The Canadian Journal for the Scholarship of Teaching and Learning

Volume 14 | Issue 1 Article 2

Spring 05-31-2023

Concept Mapping in a Flipped Clinical Environment: A Basic Qualitative Study

Juliet Onabadejo
Red Deer Polytechnic, juliet.onabadejo@rdpolytech.ca

https://doi.org/10.5206/cjsotlrcacea.2023.1.8534

Concept Mapping in a Flipped Classroom Clinical Environment: A Basic Qualitative Study

Abstract

The need to encourage critical thinking and academically engage nursing students in a clinical environment compels faculty use of assorted teaching strategies, including concept mapping and flipped learning. Though nurse educators encourage both strategies, concurrent use of both methods in clinical teaching is rare. Thus, this study examined the use of concept mapping in a flipped clinical course to encourage students' engagement and critical thinking. Twelve baccalaureate nursing students in a second-year medical-surgical clinical course provided the data for this basic qualitative study by completing journals or diaries throughout the course and through individual semi-structured interviews at course exit. Open coding of interview transcripts and journals in conjunction with constant comparative analysis helped develop categories and themes. Several overlapping themes emerged from interview and journal data. Nursing students indicated that they developed different ways of thinking, learned from many people, became actively involved in learning and expanded their thinking, connected information, determined clinical priorities and made decisions, became confident and knowledgeable in their ability to recall information and transfer knowledge, and experienced increased critical thinking and higher level thinking skills. The results of the study showed the participants derived positive meaning from their learning in a nontraditional flipped clinical with concept mapping. Students were actively engaged in their learning and were able to expand their thinking while working collaboratively with their instructor, patients, and staff.

Le besoin d'encourager la pensée critique et la participation des étudiants et des étudiantes en soins infirmiers dans un environnement clinique force les professeurs et les professeures à employer diverses stratégies d'enseignement, y compris la cartographie conceptuelle et l'enseignement inversé. Bien que les infirmiers enseignants et les infirmières enseignantes encouragent les deux stratégies, l'emploi simultané des deux méthodes dans l'enseignement clinique est rare. Ainsi, cette étude examine l'emploi de la cartographie conceptuelle dans un cours clinique inversé pour encourager la participation des étudiants et des étudiantes et la pensée critique. Douze étudiants et étudiantes en soins infirmiers d'un programme de baccalauréat inscrits dans un cours clinique médico-chirurgical de deuxième année ont fourni les données pour cette étude qualitative de base en complétant des journaux de bord ou des agendas tout au long du cours et par le biais d'entrevues individuelles semi-structurées menées à la fin du cours. Le codage ouvert des transcriptions des entrevues et des agendas, en conjonction avec une analyse comparative constante, ont favorisé la création de catégories et de thèmes. Plusieurs thèmes qui se chevauchent ont émergé des données fournies par les entretiens et les agendas. Les étudiants et les étudiantes en soins infirmiers ont indiqué qu'ils avaient développé diverses manières de penser, qu'ils avaient appris de plusieurs personnes et qu'ils étaient devenus activement impliqués dans leur apprentissage et leur manière de penser, qu'ils avaient relié les informations, qu'ils avaient déterminé les priorité cliniques et pris des décisions, qu'ils étaient devenus confiants et bien informés en ce qui concerne leur aptitude à se souvenir des informations et à transférer les connaissances, et qu'il avaient fait l'expérience d'une réflexion critique accrue et de capacités de réflexion de niveau supérieur. Les résultats de l'étude ont indiqué que les participants et les participantes avaient tiré un sens positif de leur apprentissage dans un cours clinique non traditionnel inversé où était employée la cartographie conceptuelle. Les étudiants et les étudiantes avaient été activement engagés dans leur apprentissage et avaient été en mesure d'élargir leur pensée tout en travaillant en collaboration avec leur instructeur ou leur instructrice, les patients et les patientes, et les membres du personnel.

Keywords
concept mapping, flipped learning, clinical teaching strategies, teaching in higher education, nursing education; cartographie conceptuelle, enseignement inversé, stratégies d'enseignement clinique, enseignement supérieur, enseignement des soins infirmiers

Cover Page Footnote
I would like to acknowledge my peers at the University of Lethbridge and Lethbridge College for their help in various ways when I worked on this project. A special thank you to Bernadine Wojtowicz for her work on the pilot project and to the Scholarship of Teaching and Learning (SoTL) research office in Lethbridge College for putting up with my questions.

This research paper/Rapport de recherche is available in The Canadian Journal for the Scholarship of Teaching and Learning: https://doi.org/10.5206/cjsotlrcacea.2023.1.8534

Teaching and learning in the healthcare environment are complex, and the intricacy of teaching and learning in a hectic healthcare environment is tasking for both nursing students and faculty (Billings & Halstead, 2012). Authors such as Doyle et al. (2017) and Melincavage (2011) emphasized the need for studies to improve the clinical learning environment and ensure that students feel competent and satisfied with their learning. Faculty members' tasks include planning a focused activity to academically engage students while ensuring they gain critical thinking skills (Billings & Halstead, 2012). Two teaching strategies proven to encourage active engagement are flipped learning (Kim et al., 2017; Singla et al., 2016) and concept mapping (Kusoom & Charuwanno, 2017). Though educators encourage both strategies, research is limited on the simultaneous use of flipped learning and concept mapping in clinical teaching.

Context

This paper reports the outcomes of a project on flipped clinical practice with concept mapping used as a teaching strategy within my Bachelor of Nursing program while maintaining the goal of improving the educational experience for students. This study was built on a pilot project on flipped clinical or same-day clinical in my department.

Flipped Learning

Flipped learning is a nontraditional method of delivering course content; the term *flipped* refers to the reversal of the traditional procedure of using class time for direct group instruction (Singla et al., 2016). In a flipped classroom, students prepare using textbooks and other resources at home and then use in-class time for practical activities (Üğüten & Balci, 2017). Flipped classroom has proven to be a useful method of teaching undergraduate students, and most previous examples of this teaching method incorporated video, face-to-face, and online learning with the intention that the theory would transfer to a practice environment.

