



Learning Critical Thinking During Nursing Studies - A Literature Review Based on Kolb's Experiential Learning

Jannika Niemi



Laurea-ammattikorkeakoulu

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Jannika Niemi
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Jannika Niemi

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Several studies show that critical thinking skills are diminishing. This is problematic in view of the expectations in working life which require critical thinking. The challenge at hand is for nurse educators to find a novel method to teach and encourage students to engage in analytical thinking. Since the present health care system is growing more complex and challenging, nurse graduates need to be prepared to become highly skilled problem solvers and critical thinkers.

The purpose of this thesis was to discover ways to learn critical thinking during nursing studies. Research question focusses on the tools to learn critical thinking, i.e., how students can enhance their learning during studies. The study's theoretical framework is based on Kolb's Experiential Learning Theory. According to Kolb's theory, effective learning materializes when a person completes a cycle of four learning styles. These include convergence doing and thinking, divergence feeling and watching, assimilation watching and thinking and accommodation doing and feeling.

The methodology applied in this study relies on qualitative data collection and content analysis. The study reviews and analyses six seminal articles. Results show that the learning styles most applied in nursing studies are the convergent and divergent learning styles. Results further show that there are different ways to learn and enhance critical thinking in nursing studies.

More research on critical thinking and problem solving is needed in the field of nursing in order to uncover new ways to improve critical thinking and to apply it in nursing curriculums.

Keywords: Critical thinking, Kolb`s Experiential Learning, Learning styles, Nursing,

Jannika Niemi

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Useat tutkimukset osoittavat, että kriittisen ajattelun taidot heikkenevät. Työelämässä vaaditaan kriittistä ajattelua. Sairaanhoidon opettajien haasteena on löytää erilaisia opetusmenetelmiä, jotka kannustavat opiskelijoita analyttiseen ajatteluun. Entistä haastavampi terveydenhuoltojärjestelmä edellyttää, että sairaanhoitajilla on ongelmanratkaisukykyä sekä kriittisen ajattelun taitoja.

Tämän tutkimuksen tarkoituksena on löytää keinoja oppia kriittistä ajattelua ja kehittää näitä taitoja hoitotyön opintojen aikana. Tutkimuskysymys keskittyy kriittisen ajattelun oppimisen välineisiin eli siihen, miten opiskelijat voivat tehostaa oppimistaan opintojen aikana.

Teoreettinen viitekehys on Kolbin Experiential learning. Teorian mukaan oppiminen on tehokasta, kun henkilö käy läpi neljän oppimistyylin syklin. Oppimistyyliä on neljä: Konvergentti (eng. convergent) tekeminen ja ajattelu, divergentti (eng. divergent) tuntee ja katseleva, sulauttava (eng. assimilation) katsominen ja ajattelu ja mukauttava (eng. accommodative) tekeminen ja tunteminen.

Tämän tutkimuksen menetelmänä on sisällönanalyysi valitusta aineistosta. Tutkimuksessa tarkastellaan ja analysoidaan kuutta artikkelia. Tutkimuksen tulokset osoittavat, että hoitotyössä eniten käytetyt oppimistyyli ovat konvergentti oppimistyyli ja divergentti oppimistyyli. Tulokset osoittavat myös, että hoitotyössä on erilaisia tapoja oppia ja kehittää kriittistä ajattelua.

Hoitotyön alalla tarvitaan lisää kriittisen ajattelun ja ongelmanratkaisun tutkimusta, jotta hoitotyön opetussuunnitelmissa löydettäisiin uusia tapoja parantaa kriittistä ajattelua.

Asiasanat: Kolbin Experiential Learning, Kriittinen ajattelu, Sairaanhoitoala, Oppimistyyli,

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1. Introduction

The Finnish health care sector is in crisis. The number of nurses is insufficient to meet the growing needs of an aging population. According to Tehy (The Union of Health and Social Care Professionals in Finland) there is a need for over 16600 nurses in Finland. In comparison, two years ago the need was estimated to be 8000 (Tehy 2023). The lack of professional nurses will be even more palpable if the learning institutions cannot motivate and educate capable nurses into working life.

Nurses need critical thinking skills. Critical thinking improves learning and is important both during studies and work life. It is one of the ways to secure safe care. A critical thinker has a will to express his or her own thoughts. With critical thinking skills a nurse will be able to notice what is possible and reasonable, and what is impossible or even dangerous (Nurmela 2002, p. 34).

