong, A., Sainsbury, P., Craig, J., 2007. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int. J. Qual. Health Care 19 (6), 349–357.

Tuomikoski, A.M., Ruotsalainen, H., Mikkonen, K., Ohtonen, P., Miettunen, J., Kääriäinen, M., 2018. The Nurse mentor competence of mentoring nursing student in clinical practice in Finland -cross sectional survey. Nurse Educ. Today 71, 78–83.

Warne, T., Johansson, U.-B., Papastavrou, E., Tichelaar, E., Tomietto, M., Van den Bossche, K., Moreno, M.F.V., Saarikoski, M., 2010. An exploration of the clinical learning experience of nursing students in nine European countries. Nurse Educ. Today 30 (8), 809–815.

Wu, T.T., 2014. Using smart mobile devices in social-network-based health education practice: a learning behavior analysis. Nurse Educ. Today 34 (6), 958–963.

Young, P., Moore, E., Griffiths, G., Raine, R., Stewart, R., Cownie, M., Frutos-Perez, M., 2010. Help is just a text away: the use of short message service texting to provide an additional means of support for health care students during practice placement. Nurs. Educ. Today 30 (2), 118–123.