Flipped learning, according to Lukassen et al. (2014) and Kim et al. (2017), improves students' motivation and prepares students for clinical experience. Also, flipped classroom is student-centered because it helps to capture students' attention and helps students become more active learners (Singla et al., 2016). Flipped learning also helps students retain course materials and improve critical thinking (Chyr et al., 2017; Hibbard et al., 2016; Singla et al., 2016). Educators may use the method to increase students' performance, enhance engagement, and improve learning. The method may also carry the benefit of intensifying interactions between educators and students in the classroom (Singla et al., 2016) and the transformation of the teacher's role into that of a facilitator and a coach (Altemueller & Lindquist, 2017).

Though flipped learning proved effective, Üğüten and Balci (2017) advised further study of students' performance in flipped learning and further assessment of students' learning throughout the semester because some educators require help applying the method. These authors also advised further evaluation of the learning activities and tools used for the teaching. Studies of the use of concept mapping in a flipped clinical practice are scarce, and this deficit represented a gap in the literature and practical knowledge.

In this study, I applied the flipped learning principles within the context of a demanding complex medical surgical clinical course. Traditionally in this clinical, students received their patient assignments a day ahead of clinicals and spent the night before preparing their care plan. Students reported they did not know how much to prepare, so they arrived for clinical tired after

the long night of research and work. In this flipped clinical, students received their patient assignments when they arrived for clinical practice and constructed a concept map using information from the patient's file and previous learning from class.

As in flipped learning, students were given a list of the typical patient's diagnoses, medications, and laboratory values found on the clinical ward to study prior to starting clinical. Students were also expected to bring their notes and medication cards or drug guide along to clinical, and they could use the clinical site resources. Students also learned how to construct a concept map during clinical orientation, and they constructed their concept maps during clinical, in contrast to the traditional method of constructing the maps or care plan a day in advance. Also, instructors came into the clinical environment a few minutes before students to select patient information, which they then verbally communicated to students or posted on the staff board. Students were also given a concept map template which they could alter to suit their thinking process, while instructor stood by for assistance and to answer questions. An example of concept map template appears in Figure 1.

Concept Mapping

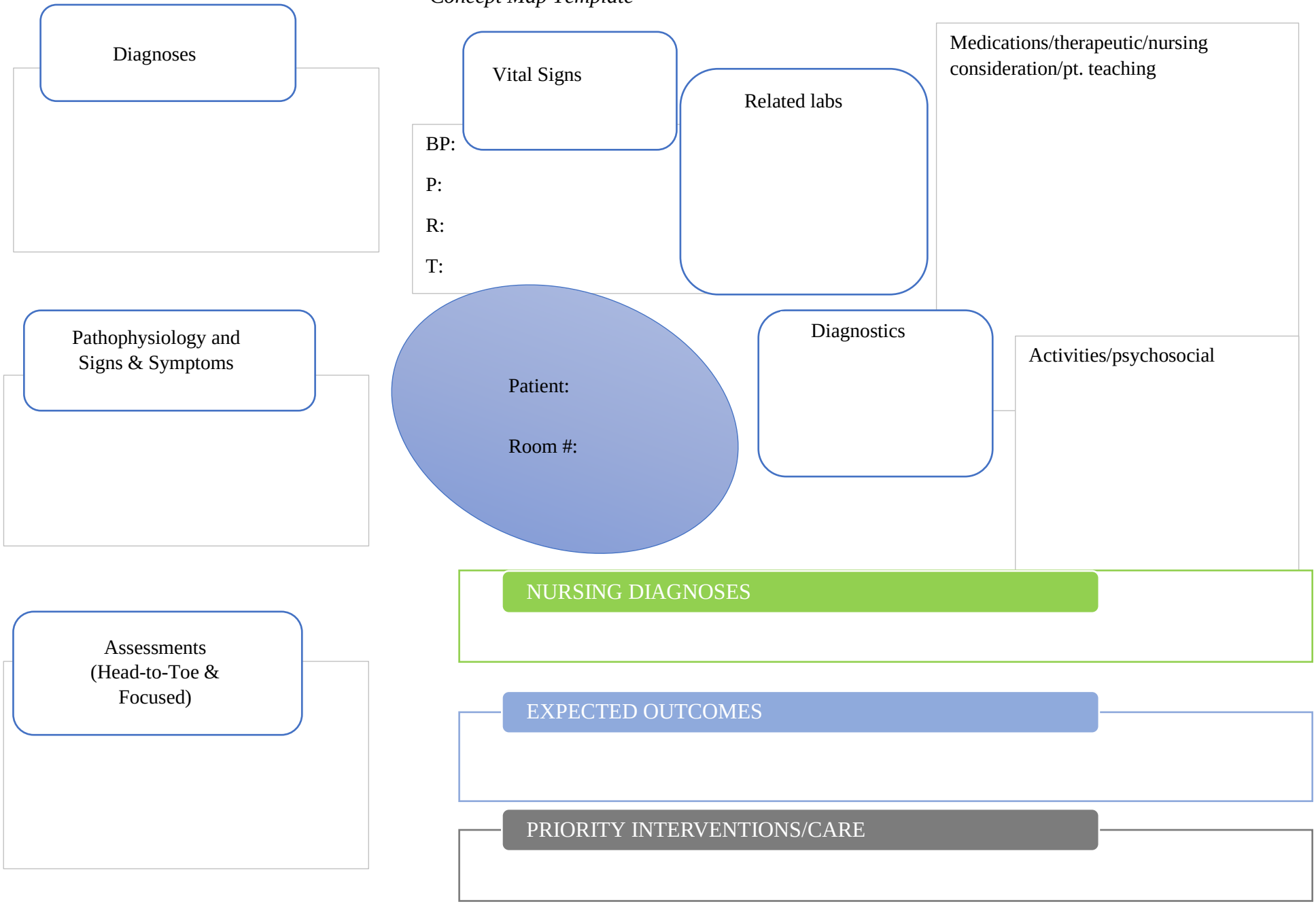
Concept mapping is an active teaching tool that helps nursing students develop expertise in problem-solving and analysis by stimulating thinking skills (Kusoom & Charuwanno, 2017). When they use concept maps, students engage in scrutinizing, deliberating, discerning, and revising the concepts related to their patient's care (Kusoom & Charuwanno, 2017). The process of reviewing and analyzing helps create teaching moments and offers points of evaluation for faculty and assists students with clinical judgment and critical thinking necessary to understand the complex patient care conditions (Abel & Freeze, 2006; Adema-Hannes & Parzen, 2005; Hicks-Moore, 2005; Kusoom & Charuwanno, 2017). The concept mapping in this program involved the creation of a diagram of concepts linked with arrows to outline a care plan throughout clinical practice. The mapping process involved analyzing the patient's data, perceiving the connections between details, and assimilating all the knowledge into a cohesive whole.

