May 2018

Promoting Meaningful Learning Through the Use of Concept Maps

Duaa Amr Hafez
University of Wisconsin-Milwaukee

PROMOTING MEANINGFUL LEARNING THROUGH THE USE OF CONCEPT MAPS

by

Duaa Amr Hafez

A Dissertation Submitted in

Partial Fulfillment of the

Requirements for the Degree of

Doctor of Philosophy

in Nursing

at

The University of Wisconsin – Milwaukee

May 2018

ABSTRACT

PROMOTING MEANINGFUL LEARNING THROUGH
THE USE OF CONCEPT MAPS

by

Duaa Amr Hafez

The University of Wisconsin – Milwaukee, 2018
Under the Supervision of Professor Kim Litwack

Background and significance: There have been dramatic changes in the healthcare system with the high use of technology. The healthcare needs of patients have increased due to the chronic diseases, and an increase in the number of the older population. These changes require nurses with high levels of thinking, knowledge and skills. It is vital to reconsider the teaching and learning methods used in nursing schools to ensure graduating nurses are capable of working in these challenging environments. The **purpose** of this naturistic inquiry descriptive study is to explore the experiences and perspectives of undergraduate and graduate nursing students and faculty on the use of concept maps as a learning tool by students, and as a teaching and assessment tool by faculty at the nursing college in a public university, Jeddah, Saudi Arabia. At this stage, meaningful learning is defined as the ability of students to make sense of the content learned in-class, and their ability to recall the information during their exams. **Methodology:** Undergraduate and graduate nursing students were trained on the creation of concept maps. Faculty were trained on the use of concept maps as a teaching and assessment tool. Using convenient sampling method, the **sample** included 18 undergraduate students, 4 graduate students, and 4 faculty. **Data was collected** using focus groups with students and indepth individual interviews with faculty. **Data was analyzed** using thematic analysis. **Findings**:Three themes were identified; enablers, constraints and guidance and support. **Conclusion**: The results

help faculty learn more about nursing students and understand their learning needs which will influence the faculty's choice of teaching methods when planning for their courses and lessons. The results need to be complemented by empirical evidence on the use of concept maps by Saudi Arabian nursing students and faculty.

Dedication

To my parents,
my sisters,
my brother,
my grandfather,
and my best-friends.

TABLE OF CONTENTS

LIST OF TABLES

ACKNOWLEDGEMENTS

I thank “Allah” for giving me the opportunity to pursue my dreams and goals. I thank him for giving me the health, strength, and determination to keep going. I thank him for gifting me with a loving supportive family and friends. He has put in my path the people who made me stronger and made me who I am today.

I have the utmost gratitude to my father and sister (Tahleel) for supporting me and believing in me and my ability to achieve my goals. My mother, sister (Shahad), and my best friend (Lujin Badawi) have been my anchor through my journey. I thank you for seeing the best in me, encouraging me to be a better person, holding my hand through thick and thin, and listening and thinking with me every-time I was lost at a cross-road.

I am grateful to Dr. Kim Litwack for her support, guidance, encouragement, motivation, and empowerment through my journey. Thank you for listening to me and giving me advice every time I knocked on your door. I was also blessed by my committee members, Dr. Lucy Mkandawire-Valhmu, Dr. Barbra Daley, and Dr. Elizabeth Rice. Thank you for your guidance and timely responses to my emails. Thank you for giving me ideas and broadening my views on life. Special gratitude to Dr. Karen Morin for accepting me in the PhD program and to Mrs. Jennifer Daood for her patience and support. Thank you all for being a part of my success. I am honored to have met all of you.

I am also grateful for my friends who were with me from the beginning of the PhD journey, Dr. Crystal-Rae Evans, Dr. Murad Taani, and Linda Wesp. We have had a lot of good memorable times. We laughed and cried together, we shared our weaknesses with no fear of judgement, and we saw the best in each other. I am blessed and honored to call you my friends.

I thank the administrators of the college of nursing in King Abdulaziz University for giving me the opportunity to conduct my research. Thank you for believing in my mission and giving me the chance to share my knowledge and expertise with the faculty. Special thanks to Dr. Maram Banakhar, Ms. Al-Anoud Abudhuher, and Mrs. Amani Jamali for their continuous support during my research.

Finally, I thank everyone I know and met who have had an impact on me personally and professionally.

CHAPTER 1

INTRODUCTION

Promoting Meaningful Learning through the Use of Concept Maps

In the nursing education literature of western countries, there has been an emphasis on the importance of active learning and meaningful learning. These two types of learning have been found to develop the cognitive skills of nursing students and graduates. Contrarily, the nursing education literature of Saudi Arabia is limited and does not explore new teaching or learning theories and methods. Hence, it is vital to explore these areas in Saudi Arabia to be able to develop and change the educational experience of nursing students and graduates. Therefore, the aim is to describe meaningful learning, ways of promoting it, and its implications on clinical practice and students' learning outcomes.

Meaningful Learning in the literature

In the literature, meaningful learning is frequently defined based on Ausubel's theory of meaningful learning. Ausubel (1963) described meaningful learning as embodying "a distinctive kind of learning process in which the learner employs a "set" to incorporate within his cognitive structure, in nonarbitrary, nonverbatim fashion, potentially meaningful materials which are subsumable by established entities within that structure" (p. 34). Meaningful learning was also described as giving meanings to new information by considering personal elements in the cognitive structure (De Sousa, Formiga, Oliveira, Costa, & Soares, 2015). Furthermore, meaningful learning is assumed to occur when relationships between old and new information are created in the cognitive structure in rational and authentic ways (Correia & Cicuto, 2014; and Clayton, 2006). Moreover, Bagnasco and colleagues (Bagnasco, et al., 2014) cited Cosentino's (2002) definition of meaningful learning as an interaction between new and old knowledge. These definitions correspond with the Ausubel's assimilation theory (1963), which entails the formation of a relationship between new and existing knowledge in the cognitive structure

through subordination, super-ordination, and combination (Ausubel, Novak, & Hanesian, 1978). Subordination is when the learner is able to incorporate new knowledge under an existing major concept in the cognitive structure (Ausubel, Novak, & Hanesian, 1978). Super-ordination is when the new knowledge becomes a major concept that existing knowledge in the cognitive structure is subsumed under that concept (Ausubel, Novak, & Hanesian, 1978). Combination is when the new knowledge cannot be subordinated nor super-ordinated, however, can be related to the background of the existing knowledge in the cognitive structure (Ausubel, Novak, & Hanesian, 1978).

Multiple disciplines view meaningful learning slightly different by linking it to the applicability and practicality of the gained knowledge. For example, in medicine, meaningful learning is perceived as information students gain that would be beneficial in their practice and help them solve problems (Michael, 2001) cited in (Gonza´lez, Palencia, Uman˜a, Galindo, & Villafrade, 2008). Also, in physiology, meaningful learning is defined as the ability of students to forsee and describe the reactions of the unstable body conditions and accurately solve mathematical problems (Gonza´lez et al., 2008). De Sousa and colleagues (2015) argue that in different research areas, the term 'meaningful' was viewed as "something close to student's interests" (p.631) because the student could relate it to previous knowledge or experience.

The term 'meaningful' learning has been interchangeably used with 'deep', and 'significant' learning in different contexts (Bagnasco, et al., 2014). Significant learning includes the behavioral and affective level (Fink, 2007) and deep learning is described as a learning method that is an opposite of superficial learning (Bagnasco, et al., 2014). Also, meaningful learning could be viewed as a process or an outcome (Bagnasco, et al., 2014). When meaningful learning is viewed as a process, the emphasis is on devotion and efforts exerted during the

learning process (Fink , 2007). When meaningful learning is viewed as an outcome, the emphasis is on the achievements and their significance to the future (Fink , 2007). Few studies have used the term 'meaningful learning' without a precise definition which leads to ambiguity in understanding the concept of meaningful learning that is addressed in the studies (Adema-Hannes & Parzen, 2005; Chapman, 2005; and Dreifuerst, 2012).

Role of meaningful learning in nursing education

Nursing education is known to use different types of learning varying along the continuum between rote and meaningful learning (Gul, Cassum, & Ajani, 2009). Lately, the educational systems in western countries have been experiencing changes and developments to enhance the learning experiences of nursing students and improve their learning outcomes. Historically, schools and colleges used teaching methods that concentrated on the content to be delivered. The objectives were more centered on the quantity of knowledge the student should gain, regardless of the knowledge the learner needs or desires to learn. The teaching method most commonly used was lecturing, which leans towards rote learning. Nowadays, the schools and colleges are more learner-centered. Learners are at the center of attention and their needs are the priority. Different teaching and learning methodologies are being used to empower students and encourage them to become self-learners. Becoming a self-learner is important to the nursing discipline; because, it allows individuals to take responsibility of their own learning, and create a positive self-concept (Merriam, Caffarella, & Baumgartner, 2007). There is special attention paid to the retention of information gained during school and college years, and how students use the knowledge gained in their life experiences. The emphasis on knowledge retention corresponds with Ausubel's assimilation and meaningful learning theory.

The skills that are required to transition from college education to practice could be achieved through meaningful learning. Meaningful learning is known to encourage the learner to integrate the new knowledge with their foundational knowledge resulting in the development of the vital skills for practice including critical thinking, problem solving and decision-making skills (Novak, 2011). Meaningful learning has two different sets of attributes that are vital to the nursing practice; invisible and visible attributes. Invisible attributes are changes that occur in the cognitive structure that cannot be visually seen. These attributes include: information retention (De Sousa et al., 2015), understanding theories and information (Dreifuerst, 2012; and Getha-Eby, Beery, Xu, & O'Brien, 2014), developing new knowledge and acquring new visions (Westin, Sundler, & Berglund, 2015), using critical and reflective thinking (Westin et al., 2015), generalizing knowledge (Novak, 2010), and interpretting, incorporating and relating new information (Gonza´lez et al., 2008).