In terms of the structure of this study, Chapter Two explains the background, including the concept of critical thinking, and reviews previous studies on the topic. The theoretical framework for this study is based on Kolb's Experiential Learning. This framework is introduced in Chapter Three.

The purpose of this thesis was to discover ways to learn critical thinking during nursing studies. Research question focusses on the tools to learn critical thinking, i.e., how students can enhance their learning during studies.

The method chosen is content analysis of the data collected from scientific databases. Chapter Five describes the methodology and process of data collection.

In Chapter Six findings from the data collection and content analysis provide an explanation why critical thinking, and a thorough understanding of different learning styles, is so important. Chapter Seven ("Discussion") analyses the findings and further discusses ethical considerations, limitations, and recommendations.

This study demonstrates the importance of learning critical thinking and problem solving already during nursing studies. It argues that paying more attention to these skills will better prepare nursing students to become professional and qualified nurses.

2. Background

It is vital to understand the concept of critical thinking and to acknowledge its importance in nursing. This chapter provides a conceptual analysis of critical thinking. This study is important in order to find answers to problems that have been acknowledged already, in particular the demands in critical care settings requiring critical thinking skills and the provision of safe care to patients. Why are, according to numerous studies, nursing students' critical thinking skills unacceptably low?

Rusnani & al. (2016, pp. 71-72) believe that nursing curricula need to be changed to include a student-centred learning approach. If nursing educators do not begin using alternative, more interactive classroom activities, students' opportunities to think critically will remain limited.

2.1. Critical Thinking in Nursing

Critical thinking is not a new concept. It has been defined already in the 1950s, and was introduced into the nursing profession in order to improve learning. The concept was more thoroughly developed during the 1990s, especially in the fields of nursing and medical education (Ignatavicius 2001, p.26). Internationally critical thinking was added to as a search term in the Cumulative Index of Nursing and Allied Health Literature (CINAHL) already in 1980 (Nurmela 2002, p. 34).

Critical thinking refers to judgment, independence, autonomy and an ability to look from a wider point of view. According to Nurmela (2002), critical thinking and high morality go hand in hand. A critical thinker holds on to moral principles but is also able to act against the pursuit of his/her own benefits. He/she acknowledges egocentric and sociocentric factors, and is aware of what is not morally right in a variety of settings. According to Nurmela (2002), to be critical is to understand that it is impossible to find the ultimate basis for everything. Critical thinking can be recognized in nursing settings based on questions and query, the object of which are matters related to patient care, the nurse himself/herself and the nursing profession. Critical thinking can be recognized from a caregiver who searches the grounds and has a will to express his/her thoughts. With critical thinking skills, the caregiver will be able to notice what is possible and reasonable, and what is impossible or dangerous. According to Nurmela (2002), it is a key method to ensure safe nursing care.

Following Martin's (2002) definition of critical thinking, the concept refers to a process of thoughts used by nurses for clinical decision making. Critical thinking is needed in problem solving and complex decision making, but it is also essential to recognize that critical thinking is not an independent skill. The best way to improve learners' abilities in these skills are through repeated experiences or practice where learners' thinking processes are supported by integrated contextual knowledge, skills and behaviours (Park 2013, p.42).

2.2. Expectations of Critical Thinking in Working Life

Several studies show that critical thinking skills are seen to diminish. In spite of the vast body of research on the development of critical thinking, studies show that only one-third of new graduate students have a satisfactory level of critical thinking skills for entry-level practice (Mann 2012, pp.26). It is beyond doubt that expectations in working life require critical thinking. The challenge at hand is for nurse educators to find a different method to teach and to encourage students to engage analytical thinking, and how to make that an integral part of their daily practice to increase patient safety. Since the present health care system is growing increasingly complex and challenging, nurse graduates need to be prepared to become highly

skilled problem solvers and critical thinkers, while at the same be compassionate caregivers. (Rusnani & al. 2016, pp.67-68)

According to the study by Shirazi & Heidari (2019), there are many reasons for nurses to increase their critical thinking skills. Critical thinking is the key component in problem solving, and a lack of this proficiency on the part of nurses can be problematic. Studies show that thinking is a balanced combination of knowledge, skills and attitudes. Possessing all these components empowers a thoughtful person to gain more knowledge and competence in varying sciences and technologies and, consequently, acquire the strength to follow the path of success. Nurses should be capable of making major decisions independently and swiftly in critical situations. Critical thinking skills enable nurses to identify crucial data and differentiate between problems that require urgent care and those that are not life-threatening. Nurses are expected to reflect on their actions and consider possible consequences of each action to make precise and appropriate decisions. (Shirazi & Heidari 2019, pp.1-2)