Previous researchers indicated concept mapping improves clinical judgment (Gerdeman et al., 2013) and critical thinking (Kusoom & Charuwanno, 2017). In fact, concept mapping is preferable to the traditional linear care plan, which may prevent nursing students from seeing the whole picture of their client (Kusoom & Charuwanno, 2017). The current study confirmed that concept mapping in a flipped clinical was an effective approach for nursing faculty who must find ways to improve the clinical environment and engage students in meaningful learning while supporting learning under stressful circumstances.

The present healthcare environment is demanding, and professionals must deal with complex medical diagnoses with acutely ill patients, as well as provide suitable clinical assignment for students (Billings & Halstead, 2012; Harris & Stamp, 2016). According to Chuan and Barnett (2012), factors such as learning in busy clinical wards, an overload of students, and being treated as workers may inhibit students' learning.

Figure 1

Concept Map Template



To encourage learning in such a hectic environment, clinical instructors must plan focused activities so nursing students can achieve the desired levels of learning while providing safe and high-quality care for the patients. Students commonly experience anxiety during clinical practice, and this stress can deter learning and impede their ability to develop the critical thinking, communication, and technical skills necessary for entry to practice (Melincavage, 2011). Therefore, the instructor's ability to create a conducive learning environment in the ward is paramount because the ward environment influences students' learning (Doyle et al., 2017; Papastavrou et al., 2010).

Application of Engagement Model

This study derived from an active engagement model and provided undergraduate nursing students with a nontraditional method of flipped clinical instruction using concept mapping as a teaching strategy. Exploration of the experience of 12 baccalaureate nursing students in a medical-surgical flipped clinical practice experience yielded understanding of their learning from an engagement perspective.

The engagement model is based on the precept that engaging students in learning generates positive outcomes. The pursuit of these positive outcomes also supported the need for continuous assessment of effective engagement in educational endeavors (Kahn, 2014; Wagetti et al., 2017). Flipped clinical and concept mapping are student-centered techniques wherein students are actively engaged in mapping the care they provide, making the connections between the concepts, and applying critical thinking throughout the process with the instructor's guidance. Learning about clinical judgment and critical thinking requires students' engagement in identifying care priorities, faculty involvement, and a productive learning environment.

Methodology

A qualitative research method was suitable to formulate an understanding of how students construct meaning within their context (Merriam, 2009; Merriam & Associates, 2002). According to Merriam (2009), the construction of meaning takes place when people engage in social interactions. Thus, the meaning students ascribed to their experience with flipped clinical teaching and concept mapping was best understood with a basic qualitative research method. My interest was to achieve an understanding of how students constructed their meaning, how they interpreted this meaning, and how they applied it to their experience. Consequently, this study explored students' experience with concept mapping in a flipped clinical to understand students' engagement and critical thinking.

Central Research Question

The following question shaped this study: What is the experience of the undergraduate nursing students with concept mapping in a flipped clinical practice course? As Merriam (2009) suggested, the data collection method was semi-structured interviews along with students' reflective journals and researcher's field notes. Students' journals included reflection on their learning (positive or negative), how they learned it, and what to change from constructive feedback received in the practice setting. The information in the documents supported the interview data

and therefore could be used for triangulation. Inductive and comparative methods of data analysis supported theme building from the interviews and written data.

Sample

Merriam (2009) advised the use of a small nonrandom sample for a basic qualitative study. The original plan was to recruit 10 participants, and 13 students signed the consent to participate, but one student dropped out at the time of the face-to-face interview. Nevertheless, a sample of 12 students was acceptable according to Onwuegbuzie and Collins's (2007) advice for a study requiring an interview. The 12 students from an undergraduate nursing program were registered in a second-year medical-surgical clinical course. To participate, students agreed to keep a reflective weekly diary of their learning experience, to learn the use of concept mapping for their care plan on the first day of clinical practice, and to complete an interview at course exit. Students ranged from 19 to 36 years of age; 10 students identified as female and two as male.

Following my institutional ethics board approval, recruitment took place through e-mail from the practice course by the principal investigator and in person at course orientation. To protect the educational experience of students and the integrity of data, no face-to-face interviews took place until course exit. All students received an explanation of informed consent and copies of the consent forms. Before they signed, participants learned about their right to withdraw from the study at any time. Signed consents were kept in a sealed envelope until the course exit to further protect the participants and data integrity.

Guiding Interview Questions

1. Tell me about your experience in using concept mapping and receiving your patient the first day of clinical practice.
2. What was it like to receive your patient and map out your care with your instructor on the unit?
3. What outcome did you experience with concept mapping in this flipped clinical?
4. Tell me about your critical thinking and making clinical connections and decisions during this clinical.
5. What barriers did you experience in making your concept map with your patient's information?
6. How did you overcome the barriers?
7. What lessons did you learn in making your concept map?