Visible attributes are changes that can be observed in the learner's words, actions, decisions, behaviors and attitudes. These attributes include: clinical reasoning abilities (Dreifuerst, 2012), problem solving (Gonza´lez et al., 2008; and Mayor, 2002), clinical judgment and decision making (Getha-Eby et al., 2014), application of knowledge and generalization of skills (Novak, 2010), and courageousness and self-awareness (Westin et al., 2015). The relationship between invisible and visible attributes could be considered complimentary. They could be viewed as a process of development. If the student develops the invisible attributes and skills then the visible attributes will be revealed subsequently.

Promoting meaningful learning

Novak (1998) highlighted the main purpose of education is to facilitate the construction of meaning by the learner through the incorporation of thinking, feelings, and acting along with

attitudes to promote meaningful learning and the creation of new knowledge. Novak (2010) emphasized the importance of sharing and discussing knowledge between the learner and the educator, because it results in the understanding of meaning by the learner. Teachers' roles have changed and different expectations are anticipated from them. Teachers should be aware of the learning environment, the teaching / learning situation, own actions, and students' learning process (Hrynchak & Batty, 2012). Hinojosa (2015) suggested that teachers should facilitate, suport, guide, collaborate, encourage and motivate students to construct and reconstruct their own knowledge. The teacher's role in promoting meaningful learning includes: building knowledge according to the learners' knowledge, breaking the dichotomy between theory and practice and articulating knowledge with action (De Sousa et al., 2015). The teacher should choose teaching methods that are effective, interesting, outstanding (Crookes, Crookes, & Walsh, 2013) and meaningful (Clayton, 2006). It is the teacher's role to encourage students to compare knowledge, apply theory and organize and structure knowledge (Bagnasco, et al., 2014).

From reviewing the nursing education literature, meaningful learning could be implemented using different teaching strategies; such as, concept maps (Clayton, 2006; Buldu & Buldu, 2010), debriefing and narratives (Dreifuerst, 2012; Balen, Rhodes, & Ward, 2010), problem based learning (Crawford, 2011; Head & Bays, 2010), videos/ online learning (Hakkarainen & Vapalahti, 2011; Hoffman, et al., 2011), and simulation (Meyer, 2012; Shinnick, Woo, & Mentes, 2011). There is no consensus on the best teaching method to promote meaningful learning. The choice of the teaching method depends on the students' learning needs, learning outcomes and objectives, and the educator's proficiency and preference. Hence, the teaching and learning method that will be explored in this research is concept mapping.

Concept maps and meaningful learning

Inspired by Ausubel's meaningful learning theory (1963), concept maps were developed by Novak and Gowin (1984) to accelerate meaningful learning. Novak defined concept maps as "graphical tools for organizing and representing knowledge" (Novak & Cañas, 2006, p. 1). Concept maps consist of a concept map question, concepts, linking words, propositions and crosslinks. The concept map's question will help the learner to be precise in the construction of the map. The learner starts answering the question by creating concepts that represent the main ideas, which are displayed in circles or rectangles. Concepts are linked together with lines where a linking word is used to define the relationship between concepts, and thereby creating propositions. Crosslinks link new concepts to old concepts, based on the learner's understanding, perception, and experience. To accurately reflect the content that is being presented, concept maps may have different forms; hierarchical, spider, flow chart, and system maps (All, Huycke, & Fisher, 2003).

Concept maps are mostly viewed as a teaching and learning tool that promote meaningful learning rather than an assessment tool. According to the literature reviewed, there is no valid and reliable assessment tool for meaningful learning. Concept maps can be viewed as a visual of the learner's cognitive structure. Concept maps allow the educator to assess and evaluate the learner's needs, misunderstandings, and the correct and incorrect connections between the old and new knowledge (Clayton, 2006). It gives the educator an opportunity to correct and guide the learner, and to identify gaps in the learners' knowledge. Concept maps assist educators to become more effective (Irvine, 1995).

Concept maps as assessment tool of meaningful learning

Concept maps are mostly viewed as a teaching/ learning tool that promote meaningful learning rather than an assessment tool. Concept maps' reliability and validity have not been reported in any of the literature of nursing education. The reliability and validity of different scoring tools of concept maps has been reported.

Meaningful learning could be viewed as an abstract concept. Abstract concepts are known to be challenging to measure empirically. It is believed that measuring meaningful learning empirically is a challenging task. Novak (2011) stated that it is difficult to measure the students' understanding of a subject matter and the behavioral changes resulting from the learning experience. Cadorin and colleagues (2013) conducted an integrated review and a concept analysis on meaningful learning among healthcare professionals. They concluded that there were no studies in the literature that aimed at exploring the outcomes of meaningful learning (Cadorin, Bagnasco, Rocco, & Sasso, 2013). Cadorin and colleagues continued their program of research on measuring meaningful learning. In 2016, they conducted a systematic psychometric review to identify, describe and evaluate psychometric properties of tools measuring meaningful learning (Cadorin, Bagnasco, Tolotti, Pagnucci, & Sasso, 2016). They reviewed a total of 13 measurement tools and found that they were all weak and not reliable to be used to measure meaningful learning (Cadorin et al., 2016). In 2017, they published an article about creating a new measurement tool that aims at measuring emotional behavior abilities of meaningful learning, using Fink's Toxonomy (Cadorin, Bagnasco, Tolotti, Pagnucci, & Sasso, 2017). The scale contains six subcategories including foundational knowledge, application, integration, human dimension, caring, and learning how to learn (Cadorin et al., 2017). The

measurement tool has not been tested yet. As per the evidenece, there is no reliable and valid tool to measure meaningful learning.

The gap in the literature

After conducting a couple of literature reviews, it was found that there is a very limited number of studies that use Ausubel's meaningful learning theory as a theoretical framework. Yet, this theory is the theoretical basis for concept mapping. Meaningful learning is one of the basic learning strategies that enables individuals to develop skills needed for their life experiences. These skills include critical thinking (Westin, Sundler, & Berglund, 2015), decision making (Getha-Eby, Beery, Xu, & O'Brien, 2014), and problem solving (Gonza´lez et al., 2008). It appears that the nursing education literature fails to extensively explore the concept of meaningful learning; instead it concentrates on the outcomes of meaningful learning (critical thinking, decision making and problem solving). It is hoped that this research will open doors for others to start to understand, value and promote meaningful learning.

Studies have been conducted in different countries around the world exploring the effectiveness of using concept maps in nursing education. Similar studies have not been conducted nor reported in Saudi Arabia. The literature is limited about the status of nursing education in Saudi Arabia. Even though studies have been conducted in countries that may have a similar culture to Saudi Arabia, yet their educational systems and student populations are different than that of Saudi Arabia. It is believed that this research will help fill the gap in the literature about the educational system used in nursing education, in Saudi Arabia.

Women's education in Saudi Arabia

Saudi Arabia is known to have a very conservative Islamic culture. Women, in Saudi, are inferior to men. Women are brought up to be dependent on their fathers, brothers, sons, and

uncles. In outdoor settings, women wear "abaya" and "hijab" at all times. Women and men are segregated in all social areas (schools, universities, hospitals, banks…etc.). Women usually work in places where there is minimal or no contact with men (Cole, n.d.). Women are usually considered as "homemakers" regardless of their educational qualifications (Alsuwaida, 2016). Recently, however, there have been some changes in women's role in the society. There are a couple of women who joined the consultative council; they do not yet have a distinctive role or voice. Women also started working in places other than schools, such as hospitals, businesses and industries. Women were not allowed to drive, however, in late 2017, women were given permission to learn to drive and will be allowed to drive by mid 2018.

Women's school education expanded in 1956 (Alsuwaida, 2016). In 1964, the first governmental girls "only" school was opened (Al Rawaf & Simmons, 1991). The government desired control over curriculum design and staffing; hence, they established the General Directorate of Girls' Education (Rugh, 2002). The curriculum of different subjects designed for girls was similar to the ones designed for boys but lacked depth and was superficial (Alsuwaida, 2016). The educational opportunities and specialties for girls are fewer and at a lower quality than of boys (Mills, 2009). The General Directorate of Girls' Education has practiced control and authority over the girls' schools. The Directorate makes the decision of what is taught and how it is taught (Aljughaiman & Grigorenko, 2013). Students, parents and teachers do not have a choice or a role in the education process (Aljughaiman & Grigorenko, 2013).

In 1970, the first females' college was established in Riyadh, the capital under the supervision of the General Directorate of Girls' Education (Al Gady, 1981). The college was established to train secondary school graduates to become teachers of intermediate and secondary school levels (Al Rawaf & Simmons, 1991). As the experience was successful,

additional colleges were established in different areas of Saudi Arabia and graduates specialized in different sciences and arts (Al Rawaf & Simmons, 1991). The colleges were financially supported by the government, hence, there were no fees paid by the enrolled students (Al Rawaf & Simmons, 1991). The government designated monthly allowances to the students to encourage and support students (Al Rawaf & Simmons, 1991). The students were strictly taught by female professors, and only in some instances by male professors through closed circuit television (CCTV) (Al Rawaf & Simmons, 1991). Although things may have slightly changed since 1991, and male professors could be present in the lecture hall of female students, it is constricted to specific specialties and subject areas. The lecture hall is located in a separate building where the male professor needs to announce his arrival so that the students are aware of his entrance and wear their "hijab".

Although women are given opportunities of education, there are restrictions in the job market (Aljughaiman & Grigorenko, 2013). For example; there are no job opportunities for women in the field of engineering specifically mechanical or chemical engineering. Hence, they are not allowed to study these disciplines. There has been a gap between the qualification and skills of graduates and the job market needs (Aljughaiman & Grigorenko, 2013). This gap resulted in recruiting foreigners in different disciplines (Aljughaiman & Grigorenko, 2013), which in return decreases the vacancies for graduates to be recruited to learn and compete with foreign workers.

The problem of the gap between the knowledge and skills of Saudi graduates is still persistent. Aljuhaiman and Grigorenko (2013) assume that one of the major causes of this gap is the high control by government figures over the curriculum, educational materials and methods of teaching. Officials seem to be fixed on using specific singular books to teach and using testing

methods that require memorization and limit "creative or applied thinking" (Aljughaiman & Grigorenko, 2013, p. 312). Although the government has exerted efforts to develop and improve the educational system, they have not created quality indicators that measure the efficiency and efficacy of the new educational system changes (Cordesman & Burke, 2002).