2.3. Previous studies of Critical Thinking in Nursing Studies

According to research findings, students' critical thinking skills are unacceptably low. For that reason, it is crucial to pay more attention to improving critical thinking skills in academic study plans. Studies have shown that there is a significant relationship between learning styles and academic achievement. Therefore, it is essential that nursing educators take into account the dominant style in every class in their study planning and in the application of proper teaching methods. (Shirazi & Heidari 2019, p.1)

Nurmela's (2001) doctoral dissertation introduced several primarily empirical studies which took place in Great Britain, the United States of America and Finland. The studies showed that critical thinking skills have not been an integral part of nursing history. Many people working in the field of nursing have criticised this relative absence, but in general not much progress has been made in promoting critical thinking critical. Even though as a concept critical thinking skills has been acknowledged since the 1980s, but it was not the past two decades that studies about thinking skills have been increased. As his conclusion, Nurmela (2001) argued that nursing students' critical thinking skills do not evolve much during studies. Having said that, it is quite unclear what critical thinking actually is and what kind of thinking skills are needed in nursing. In some of his case studies, Nurmela (2001) applies different concepts of critical thinking synonymously, addressing them in the context of problem solving, decision making, nursing process and evidence-based thinking (Nurmela 2001, p. 34-41).

3. Theoretical framework

This chapter introduces the theoretical framework of Experiential Learning in order to support the research. According to Kolb's theory, effective learning is visible when the learner completes a cycle of four different learning styles. Experiential learning model, founded by

David Kolbe in 1984, encourages active participation and critical thinking. Therefore, it is suitable to be used as a theoretical model for conducting this literature review.

3.1. Kolb's Experiential Learning

According to Kolb the process of experiential learning can be described as a four-stage cycle. It consists of four adaptive learning models, namely concrete experience, reflective observation, abstract conceptualization, and active experimentation. The structured bases of learning rely on the transactions of these four adaptive models (Kolb 1984, p. 40-41).

As the first stage, Concrete Experience is when a learner encounters a new experience. In the second stage this is followed by Reflective Observation, referring to a learner reflecting on the experience that he/she has had. In the third stage, namely Abstract Conceptualization, the learner aims to acquire new ideas and attempts to conceptualize a theory or model drawing lessons from his/her experience. In the final stage, Active Experimentation, the learner actively plans and tests their ideas and knowledge in working life.

According to Kolb's theory, effective learning is visible when he/she completes a cycle of four learning styles. In this theory Kolb views learning as a process where each stage support each other and feeds to next stage. It is possible to start cycle at any stage and complete cycle in its order.

Learning cycle

Kolb's four-stage cycle can be visualised as in Figure 1 below. For learning to be effective the learner should go through all four stages (Kolb 1984, pp. 24-25).