Data Analysis

After transcribing interview data into Word documents, I applied open coding to all interview transcripts and participants' journals. Thematic data analysis established categories from interviews and dairies, and researcher's field notes supported the themes (Merriam, 2009). The data collection and analysis took place simultaneously, and themes emerged throughout the interview process.

The constant comparative data analysis method helped to establish themes without building theory (Merriam, 2009). Also, open coding supported placing the data into categories, a procedure applied to all interview transcripts and student dairies. Words that appeared to go together were

identified and marked using the same font color, and these coded expressions formed the categories. According to Merriam (2009), open coding is helpful in category construction because the notations highlight groups of words that seem to go together. Table 1 illustrates the alignment of the themes with the interview questions and dairies (documentary) data and lists the participants whose responses made up the themes.

Transcripts for all interviews were created independently and then categorized in a similar manner. After categorizing data from each interview, the categories were compared to the former sets of groupings and then merged into a master list. According to Merriam (2009), the master list makes a primitive outline of classifications, which reflects the recurring patterns in the study.

Findings

The major themes reflect the findings of this study and answers the research question: What is the experience of the undergraduate nursing students with concept mapping in a flipped clinical practice course? These overlapping recurring themes represented the following seven categories: (a) developed different way of thinking/thinking like a nurse, (b) learned from many people, (c) became actively involved in learning and expanded their thinking, (d) connected information, (e) determined clinical priorities and made decisions, (f) become confident and knowledgeable in their ability to recall information and transfer knowledge, and (g) experienced increased critical thinking and high-level thinking skills.

Developed a Different Way of Thinking and Learned from Many People

The different way of thinking resulted from the layout of the concept map and from displaying all required concepts on a single page. Participants indicated that the layout made it easy to determine what they needed from the patients' chart and what information to review. While their instructor assisted when they had more questions, participants also shared that they learned from the staff, patients, other healthcare professionals and made use of the unit resources because they had the whole day to complete their patient research.

The concept map layout and having to research information during their care activity reiterated the need to seek out more information while connecting and analyzing patients' information. Participants utilized all available resources, their instructor, staffs, and patients while making the connections. Participants regarded the concept mapping as similar to a "life case study" with the use of life patients as their situation and felt comfortable using the patients as resources. Making use of patients as resources also created a chance to interact and build relationships with the patients. Participants were able to collect further data about patients' determinants of health and explore the psychosocial aspect of patients' care. For instance, Participant 9 stated, "Okay. Some of them, as I mentioned, I had to engage the patients in conversation. Some, I had to ask about it."

Table 1

Alignment of Interview Questions, Data Points, and Themes

Interview Questions	Sources of Data				Themes
	Examples of data points from interviews	Participants	Examples of data points from diary entries	Participants	
1, 2	• Opportunity to think like a nurse • Good introduction to holistic thinking	P1, P2, P5, P6, P7, P8, P10, P11	• A reminder that connection is normal in nursing • Concept map makes you think outside the box	P1, P11	Developed different ways of thinking and ability to think like a nurse
1, 2, 3, 4, 5	• Access to many resources • Able to invite multidisciplinary team members to help	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12	• Learned from instructor and patient. Both present to answer my questions	P1, P2, P4, P7, P10	Learned from many people
3, 4, 5, 6	• Makes you add more information • Think more	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12	• Felt good connecting dots • Realized lack of thinking and expanding and anticipating the many needs of client	P1, P2, P3, P4, P5, P6, P7, P9, P10, P11, P12	Became actively involved in learning and expanded their thinking
3, 4	• Connected lab values to patient's condition • Connects information, sees the effect of one to another	P1, P2, P4, P5, P7, P8, P9, P10, P11, P12	• Saw the links and how everything connect to each other	P1, P3, P4, P5, P7, P9	Connected information
3, 4	• Developed a category for nursing priority and care interventions • Focused on information needed on client	P1, P2, P4, P5, P7, P8	• Developed priority • Used assessment finding to guide care throughout the day	P4, P6, P7	Determined clinical priorities and made decisions
4, 6, 7	• Felt able to put information together, retained that and bring it to future practice and transfer of knowledge	P1, P3, P4, P5, P7, P8, P10, P12	• More confident speaking with patient about their condition • Visualize patient condition and was able to answer questions from staff	P2, P6, P7, P9, P11, P12	Became confident and knowledgeable in ability to recall information and transfer knowledge
1, 3, 4, 7	• Could critically think better knowing what information is more important • Makes you think further • Forces you to do the research	P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12	• Experience and time with concept map helped with thinking process • Helped me develop critical thinking	P1, P3, P7	Experienced increased critical thinking and high-level thinking skills

Note. P = participant.

Building interpersonal relationship with clients is an important nursing skill required for entry to practice competency; rapport is vital for patients' wellbeing (College and Association of Registered Nurses of Alberta, 2019). Some participants extended their care activities to include seeking inputs from other healthcare professionals. According to Participant 9, "What I would do in that was to invite people outside my own scope so that the approach can be multidisciplinary."

Students were able to grasp the patient's signs and symptoms and relate those factors to textbook and literature findings. This process created meaningful learning because participants saw their thinking process change during the process of completing research, and they described the experience as "thinking like a nurse" or "holistic thinking." Participants said they realized they had acquired a different way of thinking and looked forward to utilizing their new skills in other clinical rotation.

Expanded Thinking/Increased Critical Thinking

Concept mapping has been found to increase critical thinking, but the theme of expanding the thinking process was a novel theme that emerged from participants' responses. Participants explained that the layout of the concept map also led to improved critical thinking, expanded reasoning, and stimulation of high-level thinking processes. Participants indicated that concept mapping forced them to expand their thinking beyond their expectations. To make the connections in their patients' information, participants sought more understanding of the data, and this process created room for information expansion and further connections.