The history of women's education described above explains the current situation of nursing education in Saudi Arabia. The college of nursing is strictly a females only college. The faculty are mostly foreigners from Egypt. The teaching materials, methodologies and exams lead the students to use rote learning methods. There are no specific quality indicators that measure the students' accomplishments in relation to the teaching materials and methodologies. The students' ability to transfer their knowledge into practice is not tested nor monitored.

Role of meaningful learning in Saudi educational system

Nursing education in Saudi Arabia uses traditional teaching strategies which promotes rote learning; such as lecturing, regular examinations (Aljohani, 2013), didactic and teacher-led (Clerehan, McCall, McKenna, & Alshahrani, 2011). Rote learning techniques promote learning though memorization (Novak, 2011) and are known to limit the learners' creativity, open mindedness and ability to apply knowledge into practice (Novak, 2011; Mayor, 2002; and Aljohani, 2013). The assessment methods used during the undergraduate degree drive the students to rote learning (Whelan, 2011). This occurs because, teaching and assessing emphasizes remembering knowledge, regardless of the context (Mayor, 2002). Therefore, rote learning does not assist students to transfer the theoretical knowledge gained to their actual practice (Gul, Cassum, & Ajani, 2009). The rote learning techniques used in Saudi limit the development of knowledge, critical thinking and decision-making skills of Saudi nursing graduates (Fielden, 2012). The limited knowledge and essential practical skills are notably

magnified as acuity levels of patients' increases (Lauder, 1999), technology develops (Sinuff , Kahnamoui, Cook, Luce , & Levy, 2004), and healthcare shifts towards a patient centered care (Huber, 2010). Given the gap between nurses' theoretical knowledge and practice (Shinnick, Woo, and Mentes, 2011), nurse educators face the challenge of helping students assimilate their theoretical knowledge into practice (Andersson & Edberg, 2012).

Meaningful learning is known to encourage the learner to integrate the new knowledge with their relevant foundation of knowledge resulting the development of the vital skills for practice including critical thinking, problem solving and decision-making skills (Novak, 2011). Introducing meaningful learning though the use of concept maps in nursing education in Saudi Arabia will result in improving and enhancing the transition of nursing students into practice.

Impact of meaningful learning on nursing students and practice

The literature reviewed did not explore a direct relation between meaningful learning or concept maps and clinical practice or patient outcomes. The literature review provided evidence that the use of concept maps in education improves the students' ability to recall the knowledge they learn in classes (Clayton, 2006). The use of concept maps affected the students' level of thinking (Hsu & Hsieh, 2005; Gonza´lez, Palencia, Uman˜a, Galindo, & Villafrade, 2008; Buldu & Buldu, 2010; Jaafarpour, Aazami, & Mozafari, 2016; and Hsu, Pan, & Hsieh, 2016). The use of concept maps encouraged reflective and critical thinking that helped nurse students assimilate their knowledge. Gonza´lez, Palencia, Uman˜a, Galindo, and Villafrade (2008) and Buldu and Buldu (2010) found that the use of concept maps engaged the students in active learning and resulted in motivating them in their learning process. Concept maps have shown to be used by students as a guide during their practice and has given them confidence in making clinical decisions (All, Huycke, & Fisher, 2003).

From the literature, it could be concluded that the growth and development in the nursing students' skills would ultimately impact their clinical practice and patient outcomes. Benner, Stuphen, Leonard, and Day (2010) affirmed that the students' ability to connect knowledge will advance patient outcomes. Candela, Dalley, and Benzel-Lindley (2006) declare that the connections nursing students make will help them identify connections between patient assessments, patients data and their own knowledge which in turn will improve their clinical decision making. Decision making and clinical judgement depend on the speed of recalling knowledge, adapting and relating the basic knowledge with the new one, and translating the knowledge into practice (Thompson & Dowding, 2009). The ability to recall knowledge and make these connections depend on the organization of knowledge in the cognitive structure of the learner (Ausubel, 1963). These mental skills could be developed in nursing students through meaningful learning which will improve nursing practice and patient outcomes.

Conclusion

In conclusion, the Saudi Arabian government is exerting a lot of effort to make developments in the educational system. These efforts need to be supported by the development and enhancement of the nurse educators' knowledge and skills on different teaching and learning methods. This research aims to provide nurse educators with a review of the literature on meaningful learning, and an indepth understanding of meaningful learning through a concept analysis. This research aims to explore the experiences and perspectives of Saudi nursing students and faculty on the use of concept maps as a learning, teaching, and assessment tool.

References

Adema-Hannes, R., & Parzen, P. (2005). Concept mapping: Does it promote meaningful learning in the clinical setting? *College Quarterly, 8*(3), 1 - 7.

Al Gady, Y. (1981). *The policy of education and development in the Kingdom of Saudi Arabia.* Riyadh: Marekh.

Al Rawaf, H., & Simmons, C. (1991). The education of women in Saudi Arabia. *Comparative Education, 27*(3), 287 - 295.

Aljohani, W. (2013). The effects of teaching strategies on Saudi nursing students' critical thinking and academic performance: introducing PBL elements into a traditional course. *White Rose: eThesis Online*. Sheffield, UK: University of Sheffield.

Aljughaiman, A., & Grigorenko, E. (2013). Growing up under pressure: The cultural and religious context of the Saudi system of gifted education. *Journal for the Education of the Gifted, 36*(3), 307 - 322.

All, A., Huycke, L., & Fisher, M. (2003). Instructional tools for nursing education: Concept maps. *Nursing Education Perspectives, 24*(6), 311 - 317.

Alsuwaida, N. (2016). Women's education In Saudi Arabia. *Journal of International Education Research, 12*(4), 111 - 118.

Andersson, P., & Edberg, A. (2012). Swedish nursing students' experience of aspects for their learning process and their ability to handle the complexity of nursing degree program. *Nurse Education Today, 32*(4), 453 - 457.

Ausubel, D. (1963). *The psychology of meaningful verbal learning.* New York: Grune & Stratton, Inc.

Bagnasco, A., Cadorin, L., Tolotti, A., Pagnucci, N., Rocco, G., & Sasso, L. (2014). Instruments measuring meaningful learning in undergraduate healthcare students: A systematic review protocol. *Jan Protocol*, 655- 664.

Balen, R., Rhodes, C., & Ward, L. (2010). The power of stories: Using narrative for interdisciplinary learning in health and social care. *Social Work Education , 29*(4), 416 - 426.

Benner, P., Stuphen , M., Leonard, V., & Day, L. (2010). *Educating nurses: A call for radical transformation.* San Francisco, CA: The Carnegie Foundation.

Buldu, M., & Buldu, N. (2010). Concept mapping as a formative assessment in college classrooms: Measuring usefulness and student satisfaction. *Procedia Social and Behavioral Sciences, 2*, 2099 - 2104.

Cadorin, L., Bagnasco, A., Rocco, G., & Sasso, L. (2013). Meaningful learning in healthcare professionals: Integrative review and concept analysis. *The European Conference on Education* (pp. 1-10). Brighton, UK: The International Academic Forum.

Cadorin, L., Bagnasco, A., Tolotti, A., Pagnucci, N., & Sasso, L. (2016). Instruments for measuring meaningful learning in healthcare students: A systematic psychometric review. *Journal of Advanced Nursing, 72*(9), 1972 - 1990.

Cadorin, L., Bagnasco, A., Tolotti, A., Pagnucci, N., & Sasso, L. (2017). Developing an instrument to measure emotional behaviour abilities of meaningful learning through the Delphi technique. *Journal of Advanced Nursing*.

Candela, L., Dalley, K., & Benzel-Lindley, J. (2006). A case for learning-centered curricula. *Journal of Nursing Education, 45*, 59 - 66.

Chapman, H. (2005). Towards effective group-work in nurse education. *Nurse Education Today, 26*, 298- 303.

Clayton, L. (2006). Concept mapping: An effective, active teaching-learning method. *Nursing Education Perspectives, 27*(4), 197- 203.

Clerehan, R., McCall, L., McKenna, L., & Alshahrani, K. (2011). Saudi Arabian nurses' experiences of studying Masters degrees in Australiain. *International Nursing Review, 59*, 215 - 221.

Cole, D. (n.d.). *Culture of Saudi Arabia*. Retrieved 03 23, 2016, from Countries and their Cultures: http://www.everyculture.com/Sa-Th/Saudi-Arabia.html

Cordesman, A., & Burke, A. (2002). *Saudi Arabia enters the 21st century: Economic, demographic, and social challenges.* Washington DC: Center for Strategic and Intemational Studies.

Correia, P., & Cicuto, C. (2014). Neighbourhood analysis to foster meaningful learning using concept mapping in science education. *Science education International, 24*(3), 259- 282.

Cosentino, A. (2002). *Constructivism and Education.* Napoli: Liguori Editore.

Crawford, T. (2011). Using problem-based learning in web-based components of nurse education. *Nurse Education in Practice , 11*, 124 - 130.

Crookes, K., Crookes, P., & Walsh, K. (2013). Meaningful and engaging teaching techniques for student nurses: A literature review. *Nurse Education in Practice, 13*, 239- 243.

De Sousa, A., Formiga, N., Oliveira, S., Costa, M., & Soares, M. (2015). Using the theory of meaningful learning in nursing education. *Revista Brasileira Enfermagem, 68*(4), 626- 635.

Dreifuerst, K. (2012). Using debriefing for meaningful learning to foster development of clinical reasoning in simulation. *Journal od Nursing Education, 51*(6), 326- 333.

Fielden, J. (2012). Managing the transition of Saudi new graduate nurses into clinical practice in the Kingdom of Saudi Arabia. *Journal of Nursing Management, 20*, 28 - 37.

Fink , L. (2007). The power of course design to increase student engagement and learning. *Peer Review, 9*(1), 13 - 17.

Getha-Eby, T., Beery, T., Xu, Y., & O'Brien, B. (2014). Meaningful learning: Theoretical support for concept-based teaching. *Journal of Nursing Education, 53*(9), 494- 500.