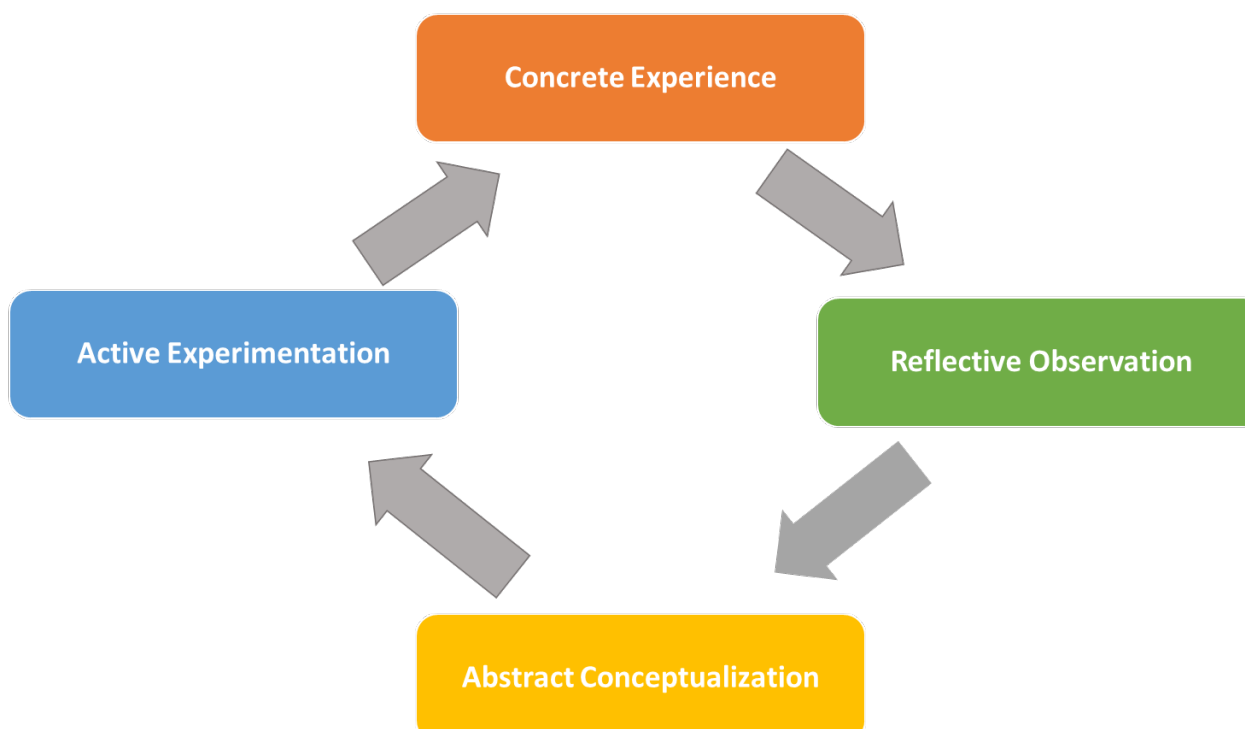


Figure 1. The Experiential Learning Cycle (Kolb & Kolb 2013, p.8.)

At the stage of concrete experience, the learner is learning through concrete situations in relation to other people showing personal involvement. At this stage learning is not systematic but rather depending on feelings and open-mindedness. During the stage of Reflective Observation, the learner understands situations and ideas from a different point of view but is not involved in taking action. They depend on objectivity and careful judgement, and opinions are based on feelings and thoughts. At the stage of Abstract Conceptualization, the learner relies on systematic planning and theories in solving practical issues. This means that interpersonal feelings are absent in this stage. Active Experimentation is an active stage during which the learner is approaching different situations in a practical approach. (Kolb 1984, pp. 23-34)

3.2. Kolb's Different learning styles

Based on the four-stage learning cycle, there are also four separate learning styles in Kolb's theory of experiential learning. Each learning style represents a combination of two preferred styles. The four learning styles are convergent (doing and thinking), divergent (feeling and watching), assimilation (watching and thinking) and accommodative (doing and feeling). (Kolb 1984, pp. 77-78)

Convergent learning style. This learning style is rooted primarily in the stages of Abstract Conceptualization and Active Experimentation. The strength of this learning style is that it can increase skills for problem solving, decision making and the practical method of ideas. According to Kolb this method is called convergence because a learner with this style seems to perform best in situations where there is a single correct answer or solution. Knowledge is organized in such a way, that through hypothetical-deductive reasoning it can be concentrated on specific problems. Research shows that in this learning style people are controlled by their expression of emotions. They prefer to deal with technical tasks and problems rather than social and interpersonal issues (Kolb 1984, p.77).

Divergent learning style. This learning style is embedded in the stages referred to as Concrete Experience and Reflective Observation. The strength of this learning style lies in imaginative ability and awareness of meaning and values. The emphasis of this learning style is on adaptation by observation rather than action. This learning style is called divergent because of its openness to alternative ideas and implications such as brainstorming sessions. Divergence learners are interested in people and tend to have imaginative feeling-oriented points view (Kolb 1984, p.77-78).

Assimilation learning style. This learning style is entrenched in the stages labelled Abstract Conceptualization and Reflective Observation, the dominant learning abilities. The strength of this learning style is inductive reasoning and the ability to create theoretical models. In contrast to convergence, this learning style is less focused on people and instead emphasizes ideas and abstract concepts. Hence, the focus is less on ideas but rather on their practical

value. In this style it is important that the theory is logically sound and precise (Kolb 1984, p.78).