To accomplish thorough mapping, participants said they had to create more "boxes and connect more" (P1) until they reached saturation, as confirmed by their instructor, or until they could make no further connections. The concept mapping met the goal of the study by engaging students in a focused activity that ensured they learned what the course required. The theme of expanded thinking resulted from the mapping process, which additionally made it possible to see students thinking at a higher level than expected. Some participants expanded their knowledge to grasp the different laboratory values in relation to patients' conditions and medications. Some questioned orders when they saw the side effects of medications manifest in their patients. The participants were able to delve deeper into understanding their patients, the disease process, treatment, and laboratory and diagnostic measures.

Some participants compared the concept map to the tool they had used in previous rotations. They indicated one difference was that with concept mapping, they had to pursue connections and research more. With the other tool, they had been obligated to complete only the forms or pages as they appeared and had no incentive to seek further information. Because they stopped work once they had filled in the form, and because the information in the tool received little attention during clinical practice, they saw the exercise as an assignment or "a chore" (P3), not connected in a meaningful way to patient care. Most of the participants specified that they usually copied and pasted the information without devoting much attention to reading or retaining the information. This theme illuminated the importance of students' connecting their care plans to patient care for safe and effective learning (Kusoom & Charuwanno, 2017).

The process of mapping and finding information was very engaging and satisfying to all participants. According to Participant 8,

> I think it did help with the learning portion because then you're not doing something because you're told to; you're doing it because it makes sense. It gave reason to our process

> and to have the maps and instructor all there, give you—I felt more confident going into a patient's room. I know why I'm there, what I'm doing, and why I'm doing it. Whereas, compared to last year, we were thrown in with patients and didn't know what was going on.

The mapping process, according to participants, stimulated thinking, expanded the thinking process, and increased critical thinking. The participants were able to seek out information on their own; therefore, they learned from different people. They collaborated with the instructor, asked for the instructor's guidance, and extended their questioning to the patients and staffs. According to the participants, when they viewed their maps, or when they noticed something was missing, they were able to ask their patients or reassess the patient for more information. They also asked for input from their primary nurses, other staffs, and their peers. What was apparent from the participants' behavior was that students were physically engaged with the task and psychologically engaged in meeting their learning needs, and this combination led to self-direction because participants became more inquisitive and intuitive as they accumulated information. Therefore, the participants became more actively involved in their questioning attitude, and as a result, they connected more information and were able to assess clinical priorities.

Became Actively Involved, Connected Information/Determined Clinical Priority and Made Decisions

Actively involving nursing students in their learning is a priority for nurse educators, especially given the present health-care environment and complex patient population. According to Papastavrou et al. (2010), the clinical environment influences students' learning and instructors' ability to create an environment conducive to learning in the ward is vital. Students' active involvement in their learning creates a safety net for collaboration and teaching moments for faculty. This environment may lead to increased student retention and higher academic performance because students experience positive learning. According to Kahn (2014), a robust learning environment may pave the way for students' becoming engaged and taking responsibility for their own learning. Moreover, facilitating critical thinking requires being involved in the process of cognitive and affective construction and reconstruction of the knowledge (Chabeli, 2010). In this study, participants were actively involved in identifying care priorities and clinical decisions, which they confirmed with their instructors.

This interactive process made learning very satisfying because over time, the participants felt satisfied and transformed. Transformation occurred because participants could do some things without relying on their instructors. According to Participant 7, "I ended up surprising myself with how many connections I could make without relying on my instructor or show[ing my work] to my instructor." Participants' realization that they had developed their abilities led to their wanting or seeking further information or knowledge. The knowledge-seeking process provided opportunities to recall information from class or from their previous research. For this reason, participants felt more confident, and learning became more meaningful and motivational.

Became Confident and Knowledgeable in Ability to Recall Information and Transfer Knowledge

Previous researchers identified the need to connect theory to practice as nurse educators seek a way to create balance (Billings & Halstead, 2012). This dynamic was prominent in participants' responses in this study because they reported being able to apply the theory they learned in class to clinical practice and vice versa. Participants explained the constant repetition involved in revision, researching, and connecting their patient information enhanced their recall and confidence. Although this study did not include a question about information recall and it was therefore not clear how the knowledge transfer took place for the participants, the majority indicated they were able to recall information from their class. They also maintained that they recalled information from their previous patients and were able to apply their learning from clinical practice to the classroom as well.

Some of the participants indicated that because their thinking process changed during the mapping process, they tended to organize information in class or during their study sections in a way that they could easily remember. Most participants pointed to having a novel way to organize their learning and were grateful for the experience of using concept mapping in clinical applications. These participants' experience may have resulted from stimulation of their cognition by concept mapping, which improves conceptual thinking and organization of thoughts (Zwaal & Otting, 2012). Having detected these themes, my next task was to place the findings within the context of previous research.

Results in Comparison to Literature

The results of this study showed that students who performed concept mapping were actively engaged in their learning throughout clinical practice. Despite an initial barrier of learning about concept map construction, students were able to negotiate their way as they began to construct their learning in the process of mapping their care. The outcomes of this study of undergraduate nursing students applying concept mapping in a flipped clinical practice course aligned with those of previous studies to indicate that concept mapping improved critical thinking and helped nursing students' link theory to practice in real-life situations (Gerdeman et al., 2013; Kusoom & Charuwanno, 2017). Finally, findings also aligned with those from researchers who utilized flipped learning, such as Üğüten and Balci (2017), who advised further study of students' performance in flipped learning and assessment of students' learning throughout their education. Students in this study were evaluated throughout the learning with positive outcomes.

The 12 undergraduate nursing students specified having increased their critical thinking abilities. Most of the participants pointed out that they were able to link the theory they learned in class to clinical and transfer the clinical knowledge to class. They explained that the responsibility of continuously researching and viewing patient information while in clinical helped them retain information and increase knowledge. Most participants indicated that they could remember information from previous patients and apply the information to a current patient with a similar condition.