Gonza´lez, H., Palencia, A., Uman˜a, L., Galindo, L., & Villafrade, L. (2008). Mediated learning experience and concept maps: A pedagogical tool for achieving meaningful learning in medical physiology students. *Advances in Physiology Education, 32*, 312- 316.

Gul, R., Cassum, S., & Ajani, K. (2009). Concept mapping strategy: An attempt to transform rote-learners into critical thinkers . *Pakistan Association of research and education Research Bulletin, 1*(1), 20- 29.

Hakkarainen, P., & Vapalahti, K. (2011). Meaningful learning through video-supported forum-theater. *International Journal of Teaching and Learning in Higher Education, 23*(3), 314-328.

Head, B., & Bays, C. (2010). Engaging nursing students and community partners in the development of decision cases. *Journal of Nursing Education, 49*(6), 346 - 350.

Hinojosa, L. (2015). Contributions of educational psychology to university education. *Psychology, 6*, 177- 190.

Hoffman, K., Dempsey, J., Levett-Jones, T., Noble, D., Hickey, N., Jeong, S., . . . Norton, C. (2011). The design and implementation of an interactive computerizsed decision support framework (ICDSF) as a strategy to improve nursing students' clinical reasoning skills. *Nurse Education Today, 31*, 587 - 594.

Hrynchak, P., & Batty, H. (2012). The educational theory basis of team-based learning. *Medical Teacher, 34*, 796- 801.

Hsu, L., & Hsieh, S. (2005). Concept maps as an assessment tool in a nursing course. *Journal of Professional Nursing, 21*(3), 141- 149.

Hsu, L., Pan, H., & Hsieh, S. (2016). Randomized comparison between objective-based lectures and outcome-based concept mapping for teaching neurological care to nursing students. *Nurse Education Today, 37*, 83 - 90.

Huber, D. (2010). *Leadership and nursing care management* (4th ed.). Matyland Heights, MO: Saunders.

Irvine, L. (1995). Can concept mapping be used to promote meaningful leaming in nurse education? *Journal of Advanced Nursing, 21*, 1175 - 1179.

Jaafarpour, M., Aazami, S., & Mozafari, M. (2016). Does concept mapping enhance learning outcome of nursing students? *Nurse Education Today, 36*, 129 - 132.

Lauder, W. R. (1999). Transfer of knowledge and skills: Some implications for nursing and nurse education. *Nurse Education Today, 19*(6), 480-487.

Mayor, R. (2002). Rote versus meaningful learning. *Theory into Practice, 41*(4), 226 - 232.

Merriam, S., Caffarella, R., & Baumgartner, L. (2007). *Learning in adulthood: A comprehensive guide* (3rd edition ed.). San Francisco, CA: Jossey-Bass.

Meyer, R. A. (2012). *Assessment of the impact of integrated simulation on critical thinking and clinical judgment in nursing instruction* . Grand Forks: University of North Dakota.

Michael, J. (2001). In pursuit of meaningful learning. *Advances in Physiology Education, 25*, 145–158.

Mills, A. (2009). Reforms to women's education make slow progress in Saudi Arabia Jeddah, Saudi Arabia. . *Chronicle Of Higher Education, 55*(43), 11.

Novak, J. (1998). *Learning, creating and using knowledge.* Mahwah, New York: Lawrence Erlbaum Associates, Inc.

Novak, J. (2010). Learning, creating, and using knowledge: Concept maps as facilitative tools in schools and corporations. *Journal of E-Learning and Knowledge Society, 6*, 21 - 30.

Novak, J. (2011). A theory of education: Meaningful learning underlies the constructive integration of thinking, feeling, and acting leading to empowerment for commitment and responsibility. *Aprendizagem Significativa em Revista/Meaningful Learning Review, 1*(2), 1-14.

Novak, J., & Cañas, A. (2006). *The theory underlying concept maps and how to construct them.* Technical Report IHMC CmapTools 2006-01. Florida Institute for Human and Machine Cognition.

Novak, J., & Gowin, D. (1984). *Learning how to learn.* New York: Cambridge University Press.

Rugh, W. (2002). *Education in Saudi Arabia: choices and constraints.* Middle East.

Shinnick, M., Woo, M., & Mentes, J. (2011). Human patient simulation: State of the science in prelicensure nursing education. *Journal of Nursing Education, 50*(2), 65-72.

Sinuff , T., Kahnamoui, K., Cook, D., Luce , J., & Levy, M. (2004). Values ethics, & rationing in critical care task, force rationing critical care beds: A systematic review. *Critical Care Medicine, 32*(7), 1588 - 1597.

Thompson, C., & Dowding, D. (2009). *Essential decision making and clinical judgment for nurses.* St. Louis, MO: Churchill Livingstone.

Westin, L., Sundler, A., & Berglund, M. (2015). Students' experiences of learning in relation to didactic strategies during the first year of a nursing programme: A qualitative study. *BMC Medical Education, 15*(49).

Whelan, A. (2011). Does the seen examination promote or constrain student learning? *Practitioner Research in Higher Education, 5*(1).

CHAPTER 2

LITERATURE REVIEW

Promoting Meaningful Learning through the Use of Concept Maps

Nursing education in Saudi Arabia uses traditional teaching strategies which promotes rote learning; such as lecturing, regular examinations (Aljohani, 2013), didactic and teacher-led (Clerehan, McCall, McKenna, & Alshahrani, 2011). The rote learning techniques used in Saudi limit the development of knowledge, critical thinking and decision making skills of Saudi nursing graduates (Fielden, 2012). Fielden (2012) observed that newly graduated Saudi nurses were confused, dissatisfied with their role, and are unable to reflect on their practice. It is vital to evaluate the educational methods used to teach Saudi nursing students and review our agenda of the learning experiences we provide to our students. This literature review aims at reviewing the current literature on the use of concept maps as a tool to promote meaningful learning. Because meaningful learning is known to encourage the learner to integrate the new knowledge with their relevant foundation of knowledge resulting the development of critical thinking, problem solving and decision making skills (Novak, 2011). In return, it will enable the newly graduated nursing students to assimilate their knowledge into their practice.

Background

Meaningful learning was defined by Ausubel as "non-arbitrary, non-verbatim, substantive incorporation of new symbolically expressed ideas into cognitive structure" (Novak, 1993, p. 4). Ausubel assumes that meaningful learning only occurs when the learning material has a potential meaning, where the learner has previously known or learned concepts and propositions to link new information and assimilate new ideas; and the learner has a desire to create links in a non-verbatim, substantive way (Novak, 1993). Meaningful learning occurs when new and existing knowledge are assimilated (Ausubel, Novak, & Hanesian, 1978). Assimilation

occurs when knowledge is subsumed either by subordination, super-ordination, or combination (Ausubel, Novak, & Hanesian, 1978).

Concept maps were developed by Novak and Gowin (1984) to accelerate meaningful learning. Novak defined concept maps as "graphical tools for organizing and representing knowledge" (Novak & Cañas, 2006, p. 1). Concept maps consist of a concept map question, concepts, linking words, propositions and crosslinks. The concept map's question will help the learner be explicit in the construction of the map. The learner starts answering the question by creating concepts that represent the main ideas, which are displayed in circles or rectangles and linked together with words on the lines that connect the concepts together. Links between the concepts represent the relationships between concepts, and thereby creating propositions. Crosslinks link new concepts to old concepts, based on the learner's understanding, perception, and experience. To accurately reflect the content that is being presented, concept maps may have different forms; hierarchical, spider, flow chart, and system maps (All, Huycke, & Fisher, 2003).

The educational systems in western countries have been experiencing changes and developments to enhance the learning experience of students, and improve their learning outcomes through using learner centered and active learning. Different teaching and learning methodologies are used to empower students and encourage them to become self-learners. Becoming a self-learner is important to the nursing discipline; because, it allows individuals to take responsibility of their own learning, and create a positive self-concept (Merriam, Caffarella, & Baumgartner, 2007). There is a special attention paid to the students' ability to retain and use their theoretical knowledge in their practice because of the increases in patients' acuity levels (Lauder, 1999), the technological developments (Sinuff , Kahnamoui, Cook, Luce , & Levy, 2004), and healthcare shifts towards a patient centered care (Huber, 2010). Nurse educators face

challenges in helping students assimilate their theoretical knowledge into practice (Andersson & Edberg, 2012), which results in creating a gap between the nurses' theoretical knowledge and practice (Shinnick, Woo, and Mentes, 2011). Promoting meaningful learning is vital for the students' smooth transition to clinical practice. Concept maps are known to be effective in assisting students recall and use of theoretical knowledge in their practice (Clayton, 2006). Concept maps are assumed to assist educators become more effective (Irvine, 1995). The purpose of this literature review is to explore recent studies that aimed at utilizing concept maps to promote meaningful learning using Ausubel's meaningful learning theory and/or Novak and Gowin's concept maps as theoretical frameworks.

Search methodology

Four databases were searched; ERIC, CINAHL, PubMed and Science Direct. During the search, the following keywords were used; Ausubel, meaningful learning, concept map, nurse, nursing, and nurses. The search from databases revealed a total of 31 articles. The inclusion criteria were the use of Novak and Gowin's (1984) definition of concept maps, published study since 2005, English language, all disciplines, undergraduate or graduate students, and accessible/ available in the UWM access to data bases and library. The exclusion criteria were dissertations, abstracts, literature reviews, guidelines, languages other than English, critical thinking, clinical judgment, and before 2005. Only 7 studies met the inclusion criteria of the literature review.

Analysis

For the analysis, the studies were read in-depth. The purpose, methods, sample, analysis method, results, and conclusion were highlighted. An evidence table was created to help compare, contrast, and analyze the studies. The columns included author, year and country; discipline, research purpose/ question(s)/ hypothesis; research design, theoretical framework,

sample, data collection measures, data analysis methods, findings and strengths and/or limitations. The studies were arranged in a chronological sequence in the rows. A thorough review of the studies was conducted to find the similarities and differences between them and group them together to create themes.