Accommodative learning style. This learning style relates to the stages of Concrete Experience and Active Experimentation. The strength of this style is to do things, carry out plans and tasks and be able to be involved in new experiences. The adaptive emphasis of this style is on opportunity seeking, risk taking and action. This learning style is called accommodation because it is best adapted to situations where theory or plans do not fit the facts. Persons who have an accommodative learning style usually solve problems in an intuitive trial-and-error manner, which means they tend to rely on other people for knowledge rather than their own analytic ability (Kolb 1984, p.78)

3.3. Learning and individuality

The learning process is not identical for all students. It appears that the psychological structures that dominate learning allow for an emergence of unique individual adaptive processes that tend to emphasize some adaptive orientations over others, as suggested by Kolb (1984 p.62). The possibility-processing structure concept bestows central importance to the role of individual choice in decision making. The way students process each newly arisen event defines the assortments of choices and decisions they witness. The choices and decisions students make define the events that they live through, and these choices impact future choices. In this way humans create themselves through choices of the actual opportunities they experience (Kolb 1984).

The complex structure of learning allows for individuals to undergo a unique possibility-processing structure or styles of learning. Through individuals' decisions of experience, they instruct themselves to seize reality. This self-seizing conditioned by experience defines the extent to which the individual emphasizes any of the four models of learning process, namely concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb 1984).

4. Aim and research question

The purpose of this thesis was to discover ways to learn critical thinking during studies. Research question focusses on the tools to learn critical thinking, i.e., how students can enhance their learning during studies.

Research question:

1. How can a nursing student enhance learning critical thinking during studies?

5. Methodology

The research questions raised in Chapter Four will be answered through a thorough literature review of research conducted on critical thinking in nursing. This study will reflect the literature collected on Kolb's learning theory. The following sections 5.1 and 5.2 will explain the data collection and content analysis, and will elucidate how these methods were used in this study.

5.1. Data collection

The data used in this study was obtained from scientific data bases including peer-reviewed articles. Data collection was limited to full-text and peer-reviewed articles. In this study attention was given to articles and research done in Finland but also overseas during the past ten years. Including and excluding criteria can be visualised as in Table 1 below.

Including criteria	Excluding criteria
Full text available	Articles not older than 2010 (which was changed later)
Peer reviewed	Lack of diversity of topic
Study subjects nursing students	

Table 1. Including and excluding criteria

Data were explored by using a different variation of search words related to critical thinking skills and nursing, yielding many potential articles. Reading through the articles it became clear that it is not easy to find precise articles answering this study's research questions. Many articles reference the topic of critical thinking but do not go into depth in answering the research questions put forward in this study. Articles chosen for this study acknowledged the problem of diminished critical thinking skills, while introducing various tools or methods to enhance students' ability to learn critical thinking skills based on theory.

One challenge was to find multiple articles on the topic of critical thinking skills in Finland, which is the reason why eventually none have been included. Data collection can be visualised as in Table 2 below.

Data base	Search terms	Year and filter	Hits	Articles selected
EBSCO Academic Search Elite	Critical Thinking Skills AND Nursing	Search any year	275	2
	Thinking Criti* AND Thinking Criti* AND Critical Care Nursing	Search any year	58	1
	Critical Thin* AND Critical Care Nursing	Search any year	61	0
	Critical Thinking Skills	Search any year	2 632	0
Sage	Critical Thinking Skills AND Nursing	2010-2019 And Open access only	774	0
PubMed	Critical Skills AND Nursing	Publication Dates 10yrs	1230	1
	Clinical Immersion AND Nursing Program	Search any year	38	1
EBSCO CINAHL	Critical Thinking AND Education AND	2012-2019 Full text and English language	50	1