The findings of this study aligned with previous indications that concept mapping is an active teaching tool that helps nursing students with problem solving and analysis because it stimulates thinking skills (Kusoom & Charuwanno, 2017). When the participants in this study constructed their maps, they were engaging, scrutinizing, and deliberating concepts related to their

patients' care throughout clinical practice. The difference between this study and previous inquiries was an instructor's presence when students received their patient assignments and researched patient information throughout the clinical day. Participants in this study had the opportunity to consult with instructors and patients while constructing their maps. They could also ask instructors, staff, and patients questions, and students compared their clinical practice to the development of life case studies. Completing the concept map in the clinical learning environment made constructing a life case study possible; therefore, flipped clinical practice provided a nontraditional learning environment for the concept mapping in this study.

During the process of researching and connecting patients' information on the concept maps, students could confirm the patients' vital signs and symptoms with their research findings. Further, students were able to compare their assessment of their patient to information in the textbook or on the Internet. Their instructor also helped to confirm the information needed for the patient's care and helped to focus students' attention on the required information for that day. The instructors helped the students maintain focus and removed the anxiety associated with researching unnecessary information, a drawback students reported in traditional clinical teaching where students received their patient assignment a day in advance and researched the patient information on their own without an instructor's guidance. Prepared with pertinent information, participants felt more confident and more informed when they walked into their patient's room. Participants also reported they could efficiently manage their time because they did not waste time collecting irrelevant information. According to Participant 3,

> It was nice because it was stressful being on the floor compared to on long-term care. I remembered long-term care was difficult because we had pages and pages [with the tool] to complete and not spending as much time with the patient and learning as much. With the concept map, it wasn't as stressful because it took less of my time, and it was all on one page with my client information right there, making it easier to connect things and remember.

Findings in this study aligned with those of previous studies in that the process of reviewing and analyzing patient information created teaching moments and offered points of evaluation for faculty while assisting students with clinical judgment and critical thinking necessary to understand complex patient care conditions (Abel & Freeze, 2006; Adema-Hannes & Parzen, 2005; Hicks-Moore, 2005). Although faculty evaluation of students fell outside the scope of this study, students confirmed concept mapping enhanced their critical thinking and clinical judgement because they performed the mapping throughout their day in a flipped clinical setting.

The participants' critical thinking regarding complex patient care was apparent in their responses to the interview questions and in their dairy entries. Some participants identified that their instructors' feedback was helpful in expanding their knowledge because the instructors offered feedback that helped them incorporate and link information they did not know or had overlooked. According to Participant 1,

> I would hand in my concept map, and then she would mark it, give it back the next week with good feedback and add to it, with so much more than what I initially put in when I handed it in. It was hard that way. I tried my best to put in as much as I could prior to handing it in, but I would get it back with more things that I didn't catch. That's what made it hard.

The participants also confirmed Kusoom and Charuwanno's (2017) findings that concept mapping is preferable to traditional linear care planning, which may prevent nursing students from seeing the whole picture of their client's condition. The participants stated that the layout of the map forced them to think further and think holistically or think like a nurse. With the traditional tool, participants would fill out the necessary parts of the form as required and sometimes "copy and paste" information. Participants indicated that they had not been encouraged by the traditional tool to seek more information, so they stopped once they completed the necessary portions. According to Participant 3, "When I used the tool, it felt like a chore." With concept mapping, the layout forced students to continue expanding their thinking to link the concepts. Participant 1 stated,

> When I also did my concept map, it was one page, but as more was being added, I added more for myself. My maps got bigger and bigger because I added more boxes. For the tool, six pages would feel overwhelmed, but if you had research and filled everything in, you would feel that is all you need to do. With concept maps, you just add more and it becomes bigger.

Findings from this study also aligned with previous research that recognized concept mapping as a useful tool for increasing clinical judgment, improving critical thinking, and engaging students in meaningful learning. Students engaged in their own learning and took responsibility for asking questions while they expanded their thinking throughout clinical practice.

Flipped classroom has been determined by previous researchers to be a useful method of teaching undergraduate students and helping students transfer knowledge from class to practice. As indicated earlier, literature about the use of flipped learning in clinical practice was scarce; therefore, the findings of the current study began to fill the gap in literature regarding flipped clinical use in nursing education. Findings aligned with those of previous researchers (e.g., Üğüten & Balci, 2017) and indicated that flipped learning is a method proven to encourage students' engagement.

The findings of the current study, however, differed in the sense that the teaching took place in clinical practice, and participants affirmed the reciprocal transfer of knowledge from classroom to clinical and from clinical to classroom. The concurrent use of flipped learning and concept mapping improved students' motivation to learn. Current findings also confirmed previous findings that flipped learning improves students' motivation (Lukassen et al., 2014) and prepares students for clinical experience (Kim et al., 2017). Participants showed motivation and preparedness to learn because their thinking processes changed. They wanted to learn more and learn to think like a nurse. Consequently, the instructor was able to create a conducive learning environment in the ward, which influenced students' learning. Authors such as Doyle et al. (2017) and Melincavage (2011) emphasized the need to improve the clinical learning environment to guarantee learning. Ensuring learning is vital for increasing students' engagement in educational activities in nursing and higher education.

Results in Comparison to Engagement Model

According to Lodico et al. (2010), qualitative inquiries such as the current study may be related to previous research and literature used to interpret the meaning. In relating findings of this study to the previous body of literature on engagement, I narrowed the review to outcomes directed

by the engagement model. According to Khan (2014), institutions benefit from learning activities that engage students. Educators encourage high impact activities because they inspire students to seek out action that increases engagement.