Findings

The data analysis revealed four themes; students' training, students in groups, teachers' guidance and support, and effect on students. First, the theme of training students on the utilization of concept mapping in their learning process. It was noted that only three studies conducted students' training on concept maps before the beginning of the semester (Hsu & Hsieh, 2005; Jaafarpour, Aazami, & Mozafari, 2016; and Martínez-Cañas & Ruíz-Palomino, 2011). Each study used a different method of introducing the idea of concept mapping to the students. Hsu and Hsieh (2005) did not specify any details about the training, Jaafarpour et al., (2016) conducted a 2 hours session on the definition and construction of concept maps, and Martínez-Cañas and Ruíz-Palomino (2011) conducted a 40 minutes session explaining the origin, the use and construction, and the evaluation of concept maps.

The second theme is dividing the students into groups and subgroups. Five of the studies divided their participants into learning groups (Hsu & Hsieh, 2005; Gonza´lez, Palencia, Uman˜a, Galindo, & Villafrade, 2008; Buldu & Buldu, 2010; Martínez-Cañas & Ruíz-Palomino, 2011; and Reiska, Soika, Möllits, Rannikmäe, & Soobard, 2015). All five studies concluded that having students in groups were more beneficial to the students. The students engaged in discussions and sharing ideas which resulted in a better understanding of the content. Participants emphasized the importance of their teachers' availability during and after the construction of a concept map; leading us to the third theme, teacher's support and guidance. Four of the studies found that the

students appreciated their teacher's support, guidance and discussions during the students' groups discussions (Hsu & Hsieh, 2005; Gonza´lez et al., 2008; Buldu & Buldu, 2010; and Jaafarpour et al., 2016).

The fourth emerging theme was the effect of concept maps on the students. The use of concept maps affected the students' level of thinking (Hsu & Hsieh, 2005; Gonza´lez et al., 2008; Buldu & Buldu, 2010; Martínez-Cañas & Ruíz-Palomino, 2011; Jaafarpour et al., 2016; and Hsu, Pan, & Hsieh, 2016). The use of concept maps encouraged reflective and critical thinking that helped them assimilate their knowledge. Gonza´lez et al., (2008) and Buldu and Buldu (2010) found that the use of concept maps engaged the students in active learning and resulted in motivating them in their learning process. Gonza´lez et al., (2008), Reiska et al., (2015) and Jaafarpour et al., (2016) found that students scores in exams significantly improved with the use of concept maps. Contrarily, Hsu et al., (2016) and Reiska et al., (2015) found that the students scores in multiple choice exams did not improve and the use of concept maps did not change the students performance in exams but improved their understanding of course content. Lastly,the construction of concept maps was time consuming to the students (Buldu & Buldu, 2010; and Jaafarpour et al., 2016) and there should be a consideration to the student's background and the course content (Reiska et al., 2015) so that students will be able to make the relevant connections between concepts and their lived experiences.

Quality critique

The studies included in the literature review used randomized control trials (Gonza´lez et al., 2008; and Hsu et al., 2016) quasi-experimental (Jaafarpour et al., 2016) and experimental research designs (Hsu & Hsieh, 2005; Buldu & Buldu, 2010; Martínez-Cañas & Ruíz-Palomino, 2011; and Reiska et al., 2015). The studies were conducted in different countries; two studies

were conducted in Taiwan (Hsu et al., 2016; and Hsu & Hsieh, 2005), one in Colombia (Gonza´lez et al., 2008), one in Spain (Martínez-Cañas & Ruíz-Palomino, 2011), one in Estonia (Reiska et al., 2015), one in Iran (Jaafarpour et al., 2016), and one in United Arab Emirates (Buldu & Buldu, 2010).

Furthermore, the studies were conducted in different disciplines; three studies were in Nursing (Hsu & Hsieh, 2005; Jaafarpour et al., 2016; and Hsu et al., 2016), one in Medical Physiology (Gonza´lez et al.,2008), one in Teacher Education (Buldu & Buldu, 2010), one in Social Sciences (Martínez-Cañas & Ruíz-Palomino, 2011), and one in Natural Science Education (Reiska et al., 2015). The common conceptual framework used in all the studies was Novak and Gowin's (1984) theory of concept mapping. The studies scored the concept maps using Novak and Gowin's (1984) scoring tool or adapted their own scoring tool from it. The sampling methods were convenient purposeful and sample sizes ranged between 43 – 379 students. It is assumed that the samples are limited and might not represent the nursing students population or have fallen into sample bias. Because the sample sizes were relatively small compared to the population of nursing students and power analysis was reported in one study only (Hsu et al., 2016). Gonza´lez et al., (2008) used a non-equivalent control group size which could have resulted in the significant difference of results between the control and intervention group.

The data collection methods were different in the studies. Five studies used concept maps as their main source of data. (Hsu & Hsieh, 2005; Martínez-Cañas & Ruíz-Palomino, 2011; Jaafarpour et al., 2016; Reiska et al., 2015; and Hsu et al., 2016). Two studies used the scores of exams (Gonza´lez et al., 2008; and Jaafarpour et al., 2016). Three studies used assessment tools to understand students perceptions on the use of concept maps (Gonza´lez et al.,2008; Buldu &

Buldu, 2010; and Jaafarpour et al., 2016). Buldu and Buldu (2010) reported Cronbach Alpha = 0.92 for the concept mapping questionnaire they used in their study. Jaafarpour et al., (2016) reported Cronbach Alpha = 0.81 for the questionnaire of students' perceptions. Both Cronbach Alphas of the tools used are high indicating that the tools are effective in measuring the students' perspectives. Other assessment tools were used by Hsu et al., (2016) and Reiska et al., (2015) with no reference to their Cronbach Alphas such as Program for International Students Assessment (PISA)- like (Reiska et al., 2015), Competency Inventory of Nursing Students, Cognitive Load Scale of Neurological Nursing, and Learning Satisfaction Scale of Neurological Nursing (Hsu et al., 2016). Generally, the measurement tools included in the studies lack the reliability and validity and therefore could raise doubts about their results. The interventions in the studies were clearly described. It was not clear if the researchers were the faculty teaching or the researchers took the role of a guide. It seemed that the researchers were part of the educational system which could raise the issue of bias towards their tools and/ or students.

The data analysis method most commonly used in the studies was descriptive analysis (Hsu & Hsieh, 2005; Gonza´lez et al., 2008; Buldu & Buldu, 2010; and Jaafarpour et al., 2016). Multivariate statistical analysis was also used by the studies (Martínez-Cañas & Ruíz-Palomino, 2011; Reiska et al., 2015; and Hsu et al., 2016).

Discussion

It is assumed that the inconsistency and lack of scientific rationale of the training may have had an impact on the students' understanding and ability to create concept maps. There is no evidence in the literature about the ideal duration of time for training students on the use of concept maps. Carnot, Dunn, and Cañas (2001) conducted a study to compare browsers based on a concept map based interface to a worldwide web page based interface. They found that

training differed between participants and there was not a specific period of training to be more effective than another (Carnot, Dunn, & Cañas, 2001). This does not eliminate the importance of training; it is vital to train participants on the construction of concept mapping (Jonassen & Wang, 1993). Cañas et al., (2003) suggested the use of a software that would be available to both students and faculty to train on the construction of concept mapping, whenever needed. Including the evaluation criteria in the training will be a good practice as it benefits the students by making them aware of the learning objectives and the expectations of the teacher which in return will enhance their learning (Biggs, 2003).

As per the literature review, concept maps' reliability and validity have not been reported in any of the literature of nursing education. Concept maps are most commonly used by students to present their knowledge and current understanding; and by teachers to evaluate the students understanding. Concept maps' feedback is known to consume time by the faculty to complete (Ingeç, 2009), and giving feedback is considered as an extra workload on faculty (Wu, Hwang, Milrad, Ke, & Huang, 2012). Concept maps' use has shown to improve students' learning achievements and adaptation to the learning materials (Wu, Hwang, Milrad, Ke, & Huang, 2012; Clayton, 2006; and Irvine, 1995). It is believed that there is a need for an exploration of the different utilizations of concept maps in the nursing education system.

In this literature review, few factors could have limited the findings. The inclusion and exclusion criteria were specific to English language, the use of Novak and Gowin's (1984) definition and scoring tool of concept maps, and years after 2005. It was noted that multiple studies were conducted before 2005. There are several studies, that were omitted, in other languages such as; Spanish and Chinese. The review was conducted by one person which could result in author and personal bias.

Conclusion

In conclusion, the literature reviewed provides evidence that the use of concept maps in education improves the students' ability to recall the knowledge they learn in classes. It shows the importance of considering student's personal experiences and the context of their learning to facilitate their learning using concept maps. Reviewing the goals, aims, and objectives of undergraduate education, and make policy changes accordingly is recommended. One of the major goals should be facilitating and promoting meaningful, active and student-centered learning to enhance the students' ability in assimilating their theoretical knowledge into their practice. The evidence was inconclusive about the effect of concept maps on the students' academic performance when tested using traditional exams. Therefore, the use of concept maps in nursing education is recommended with consideration and caution. Further research is required to explore the effect of concept maps on traditional testing scores. Future research is advised to address questions such as; what is the level of thinking required for good performance in traditional testing? What type of learning does traditional testing require from students? What are the required changes in traditional testing to assess the students' meaningful learning? The literature is limited about the status of nursing education in Saudi Arabia. As per the literature review conducted, there is no published studies about meaningful learning nor the use of concept maps in Saudi Arabia. It is vital to conduct studies in Saudi Arabia that shed light on the status and the developments in nursing education.

References

Aljohani, W. (2013). The effects of teaching strategies on Saudi nursing students' critical thinking and academic performance: Introducing PBL elements into a traditional course. *White Rose: eThesis Online*. Sheffield, UK: University of Sheffield.

All, A., Huycke, L., & Fisher, M. (2003). Instructional tools for nursing education: concept maps. *Nursing Education Perspectives, 24*(6), 311 - 317.

Andersson, P., & Edberg, A. (2012). Swedish nursing students' experience of aspects for their learning process and their ability to handle the complexity of nursing degree program. *Nurse Education Today, 32*(4), 453 - 457.

Biggs, J. (2003). *Teaching for quality learning at university* (2nd ed.). Buckingham: Open University Press.

Buldu, M., & Buldu, N. (2010). Concept mapping as a formative assessment in college classrooms: Measuring usefulness and student satisfaction. *Procedia Social and Behavioral Sciences, 2*, 2099 - 2104.