Table 2: Data Collection

	Author + year	Name of the article	Journal volume, pages
1.	Rusnani Ab Latif, Rasidad Mohamed, Akesan Dahlan (2016)	Concept Mapping as a Teaching Tool on Critical Thinking Skills and Academic Performance of Diploma Nursing Students	Special Communication Vol 8 Issue 1 2016, pp. 67-74
2.	Shirazi Fatemeh, Heidari Shiva (2019)	The Relationship Between Critical Thinking Skills and Learning Styles and Academic Achievement of Nursing Students	The Journal of Nursing Research Vol. 00, No. 0, 2019. Pp.1-7
3.	Ignatavicius Donna D., (2001)	Six critical thinking skills for at-the bedside success	Dimensions of Critical Care Nursing Vol. 20, No 2, 2001,
4.	Mann Jeanne, (2012)	Critical Thinking and Clinical Judgment Skill Development in Baccalaureate Nursing Students	The Kansas Nurse January-February Vol. 87 No.1 2012 pp.26-30
5.	Doerner Mary E., Swenty Constance F., (2019)	The Effect of a Perioperative Clinical Immersion on Senior Nursing Students' Perception of Readiness to Practice: A Quality Improvement Project	AORN Journal February Vol. 109, No. 2, 2019, pp. 193-200
6.	Park Mee Young, McMillan Margaret Anna, Conway Jane Frances, Cleary Sonja R., Murphy Leonie, Griffiths Sharee Kathleen, (2013)	Practice-based simulation model: a curriculum innovation to enhance the critical thinking skills of	Australian Journal of Advanced Nursing Vol. 30 No. 3 2013, pp.41-51

Table 3. Articles selected for review

5.2. Content analysis

The approach adopted by this study is deductive content analysis. Content analysis is a method where written, verbal or visual communication messages are being analysed. As a research method content analysis is objective and systematic, allowing the researcher to test theoretical issues and enhance understanding of the data accessed (Kyngäs & Elo 2010). Deductive content analysis is being used when the structure of analysis is operationalized on the basis of previous knowledge and the aim of the study is testing theory (Kyngäs & Elo 2010).

Content analysis provides a simplified perception of the phenomenon being studied (Tuomi & Sarajärvi 2018, p. 301), in this case, critical thinking and how to enhance it in nursing studies.

The first phase of theoretical content analysis is to form a structured analysis of the phenomenon being studied. Through this structure different categories and themes can be found. These categories can then be compared to the theoretical framework (Tuomi & Sarajärvi 2018, pp. 333-334.).

In this study content analysis has been done by systematically reading and analysing the chosen articles. Through systematic content analysis the articles were divided into two themes: how to enhance critical thinking and learning styles. Then these categories were compared to Kolb's Experiential learning theory and examined in terms of how they fit the different kind of learning styles. Table 4 lists the different themes and categories for each article.

Article number	Ways to enhance critical thinking	Learning styles
1.	Concept mapping	Stimulating learning
2.	Diverting and accommodating	Kolb's theory
3.	Six critical thinking skills	Not found in article
4.	Grand rounds	Peer learning
5.	Clinical immersion	Learning from experts

6.	Practice based simulation model	Constructivist pedagogy
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Table 4. Ways to enhance critical thinking and different learning styles

Chapter Six analyses the ways to enhance critical thinking as results in terms of the research questions. Findings are subsequently analysed according to Kolb's experiential learning theory.

6. Findings

Critical thinking is crucial for professional growth and to become a better nurse. There are different ways to enhance critical thinking in nursing studies.

6.1. Ways to enhance critical thinking during nursing studies

In concept mapping, the patient's diagnosis is placed at the centre of a concept map. Around the diagnosis assessment findings are written down. Seeing all this information in a diagram helps students to identify important factors to support solving a patient's problems. According to Rusnani & al., concept mapping should be a part of nursing studies. Through concept mapping students can learn how to organise data, prioritise the patient's needs and nursing intervention. (Rusnani & al. 2016, pp. 67-72.)

Diverting learning means feeling and watching. **Accommodation** means doing and feeling. According to Shirazi and Heidari (2019) a diverting learning style is more appropriate for the field of nursing than accommodation. This learning style encourages students to be holistic and social. Being social and thoughtful develops and enables creative, workable and effective solutions when dealing with difficult patient situations. It also enhances students' problem-solving capabilities. (Shirazi and Heidari 2019, pp. 1-5.)

Ignatavicius (2001) introduces **six critical thinking skills**. These cognitive skills are Interpretation, analysis, evaluation, inference, explanation, and self-regulation. Interpretation means understanding the patient's laboratory values, vital signs and physical assessment data. Analysis refers to understanding the patient's problems based on assessment data. Evaluation means identifying what the expected outcome is and assessing if they are met. Inference includes drawing conclusions from the situation. Explanation means that you need to be able to justify your actions and decision making. Self-regulation is self-reflection of your actions. (Ignatavicius 2001, pp. 30-32.)