The findings from this study showed students were highly involved in developing their care maps and committed to learning while having fun with the activity. Students eagerly collaborated with faculty in the clinical setting, and this dynamic comprised the learning milieu. This collaborative learning environment has been noted as positive for students learning because it eliminates the anxiety which students commonly report in clinical practice. Such anxiety hinders learning and engagement in the learning process (Melincavage, 2011) According to Participant 1, "Of course, I wanted to do better, and [the instructor] would acknowledge that and add more." Students exhibited increased motivation to learn and demonstrated active involvement in their learning. For example, some of the students generated additional links and extra boxes of intervention on their concept maps. Participant 1 shared,

> When I also did my concept map, it was one page, but as more was being added, I added more for myself. My maps got bigger and bigger because I added more boxe**s**. For the tool, six pages would feel overwhelmed, but if you had research and filled everything in, you would feel that is all you need to do. With concept maps, you just add more and it becomes bigger.

Increased motivation carried students beyond participation to making sense of the educational activity and striving to continue to do well. This progression was clear in the participants' words and their actions as they mapped their patients' care. Initially, the student participants had to learn to construct their concept map as directed by their instructors. However, during the mapping process, they discovered themselves and found that their thinking process was changing, they made further connections and became increasingly knowledgeable. This growth in turn helped with motivation and increased responsibility as students added new boxes of interventions and expanded their thoughts.

The participants stated they wanted to know more and were happy with their knowledge expansion. This sense of satisfaction led to the production of deep and meaningful learning because the learning became goal-focused and mindful; similarly, Ke et al. (2016) reported that game-based learning engendered goal-oriented and mindful behaviors that improved students' engagement. Students in this project enjoyed constructing their maps, problem–solving during the process by looking up information and asking for additional input. They involved patients in their research and asked instructors and staff questions when they were unsure. Despite the initial difficulty of learning to construct the map, students said they were motivated to continue because they could see a change in their thinking process, and they were able to give meaning to their learning because they looked forward to mastering the "nursing thinking" (P1) and applying the new knowledge to patient care. Participant 4 described the process: "If I was unsure about a certain diagnosis or medication or medical condition, I would research it. It helped me understand what I already know and helped me link stuff." Participant 2 shared,

> It made me feel good. When we do the information, you are prepared for when you get to work with your clients. It was fun to do. A lot of the other students connected the dots with colors as that was satisfying to use. But it was a way better tool than the student planning tool.

Discussion and Limitations of Study

The goal of the current study was to explore students' learning in flipped clinical practice with concept mapping used as a teaching strategy; this project took place within my Bachelor of Nursing program and was guided by the goal of improving the educational experience for students. The results indicated some positive outcomes related to the course material, and nursing students acquired the necessary critical thinking skills to enter practice (Billings & Halstead, 2012). According to the participants, this experience of flipped clinical and concept mapping was rather short because it took place only within one course in one semester. Participants stated they would have preferred to continue with the experience throughout the rest of the program. The short duration of the application did not allow for determination of how far the students would carry their critical thinking skills. Having the students use this method throughout their nursing program might help determine their skills at graduation. Therefore, one recommendation is for further study of the outcomes with students who are exposed to concept mapping throughout their nursing education. The students' results could also be compared to those of students with no experience with flipped clinical and concept mapping. Future researchers may also consider previous indications that reviewing and analyzing patient information creates teaching moments and offers points of evaluation for faculty (Abel & Freeze, 2006; Adema-Hannes & Parzen, 2005; Hicks-Moore, 2005).

The current study did not include questions regarding faculty evaluation and the creation of teaching moments for students. Though students confirmed that concept mapping assisted in their critical thinking and clinical judgement, findings do not reflect instructors' perspectives. Asking faculty members questions about evaluation and teaching moments could be beneficial to the field of nursing education. Another recommendation is a cost-benefit analysis of eliminating the need for faculty to go to the hospital or healthcare facility a day before clinical practice to obtain patient information for students, as is common practice in traditional clinicals. For this study, instructors came into the clinical environment a few minutes before students to select patient information. Faculty then informed students verbally or posted a list on the staff board, thereby eliminating the need for faculty to spend time typing all patient information and e-mailing to students. The current study focused on the clinical teaching and learning, and the findings revealed the engagement of students in their learning during the mapping of their care activities in a flipped clinical environment.

Conclusion

The aim of this study was to explore the experience of undergraduate nursing students with the use of concept mapping in a flipped clinical setting. The findings suggested that the use of concept mapping in a flipped clinical is valuable for engaging students and increasing their critical thinking. Despite the barriers of learning the mapping process and receiving their patients when they arrive clinical, student participants were actively engaged and deeply involved in meaningful learning. Participants strived to learn the concepts related to their patients and were motivated to

continue because they wanted to learn to think like a nurse. They also noticed positive changes to their thinking process while they completed an enjoyable activity. This study, which was founded from an active engagement model, provided 12 undergraduate nursing students a nontraditional method of flipped clinical instruction using concept mapping as a teaching strategy. The undergraduate students' behavior in clinical practice demonstrated their engagement. All participants expressed feeling supported and engaged in mapping out their care in clinical.

The basic qualitative research design supported understanding the nursing students' learning in a second-year medical-surgical clinical course with the goal of assisting future clinical instructors in a busy complex health-care environment to plan a focused activity while encouraging students' learning. The current findings may refine the ongoing discussion of the use of flipped clinical practice within Bachelor of Nursing programs. The findings may also contribute to the teaching and learning literature while helping define effective clinical teaching strategies in nursing education and other related fields.