Cañas, A., Coffey, J., Carnot, M., Feltovich, P., Hoffman, R., Feltovich, J., & Novak, J. (2003). *A summary of literature pertaining to the use of concept mapping techniques and technologies for education and performance support.* The Institute for Human and Machine Cognition, Pensacola.

Carnot, M., Dunn, B., & Cañas, A. (2001). Concept Map-based vs. web page-based interfaces in search and browsing. *Proceedings of the Nineteenth International Conference on Technology and Education.* Tallahassee: Institute for Human and Machine Cognition.

Clayton, L. (2006). Concept mapping: An effective, active teaching-learning method. *Nursing Education Perspectives, 27*(4), 197 - 203.

Clerehan, R., McCall, L., McKenna, L., & Alshahrani, K. (2011). Saudi Arabian nurses' experiences of studying Masters degrees in Australiain. *International Nursing Review, 59*, 215 - 221.

Fielden, J. (2012). Managing the transition of Saudi new graduate nurses into clinical practice in the Kingdom of Saudi Arabia. *Journal of Nursing Management, 20*, 28 - 37.

Gonza´lez, H., Palencia, A., Uman˜a, L., Galindo, L., & Villafrade, L. (2008). Mediated learning experience and concept maps: A pedagogical tool for achieving meaningful learning in medical physiology students. *Advances in Physiology Education*, 312 - 316.

Hsu, L., & Hsieh, S. (2005). Concept maps as an assessment tool in a nursing course. *Journal of Professional Nursing, 21*(3), 141 - 149.

Hsu, L., Pan, H., & Hsieh, S. (2016). Randomized comparison between objective-based lectures and outcome-based concept mapping for teaching neurological care to nursing students. *Nurse Education Today, 37*, 83 - 90.

Huber, D. (2010). *Leadership and nursing care management* (4th ed.). Matyland Heights, MO: Saunders.

Ingeç, S. (2009). Analysing concept maps as an assessment tool in teaching physics and comparison with the achievement tests. *International Journal of Science Education, 31*(14), 1897- 1915.

Irvine, L. (1995). Can concept mapping be used to promote meaningful leaming in nurse education? *Journal of Advanced Nursing, 21*, 1175 - 1179.

Jaafarpour, M., Aazami, S., & Mozafari, M. (2016). Does concept mapping enhance learning outcome of nursing students? *Nurse Education Today, 36*, 129 - 132.

Jonassen , D., & Wang, S. (1993). Acquiring structural knowledge from semantically structured hypertext. *Journal of Computer-Based Instruction, 20*(1), 1- 8.

Lauder, W. R. (1999). Transfer of knowledge and skills: Some implications for nursing and nurse education. *Nurse Education Today, 19*(6), 480-487.

Martínez-Cañas, R., & Ruíz-Palomino, P. (2011). Concept mapping as a learning tool for the employment relations degree. *Journal of International Education Research, 7*(5), 23 - 27.

Merriam, S., Caffarella, R., & Baumgartner, L. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.). San Francisco, CA: Jossey-Bass.

Novak, J. (1993). A view on the current status of ausubel's assimilation theory of learning. *The Proceedings of the Third International Seminar on Misconceptions and Educational Strategies in Science and Mathematics.* Ithaca: Misconceptions Trust.

Novak, J. (2011). A theory of education: Meaningful learning underlies the constructive integration of thinking, feeling, and acting leading to empowerment for commitment and responsibility. *Meaningful Learning Review, 1*(2), 1 - 14.

Novak, J., & Cañas, A. (2006). *The theory underlying concept maps and how to construct them.* Technical Report IHMC CmapTools 2006-01. Florida Institute for Human and Machine Cognition.

Novak, J., & Gowin, D. (1984). *Learning how to learn.* New York, New York: Cambridge University Press.

Reiska, P., Soika, K., Möllits, A., Rannikmäe, M., & Soobard, R. (2015). Using concept mapping method for assessing students' scientific literacy. *Procedia Social and Behavioral Sciences, 177*, 352 - 357.

Shinnick, M., Woo, M., & Mentes, J. (2011). Human patient simulation: State of the science in prelicensure nursing education. *Journal of Nursing Education, 50*(2), 65-72.

Sinuff , T., Kahnamoui, K., Cook, D., Luce , J., & Levy, M. (2004). Values ethics, & rationing in critical care task, force rationing critical care beds: A systematic review. *Critical Care Medicine, 32*(7), 1588 - 1597.

Wu, P., Hwang, G., Milrad, M., Ke, H., & Huang, Y. (2012). An innovative concept map approach for improving students' learning performance with an instant feedback mechanism. *British Journal of Educational Technology*, *43*(2), 217- 232.

Appendix A: Evidence Table

Author Date Country	Discipline	Purpose/ question(s)/ hypothesis	Research design	Theoretical framework	Sample	Data collection measures	Data analysis method	Findings	Strengths/ Limitations
Hsu et al 2005 Taiwan	Nursing	Implement Cmaps as a learning strategy in a nursing course and to evaluate students' learning progress through the construction of Cmaps based on scenarios	Experimental	Novak and Gowin (Cmaps)	43 students	Cmaps	Novak and Gowin scoring	Groups and individuals maps improved	No specific description of analysis method Small sample
Gonza´lez, et al. 2008 Colombia	Medical physiology	Evaluated the impact of articulating the Cmap strategy with the mediated learning experience on meaningful learning during the cardiovascular module of a medical physiology course at Universidad Auto´noma de Bucaramanga	RCT	Ausubel (meaningful learning) Novak (Cmaps) Reuven Feuerstein (mediated learning experience)	122 -3rd semester medical students Cont. grp. =39 Int. grp. = 83	Problem solving exam Multiple choice exam Self-evaluations (students and observers)	Descriptive	Problem solving grades SS P=0.0013 in intervention group higher than control Multiple choice NSS Greater impact on students with initial lower grades	Unequal intervention & control group Small sample size

Appendix A: Evidence Table

Author Date Country	Discipline	Purpose/ question(s)/ hypothesis	Research design	Theoretical framework	Sample	Data collection measures	Data analysis method	Findings	Strengths/ Limitations
Buldu et al 2010 United Arab Emirates	Teacher education	To what degree is Cmaps useful to teacher educators and student teachers as a formative assessment? To what degree do Cmaps as a formative assessment method contribute to student teachers' learning? To what degree do the student teachers are satisfied with the use of Cmaps as a formative assessment?	Experimental	Novak and Gowin (Cmaps)	Purposive convenient sampling 2 observers 166 student teachers	Concept mapping questionnaire (Cronbach alpha = 0.92) Observation Focus group interviews	Descriptive statistics Inductive analytical approach	Mean of usefulness of Cmaps = 40.1 Mean of satisfaction of using Cmaps = 7.63 Visualizing learning was helpful Decreased ambiguity of concepts More effective in groups	Subjectivity of participants observation Small sample size Participants Arabic speakers

Appendix A: Evidence Table

Author Date Country	Discipline	Purpose/ question(s)/ hypothesis	Research design	Theoretical framework	Sample	Data collection measures	Data analysis method	Findings	Strengths/ Limitations
Martínez-Cañas 2011 Spain	Social Sciences	Students that make continuous activities throughout the course obtain a better learning and therefore have better final qualifications in their Cmaps activities at the end of the course	Experimental	Novak and Gowin (Cmaps)	51 students	Cmaps	Correlation analysis t-test	Score of both maps significantly correlated $r = 0.562$, $p < 0.05$ SS Mean differences	Lack of control group Small sample size
Jaafarpour et al. 2016 Iran	Nursing	Assess the Cmaps as a teaching method in the academic achievement of nursing students.	Quasi-experimental in case-control crossover design	Novak and Cañas (2006), called the Annotation protocol	64 freshmen students cnot. grp= 32 int. grp= 32	Cmaps Multiple choice Qs Questionnaire of students' perceptions (Cronbach alpha= 0.81)	Descriptive statistics Paired t-test	Mean of cumulative tests higher in int. grp Mean score of students opinion= 3.73±0.27	Small sample Participants recruitment

Appendix A: Evidence Table

Author Date Country	Discipline	Purpose/ question(s)/ hypothesis	Research design	Theoretical framework	Sample	Data collection measures	Data analysis method	Findings	Strengths/ Limitations
Reiska et al. 2015 Estonia	Natural science education	Evaluate Cmaps as an assessment tool for determining cognitive aspects of scientific literacy.	Experimental	Novak and Gowin (cmaps)	379 students	Program for International Students Assessment (PISA)- like Cmaps	PISA-like Cmaps analysis Cmaps scoring Correlations on excel	SS correlation between PISA and Cmaps scores (r=0.33) Students created more connection between daily used terms than course specific ones	Quality of PISA is not reported Cmaps scoring is primitive
Hsu 2016 Taiwan	Nursing	Demonstrate that outcome-based course design using Cmaps would bring about significant differences in the nursing students' competency, cognitive load, and learning satisfaction with the neuro-logical care course	RCT	Novak and Gowin (Cmaps)	Purposive sample 213 sophomore students Cont. grp = 104 Int. grp = 106	Competency Inventory of Nursing Students Cognitive Load Scale of Neurological Nursing Learning Satisfaction Scale of Neurological Nursing Cmaps Scoring Scale adapted from Novak and Gowin	Mann–Whitney U tests, unpaired ttest, Pearson χ^2, and Fisher's exact tests.	SS difference in means of students learning satisfaction in int. grp NSS in mean competency scores of both groups in mean competency	In vocational college

CHAPTER 3

CONCEPT ANALYSIS

Meaningful Learning: A Concept Analysis

Meaningful learning has been discussed by the theorist Ausubel since 1963. However, it seems like his emphasis on the importance of meaningful learning has been misunderstood and neglected. Therefore, this paper aims to provide an in-depth understanding of meaningful learning, its attributes, antecedents and measurement tools. Walker & Avant's (2011) guidelines of concept analysis were used. The studies included in this paper were derived from data bases; ERIC, EBSCO and PUBMED. The attributes concluded were invisible and visible attributes. The antecedents were related to teachers, learning materials, students, and students' ability to assimilate new and old knowledge. The consequences included the impacts on students' learning and clinical experiences. By the end of the analysis, it was concluded that meaningful learning is an abstract concept that requires further exporation and study.