For new graduates and students critical thinking skills may not have been developed yet. Even experienced nurses can need support to enhance their skills. Actively practising the six critical thinking skills can be acquired, leading to more evolved critical thinking in nursing. It is a long-term process that takes time and needs continuous practising. (Ignatavius 2001, pp. 30-32.)

Grand rounds is an educational strategy to enhance critical thinking as well as clinical judgement skills. Grand rounds is peer learning from other students and the teachers. The idea is that problem solving takes place in a group instead of individuals. Mann's (2012) study included an intervention group that learned according to the educational strategy of grand rounds. The comparison group did not meet as often, and they did not engage in the same kind of problem solving. Results showed that the members of the intervention group had developed more critical thinking skills. (Mann 2012, pp. 26-28.)

Clinical immersion is a model providing students the opportunity to improve their clinical abilities. Clinical immersion is a way to enhance critical thinking, skills, and competence. Nursing students need to work safely in their role of nurse. They also need support from senior nurses in a clinical environment. A workplace that provides clinical immersion attracts students to work there in the perioperative field. According to Doerner & al. the help of a senior nurse provides an opportunity for professional growth. Nursing students learn critical thinking as well as improve their clinical skills. (Doerner & al. 2019, pp. 193-196.)

There are five elements in the **practice-based simulation model**. The element in the middle is practice situation. Other elements in the practise situation are 1. simulation, 2. structured learning, 3. inquiry process and finally 4. assessment. In simulations the idea is to go through all elements (stages) in order. (Park & al. 2013, pp. 41-49.)

The model includes preparation, the simulation practice and debriefing. Structured learning includes lectures, tutorials, clinical skill labs and web-based interactive learning sessions. In the model the inquiry process means enhancing critical thinking skills. The idea is that this model helps students to become life-long learners. Concept mapping is used as a tool in the inquiry process. Assessment means that the students analyse if they have succeeded in basic clinical skill, scientific knowledge, moral development, and cognitive functions. Constructivist pedagogy implies that the goals for practice-based simulation model meet the professional competence as described in the curriculum. (Park & al. 2013, pp. 41-49.)

2. Findings in the framework of Kolb's experiential learning theory

In Rusnani & al.'s (2016) study, the way to enhance critical thinking was concept mapping and the learning style was stimulating learning. In Kolb's theory this can be seen as converging learning style because it involves doing and thinking. This type of learning method is optimal for a learner who performs best in situations where there is a single correct answer or solution. It is possible to surmise that this way of learning is a good starting point when learning new skills.

The study by Zhirazi & Heidari (2019) was entirely based on Kolb's theory of learning styles, going through all the different styles of learning. The conclusion of the study was that students used all these different kinds of learning styles but the most common was divergence. Their learning was based on feeling and watching.

Ignatavius (2001) introduced six critical thinking skills. The article did not mention a specific learning style. Even so, the skills can be seen as belonging to a convergent learning style. The idea of the critical thinking skills is based on doing and thinking.

In Mann's (2012) article, the way to enhance critical thinking was based on the method of grand rounds. Peer learning was mentioned as learning style. Closest to this learning style in Kolb's theory is accommodative learning, because it involves relying on other people for knowledge rather than on one's own analytic ability. The things that were not in line with Kolb's theory and accommodative learning included risk taking and opportunity seeking.

In their study, Doerner & al. (2019) used clinical immersion and learning from experts. This type of learning can be seen as akin to the divergent learning style because it involves working with a senior nurse. The emphasis of the learning style is on adaptation by observation rather than action. What is good in this type of learning is the possibility to change ideas through brainstorming in the work environment.

The study by Park & al. (2013) introduced the practice-based simulation model. In their study the learning style was constructivist pedagogy. The aim of this model is to integrate thinking and doing during the learning process, so it follows the convergent learning style.

Based on the findings two different learning styles from Kolb's experiential learning theory stand out: the convergent learning style and the divergent learning style. Students who used these learning styles significantly enhanced their critical thinking skills and showed considerable progress in their professional growth.

7. Discussion

This discussion chapter analyses and interprets the results of this study. The chapter also addresses the limitations of the study as well as ethical considerations.