References

Abel, W., & Freeze, M. (2006). Evaluation of concept mapping in an associate degree nursing program. *Journal of Nursing Education*, *45*(9), 356-364. https://www.healio.com/nursing/journals/jne

Adema-Hannes, R., & Parzen, M. (2005). Concept mapping: Does it promote meaningful learning in the clinical setting? *College Quarterly*, *8*(3), 1-7. https://doi.org/10.1177/104515950501600302

Altemueller, L., & Lindquist, C. (2017). Flipped classroom instruction for inclusive learning. *British Journal of Special Education, 44*(3), 341-358. https://doi.org/10.1111/1467-8578.12177

Billings, D. M., & Halstead, J. A. (Eds.). (2012). *Teaching in nursing: A guide for faculty* (4th ed.). Elsevier

Chabeli, M. M. (2010). Concept-mapping as a teaching method to facilitate critical thinking in nursing education: A review of the literature. *Health SA Gesondheid: Journal of Interdisciplinary Health Sciences, 15*(1). https://doi.org/10.4102/hsag.v15i1.432

Chuan, O. L., & Barnett, B. (2012). Student tutor and staff nurse perception of the clinical environment. *Nurse Education in Practice*, *12*(4), 192-197. https://doi.org/10.1016/j.nepr.2012.01.003

Chyr, W.-L., Shen, P.-D., Chiang, Y.-C., Lin, J.-B., & Tsai, C.-W. (2017). Exploring the effects of online academic help-seeking and flipped learning on improving students' learning. *Journal of Educational Technology & Society*, *20*(3), 11-23.

College and Association of Registered Nurses of Alberta. (2019). Entry–level competencies for the practice of registered nurses. Retrieved from https://allnurses.com/teaching-nursing-theory-t323785/

Doyle, K., Sainsbury, K., Cleary, S., Parkinson, L., Vindigni, D., McGrath, I., & Cruickshank, M. (2017). Happy to help/happy to be here: Identifying components of successful clinical placements for undergraduate nursing students. *Nurse Education Today, 49*, 27-32. https://doi.org/10.1016/j.nedt2016.11.001

Gerdeman, J. L., Lux, K., & Jacko, J. (2013). Using concept mapping to build clinical judgment skills. *Nurse Education in Practice, 13*(1), 11-17. https://doi.org/10.1016/j.nepr.2012.05.009

Harris, A. L., & Stamp, K. D. (2016). Students' perspectives of same day clinical assignments: A qualitative descriptive study. *Nurse Education Perspectives*, (37), 159-161. https://doi.org/10.5480/13-1232

Hibbard, L., Shannon, S., & Wells, B. (2016). Examining the effectiveness of a semi-self-paced flipped learning format in a college general chemistry sequence. *Journal of Chemical Education*, *93*(1), 24-30. https://doi.org/10.1021/acs.jchemed.5b00592

Hicks-Moore, S. (2005). Clinical concept maps in nursing education: An effective way to link theory and practice. *Nurse Education in Practice*, *5*(6), 348-352. https://doi.org/10.1016/j.nepr. 2005.05.003

Kahn, P. E. (2014). Theorising student engagement in higher education. *British Educational Research Journal*, *40*(6), 1,005-1,018. https://doi.org/10.1002/berj.3121

Ke, F., Xie, K., & Xie, Y. (2016). Game-based learning engagement: A theory- and data-driven exploration. *British Journal of Educational Technology*, *47*(6), 1183-1201. https://doi.org/10. 1111/bjet.12314

Kim, H. S., Kim, M. Y., Cho, M., & Jang, S. J. (2017). Effectiveness of applying flipped learning to clinical nursing practicums for nursing students in Korea: A randomized controlled trial. *International Journal of Nursing Practice*, *23*(5). https://doi.org/10.1111/ijn.12574

Kusoom, W., & Charuwanno, R. (2017). Concept mapping: An effective strategy for clinical teaching in nursing. *Pacific Rim International Journal of Nursing Research, 21*(4), 263-266. https://www.tci-thaijo.org/index.php/PRIJNR/article/view/95432

Lodico, M. G., Spaulding, D. T., & Voegtle, K. H. (2010). *Methods in educational research: From theory to practice* (2nd ed.). Jossey-Bass.

Lukassen, N. B., Pedersen, A., Nielsen, A., Wahl, C., & Sorensen, E. K. (2014). Digital education with IT: How to create motivational and inclusive education in blended learning environments using flipped learning: A study in nurse education. In R. Ørngreen & K. T. Levinsen (Eds.), *Proceedings of the European Conference on E-Learning* (pp. 305-312). http://vbn.aau.dk/en/publications/digital-education-with-it(3ae3245d-3821-442a-b120-3961c0736fc3).html

Melincavage, S. M. (2011). Student nurses' experiences of anxiety in the clinical setting. *Nurse Education Today, 31*(8), 785-789. https://doi.org/10.1016/j.nedt.2011.05.007

Merriam, S. B. (2009). *Qualitative research: A guide to design and implement* (2nd ed.). Jossey-Bass.

Merriam, S. B., & Associates. (2002). *Qualitative research in practice: Examples for discussion and analysis*. Jossey-Bass.

Onwuegbuzie, A. J., & Collins, K. M. T. (2007). A typology of mixed methods and sampling designs in social science research. *The Qualitative Report, 12*(2), 281-286. https://nsuworks.nova.edu/tqr/vol12/iss2/9/

Papastavrou, E., Lambrinou, E., Tsangari, H., Saarikoski, M., & Leino-Kilpi, H. (2010). Student nurses' experience of learning in the clinical environment. *Nurse Education in Practice, 10*(3), 176-182. https://doi.org/10.1016/j.nepr.2009.07.003

Singla, N., Saini, P., & Kaur, J. (2016). Evaluating the flipped vs traditional teaching method on student nurse's performance. *International Journal of Community Health & Medical Research*, *2*(4), 30-37. https://doi.org/10.21276/ijchmr.2016.2.4.06

Üğüten, S. D., & Balci, Ö. (2017). Flipped learning. *Journal of Suleyman Demirel University Institute of Social Sciences*, *26*(1), 253-265.

Wagetti, R. J., Johnston, P., & Jones, L. B. (2017). Beyond simple participation: Providing reliable informational assessment tool of student engagement for teachers. *Education*, *137*(4), 393-397. https://www.projectinnovation.com/home.html

Zwaal, W., & Otting, H. (2012). The impact of concept mapping on the process of problem-based learning. *Interdisciplinary Journal of Problem-Based Learning*, *6*(1). https://doi.org/10.7771/1541-5015.1314