Introduction

The healthcare system has been undergoing changes through the increased acuity levels of patients (Lauder, 1999), patient-centered care plans (Huber, 2010), and technological developments (Sinuff , Kahnamoui, Cook, Luce , & Levy, 2004). The nurses' mental skills required to adapt to these changes include critical thinking, decision making, and clinical judgment skills. These skills require nursing students to have the ability to transfer their theoretical knowledge into practice. Nurse educators have been facing challenges in helping students transfer theoretical knowledge to practice (Andersson & Edberg, 2012). Shinnick, Woo, & Mentes (2011) claim that there is a gap between theoretical knowledge and practice. On the other hand, students seem to be eager to learn more and become more engaged in the learning process when they feel or perceive the relevance of the information and its application to future practice (Crookes, Crookes, & Walsh, 2013). These facts have lead nurse educators to explore

different ways to engage students and promote meaningful learning. Meaningful learning is known to help students assimilate new meanings from the interaction between new and old knowledge (Ausubel, Novak, & Hanesian, 1978). The aim of this research is to analyze the concept of meaningful learning by using the concept analysis guidelines suggested by Walker and Avant (2011) to provide and in-depth understanding of meaningful learning and identify its characteristics, antecedents, and consequences.

Search methods

An extensive search was conducted in the databases ERIC, EBSCO and PUBMED to retrieve studies that explore or examine meaningful learning. The key words used were: meaningful learning, Ausubel theory, assimilation theory, significant learning, effective learning, and deep learning. The studies included used English language. Studies must have included meaningful learnig theory as a theoretical framework or as a concept to explore. The studies that have not discussed meaningful learning in depth were excluded. The studies included were between 2016 and 2010. There were a few prior to 2010 that were included due to their relevance and strong impact.

Analysis method

There are several methods and processes of concept analysis available in the literature. For example, Rodgers' (2000) evolutionary concept analysis method was inspired by the Wilsonian concept analysis process. The evolutionary concept analysis concentrates on the inductive process of analysis (Rodgers, 2000). It considers context including discipline, socioculture, and time as important elements that influence the analysis (Rodgers, 2000). Another example is Walker and Avant (2011) concept analysis process. Their concept analysis process emphasizes the importance of understanding the effects of context on concepts over time (Walker & Avant,

2011). They also explain that it is likely for definitions and attributes to change over time (Walker & Avant, 2011). Their process is easy to understand, apply, and master especially for beginners (Walker & Avant, 2011). Hence, Walker and Avant's (2011) process will be used to analyze the concept of meaningful learning.

Walker and Avant (2011) view concepts as the building blocks of a theory that contain characteristics and attributes. Walker and Avant (2011) defined concept analysis as " a formal, linguistic exercise to determine those defining attributes" (p. 157). The main purpose of concept analysis is to explore the fundamental elements of a concept (Walker & Avant, 2011). Concept analysis usually results in a better understanding of the concept and an operational definition (Walker & Avant, 2011). The concept analysis guidelines suggested by Walker & Avant (2011) are: "Select a concept, determine the aims or purposes of analysis, identify all uses of the concept that you can discover, determine the defining attributes, identify a model case, identify borderline, related, contrary, invented and illegitimate cases, identify antecedents and consequences, and define empirical referents" (p. 160).

Concept selection and aim of analysis

The concept selected is meaningful learning. Meaningful learning is analyzed to provide a clear understanding of its attributes, antecedents, and consequences to nurse educators.

Uses of meaningful learning

In the nursing education literature, meaningful learning was frequently defined based on Ausubel's theory of meaningful learning. Ausubel (1963) described meaningful learning as embodying "a distinctive kind of learning process in which the learner employs a "set" to incorporate within his cognitive structure, in nonarbitrary, nonverbatim fashion, potentially meaningful materials which are subsumable by established entities within that structure" (p. 34).

Meaningful learning was also described as giving meanings to new information by considering personal elements in the cognitive structure (De Sousa, Formiga, Oliveira, Costa, & Soares, 2015). Furthermore, meaningful learning is assumed to occur when relationships between old and new information are created in the cognitive structure in a non-arbitrary and non-literal way (Correia & Cicuto, 2014; and Clayton, 2006). Moreover, Bagnasco and colleagues (2014) cited Cosentino's (2002) definition of meaningful learning as an interaction between new and old knowledge. Getha-Eby, Beery, Xu, and O'Brien, (2014) believe that knowledge is utilizable when the learner is able to understand the "underlying concepts and ideas" (p. 495) and is able to relate them to the new learned knowledge. They also believe that "logically organized and accurately integrated knowledge" (Getha-Eby et al., 2014, p. 496) results in meaningful learning. Brajtman, Higuchi, and Murray (2009) explained that meaningful learning occurs when nurse educators provide learning opportunities that develop the students ability to assimilate and transfer their theoretical knowledge to their practice, hence, improve their clinical decision making skills.

Additionally, disciplines view meaningful learning slightly different by linking it to the applicability and practicality of the gained knowledge. For example, in medicine, meaningful learning is perceived as information students gain that would be beneficial in their practice and help them solve problems (Michael, 2001 cited in Gonza´lez, Palencia, Uman˜a, Galindo, & Villafrade, 2008). Daley, Durning, and Torre (2016) explained that meaningful learning occurs when "medical students, residents, and practicing physicians actively seek out ways to link new information and experience with what they already know, thus creating an organized knowledge base leading to the development of adaptive expertise in medical practice" (p. 2). Cutrer, Castro , Roy, and Turner (2011) declare that meaningful learning helps medical clinician have a smooth

transition along the continuum of novice to expert. In physiology, meaningful learning is defined as the ability of students to forsee and describe the reactions of the unstable body conditions and accurately solve mathematical problems (Gonza´lez et al., 2008). De Sousa and colleagues (2015) argue that in different research areas, the term 'meaningful' was viewed as "something close to student's interests" because the student could relate it to previous knowledge or experience. In chemistry, Galloway and Bretz (2015) assumed that meaningful learning requires chemistry students to "actively integrate both the cognitive domain and the affective domain" (p. 1149) into their practice.

The term 'meaningful' learning has been interchangeably used with 'deep' learning, and 'significant' in different contexts (Bagnasco, et al., 2014). Significant learning includes the behavioral and affective level (Fink , 2007) and deep learning is described as a learning method that is an opposite of superficial learning (Bagnasco, et al., 2014). Also, meaningful learning could be viewed as a process or an outcome (Bagnasco, et al., 2014). When meaningful learning is viewed as a process, emphasis is on devotion and efforts exerted during the learning process (Fink , 2007). When meaningful learning is viewed as an outcome, emphasis is on the achievements and their significance to the future (Fink , 2007). A few studies have used the term 'meaningful learning' without a precise definition which leads to ambiguity in understanding the concept of meaningful learning that is addressed in the studies (Adema-Hannes & Parzen, 2005; Chapman, 2005; and Dreifuerst, 2012). There has been a mix between meaningful learning as a process in the student's cognitive structure and teaching strategies that promote meaningful learning.

The defining attributes of meaningful learning

Attributes of meaningful learning could be categorized into visible and invisible attributes. Invisible attributes are changes that occur in the cognitive structure. These attributes include: information retention (De Sousaet al., 2015), understanding theories and information (Dreifuerst, 2012; and Getha-Eby et al., 2014), developing new knowledge and acquiring new visions (Westin, Sundler, & Berglund, 2015), interpreting, incorporating and relating new information (Gonza´lez et al., 2008), using critical and reflective thinking (Westin et al., 2015), and generalizing knowledge (Novak, 2010).

Retention was defined by Ausubel, Novak, and Hanesian (1978) as the ability to continuously access the newly learned materials. Retention of information is greater with meaningful learning than rote learning because the learning is oocuring in a "substantive and nonarbitrary relatability of new ideas to relevant" (Ausubel, Novak, & Hanesian, 1978, p. 135); hence, the learner will be able to easily integrate and avail more knowledge after learning. Ausubel and colleagues (1978) explain further that meaningful learning occurs by the assimilation of new ideas to a stable old idea. Therefore, the new idea gains the stability of the old idea and is retained for a longer period of time (Ausubel et al., 1978). The learner's ability to understand, interpret, incorporate, and relate new knowledge then develop new insights and visions are results of assimilating knowledge. Because the learner makes the relations between new and existing knowledge, hence, the learner better understand and corporates knowledge. Generalizing knowledge will occur after the subsumption, superordination, and combination of knowledge (assimilation processes) that will help the learner start generalizing. The learner will start developing critical thinking and reflective skills during the assimilation process and when generalizing the knowledge.

Critical thinking definitions have changed through the years (Benner, Hughes, & Sutphen, 2008). Critical thinking was defined by the American Philosophical Association (1990) as "purposeful, self-regulatory judgment that uses cognitive tools such as interpretation, analysis, evaluation, inference, and explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations on which judgment is based" (Benner et al., 2008, p. 87). These processes and developments happen in the cognitive structure of the learner. It is challenging to physically identify them and they will start changing the learner's visions and perspectives translated into actions and words.

Visible attributes are changes that can be observed in the learner's words, actions, decisions, behaviors and attitudes. These attributes include: clinical reasoning abilities (Dreifuerst, 2012), problem solving (Gonza´lez et al., 2008; and Mayer, 2002), clinical judgment and decision making (Getha-Eby et al., 2014), application of knowledge and generalization of skills (Novak, 2010), and courageousness and self-awareness (Westin et al., 2015).

Problem solving is defined as the ability of the individual to appropriately understand the situation by using their knowledge, experience and skills which will help them make the best decision of action (Lillis & Lynn, 2011). Decision making is defined as the ability of the individual to make a choice among options available in a systemic, purposeful way (Lipe & Beasley, 2004). Hill, Davidson, and Theodoros (2012) explained that clinical reasoning constitutes the processes of thinking and decision making during practice leading to the choice of action taken. Furthermore, clinical judgment is defined as the ability of the individual to identify and assess different choices of action using what they know about a patient through their observations and assessments (Standing, 2017). From the definitions of these clinical skills, it is concluded that it is vital for the individual to be able to relate and generalize their own

knowledge, skills and experience. These skills requires high levels of critical and reflective thinking, which are the invisible skills discussed above. When an individual thinks and makes the appropriate and correct decisions, their self-awareness and confidence are increased and they are encouraged to trust their own knowledge, skills, experience and intiutions.