7.1. Analysing the results

Six articles were chosen for the content analysis. The focus was on studies about critical thinking and how enhance it in the context of nursing students. As a result of the literature review and content analysis, it can be said that there are two learning styles from Kolb's experiential learning theory that help students to enhance their critical thinking skills. The two styles that stand out are convergent learning (doing and thinking) and divergent learning (feeling and watching). From these two the convergent learning style entails more active learning. In nursing studies, it not only enhances critical thinking but also facilitates students developing crucial professional skills. According to Kolb the convergent learning style seems

to perform best in situations where there is a single correct answer or solution. Problem solving is a crucial part of critical thinking. (Kolb, 1984)

In her study, Ingnavius (2001) introduced six critical thinking skills. She points out that anyone can learn critical thinking. However, critical thinking needs to be practiced and reinforced continuously. Therefore, as a conclusion, even after graduation nursing students need to continue improving critical thinking skills in working life. On a personal note, going through the studies made the author of this study recognize that a key element for nursing students is to realize and understand that they need to be motivated and prepared to become highly skilled problem solvers and critical thinkers. This builds a solid foundation and preparedness to meet expectations in working life.

Working as a nurse in the clinical setting can be highly demanding, necessitating the ability to make quick decisions in changing situations. It is crucial to have these skills because in the health care it is about the patient's wellbeing, and in some cases a matter of life and death. During their studies it is key for nursing students to understand the responsibility of a nurse.

The studies that were introduced in Chapter Two (Rusnani & al. 2016) showed that schools should find a different method to teach and encourage students to engage in analytical thinking and make it a part of their daily practice. This is crucial for patient safety. Nurse educators should invest in insuring that critical thinking and different learning styles are an integral part of the nursing curriculum. Simulation-based practices help students to learn the skills needed in a safe environment. In simulations the teachers need to actively support and engage problem solving and critical thinking skills. The role of the teacher cannot be undermined during the learning process.

In the personal experience of this author, nursing studies in Finland are based on three different divisions: theory, simulation practice, and training in working life. First one studies the theory, then one practices in simulation centres under supervision, and finally one engages in practical training working with real patients. In the training one also works under supervision. This type of learning mirrors both the divergent and convergent learning styles (Kolb 1984). These were the styles that stood out in the previous studies and in the content analysis. In sum, these approaches hold great potential for nursing students in Finland to improve their critical thinking skills.

In practice this does not build up the kind of skill set that nursing students need to meet the expectations in working life. The problem is often that groups are too big, and students have different learning styles and skills to begin with. Some teachers might not have enough experience from clinical work to meet the needs of the students. They might lack the hands-on experience, or their skills are outdated which means that the skills they teach do not meet the demands of working life. What is important to acknowledge is that students need to have the right mindset and motivation for this field, but also teachers need to have up-to-date knowledge of an increasingly complex and challenging health care system.

7.2. Ethical considerations

The appropriate choice of methodology and methods is important. The chosen methodology should meet the research questions being addressed, and an be in line with researcher capability. It is important to choose the method so that it is in line with the data being used. (Fleming 2018 p. 212)

The articles presented in this study were collected using specific key words and trustworthy databases. This study did not involve participants because it was based on literature and theory. Hence, there is no need for considerations about anonymity or confidentiality.

An important part of a study is to analyse how the process went and how conclusions were reached. The method in this study was content analysis conducted after data collection. Data collection could have been done using more specific key words and databases. This would have probably given more sources for the study, including studies that have been made in Europe.

Attempts were made to retrieve studies conducted in Finland, but at the time of data collection studies done on Finnish nursing students and critical thinking were not available.

7.3. Limitations and recommendations

Related to ethical considerations, it needs to be reiterated that there is a lack of Finnish studies on the topic. This makes it harder to translate the results into the Finnish nursing curriculum. Arguably, with a wider search the data could have been more comprehensive and providing more knowledge of the phenomenon of critical thinking skills and problem solving in nursing studies. However, the body of research necessarily had to be limited within the scope of this study.

There is an obvious need for more research on critical thinking in nursing. Hopefully in the future these will include studies in and on Finland. Through research done in this field, new ways to improve critical thinking can be found. Maybe this way critical thinking and different learning styles can become an intrinsic part of nursing curriculums in Finland.

This study has aimed to increase awareness among both students and teachers of the importance of critical thinking skills in learning and in becoming a professional nurse.

For me personally, this study was an important learning experience. I learned a lot about how research is conducted and how crucial it is to study critical thinking so that it comes into practice in nursing studies. I also learned how to enhance critical thinking skills, which has certainly enriched me and will make me a better nurse in the future.

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