Reading through the literature and understanding the visible attributes resulted in the conclusion that the visible attributes are very interrelated and used interchangeably in the literature with out a distinctive defining characteristic among them. The invisible attributes are unseen processes of meaningful learning occuring in the cognitive structure. So, they are difficult to actually see, observe or measure. The visible attributes could be percieved as outcomes of the invisible attributes, which can be seen or observed in different ways (Appendix A). This relationship between the attributes, makes meaningful learning a unique abstract concept.

Model case of meaningful learning

A model case is used to demonstrate an example of the phenomenon being studied whereby all the attributes are present in the case (Walker & Avant, 2011). Hence, the model case presents an ideal scenario of the phenomenon being studied where we have no doubt that the phenomenon is present (Walker & Avant, 2011). Therefore, a model case of meaningful learning is presented to demonstrate how meaningful learning would ideally represent itself in students.

Mary is a second year nursing student. She is excited to become a nurse and eager to learn about the nursing care she could provide to patients. She is currently taking Foundations of Nursing course. In class, she learned about different kinds of nursing interventions, where the teacher explained the purpose, indications, contraindications, and complications of every intervention. In the nursing lab, Mary practices nursing interventions under the supervision of

her teacher. Mary always goes home and studies what she learned in class and the nursing laboratory. She uses concept maps while studying and connects together the information from different courses she takes using subsumption, superordination and combination processes of assimilating knowledge (interpret, incorporate and relate information- invisible). During the revision week, before exams, her teacher conducted a revision class where students were given an opportunity to ask questions and practice with the teacher. The teacher presented real case scenarios that required students to critically think and reflect on their classes, labs, and experience. Mary was able to identify (recall- invisible) and describe the nursing interventions needed for the patient's case starting with patient assessment to evaluation of patient's condition after nursing intervention (problem solving and clinical jugdment- visible). Also, she was able to describe how nursing interventions could change depending on the patient's health condition, and whether it was improving or deteriorating (applying knowledge and generalizing skills- visible). In this case model, Mary was able to demonstrate the outcomes of meaningful learning, visible attributes, that would only be displayed if the invisible attibutes occurred and changes in the cognitive structure and process have taken place. Therefore, we could assume that Mary's learning experience was meaningful.

Contrary case of meaningful learning

A contrary case demonstrates a clear scenario of the absence of the phenomenon being studied (Walker & Avant, 2011). Contrary cases are used to show that the absence of the attributes results in the absence of the phenomenon itself (Walker & Avant, 2011). Therefore, a contrary case is presented to demonstrate how the absence of visible and invisible attributes results in the absence of meaningful learning; hence, represents rote learning.

Julie is a second year nursing student. She entered the nursing program because it was the only one available during her enrollment. She was Mary's colleague, so she attended the same classes and nursing laboratory. When Julie goes home, she doesn't read or study what she learned during the day. She usually starts memorizing the learning materials one or two nights before the exam. She attended the revision class with Mary, but she was passive and only listened to the discussions in class. Even when the teacher asked her questions, she did not know what to answer or what were the appropriate interventions for the patient's condition. In this contrary model, Julie has used rote learning. She did not demonstrate problem solving, decision making or clinical judgment skills (visible attributes). Therefore, we could assume that she did not relate to the learned materials and did not create links that will help her to recall the material (invisible attributes). Thus, her learning experience was not meaningful.

Antecedents and consequences of meaningful learning

Ausubel and colleagues (1978) highlighted the importance of the interaction between the new and pre-existing knowledge in the cognitive structure of the learner. They further explained that meaningful learning occurs when old and new meanings are assimilated in the cognitive structure through the processes of subordination, superordination and combination. To understand subordination, the process of subsumption is important to explain. The subsumption process occurs when links are created between new and pre-existing knowledge in the cognitive structure (Ausubel et al., 1978). Ausubel and colleagues (1978) further explain that subordination is when new knowledge is subsumed under a general pre-existing concept. Subordination occurs this way because the cognitive structure is usually organized in a heirarchical way (Ausubel et al., 1978). Furthermore, subordination has two distinctive types; derivative subsumption and correlative subsumption. Derivative subsumption is when the

subsumed new knowledge is an example or supportive of the pre-existing knowledge in the cognitive structure (Ausubel et al., 1978). On the other hand, correlative subsumption is when the subsumed new knowledge is "an extension, elaboration, modification, or qualification" (Ausubel et al., 1978, p. 59) of the pre-existing knowledge in the cognitive structure. The second assimilation process is super-ordination. Super-ordination occurs when the newly learned knowledge consists of more general concepts, which pre-existing knowledge could be subsumed under them (Ausubel et al., 1978). The last assimilation process is combination or combinatorial. Combinatorial learning occurs when the newly learned knowledge cannot be subordinated or superordinated (Ausubel et al., 1978). However, the new knowledge is important because it could be broadly related to the background of pre-existing knowledge (Ausubel et al., 1978).

Three major categories of antecedents were identified from the literature; teacher's role, learning material and learner's role. The teacher's role in promoting meaningful learning includes: building knowledge according to the learners' knowledge, breaking the dichotomy between theory and practice and articulating knowledge with action (De Sousa et al., 2015). Moreover, it is the teacher's role to encourage students to compare knowledge, apply theory and organize and structure knowledge (Bagnasco, et al., 2014). Novak (2010) emphasized the importance of sharing and discussing knowledge between the learner and the educator, because it results in the understanding of meaning and processes by the learner. The teachers' roles have changed and different expectations are anticipated from them. Teachers should be aware of the learning environment, the teaching / learning situation, own actions, and students' learning process (Hrynchak & Batty, 2012). Hinojosa (2015) suggested that teachers should facilitate, suport, guide, collaborate, encourage and motivate students to construct and reconstruct their own knowledge. The teacher should choose teaching methods that are effective, interesting,

outstanding (Crookes et al., 2013) and meaningful (Clayton, 2006). The nursing education literature indicates that meaningful learning could be implemented using different teaching strategies; such as, concept maps (Clayton, 2006; Buldu & Buldu, 2010), debriefing and narratives (Dreifuerst, 2012; Balen, Rhodes, & Ward, 2010), problem based learning (Crawford, 2011; Head & Bays, 2010), videos/ online learning (Hakkarainen & Vapalahti, 2011; Hoffman, et al., 2011), and simulation (Meyer, 2012; Shinnick, Woo, & Mentes, 2011). There is no consensus on the best teaching method to promote meaningful learning. Nevertheless, the choice of the teaching method depends on the students' needs, learning outcomes and objectives, and the educator's proficiency and preference.

The learning material should have a plausible meaning (Novak, 1993), be useful for practice (Crookes et al., 2013), and reasonably and psychologically meaningful (De Sousa et al., 2015). The learning materials should be presented in a meaningful way (Clayton, 2006). The learner's role and characteristics play a vital part in meaningful learning. The learner must take an active role in his/her own learning to achieve meaningful learning (Ausubel, 1978). The learner should be eager and motivated to learn (De Sousa et al., 2015; Novak, 2010; and Crookes et al., 2013). The student should have previously learned foundational information (Ausubel, 1978) and is willing to link the old and new concepts together (Clayton, 2006; and Ausubel, 1978).

Most of the literature reviewed identified antecedents that were originated from Ausubel's theory of meaningful learning. All categories of antecedents are equally important. They highly depend on each other, for example, the teacher needs to know the students' learning requirements, plans the learning materials accordingly, then chooses the most appropriate teaching method. The students, in return, need to cooperate with the teacher and be transparent

during assessment of needs. The students need to take an active role in the learning process to make it meaningful to them. The active role of the student requires the student to use the processes of assimilation of knowledge, subordination, super-ordination and combination. Which in return will develop the invisible and visible attributes of meaningful learning (Appendix B).

The consequences of meaningful learning presented themselves in the literature reviewed. The literature, yeilds that the growth and development in the nursing students' skills could ultimately impact their clinical practice and patient outcomes. Benner, Stuphen, Leonard, and Day (2010) affirmed that the students' ability to connect knowledge will advance patient outcomes. Candela, Dalley, and Benzel-Lindley (2006) declare that the connections nursing students make will help them identify connections between patient assessments, patients data and their own knowledge which in turn will improve their clinical decision making. Decision making and clinical judgement depend on the speed of recalling knowledge, adapting and relating the basic knowledge with the new one, and translating the knowledge into practice (Thompson & Dowding, 2009). The ability to recall knowledge and make these connections depends on the organization of knowledge in the cognitive structure of the learner (Ausubel, 1963). These mental skills are required to transition from college education to practice and could be achieved through meaningful learning. Because meaningful learning is known to encourage the learner to integrate the new knowledge with their foundational knowledge resulting in the development of the vital skills for practice including critical thinking, problem solving and decision-making skills (Novak, 2011).

Empirical measurements of meaningful learning

Meaningful learning could be viewed as an abstract concept. Abstract concepts are known to be challenging to measure empirically. It is believed that measuring meaningful

learning empirically is a challenging task. Novak (2011) stated that it is difficult to measure the students' understanding of a subject matter and the behavioral changes resulting from the learning experience. Cadorin and colleagues (2013) have conducted an integrated review and a concept analysis on meaningful learning among healthcare professionals. They concluded that there were no studies in the literature that aimed at exploring the outcomes of meaningful learning (Cadorin, Bagnasco, Rocco, & Sasso, 2013). Cadorin and colleagues continued their program of research on measuring meaningful learning. In 2016, they conducted a systematic psychometric review to identify, describe and evaluate psychometric properties of tools measuring meaningful learning (Cadorin, Bagnasco, Tolotti, Pagnucci, & Sasso, 2016). They reviewed a total of 13 measurement tools and found that they were all weak and not reliable to be used to measure meaningful learning (Cadorin et al., 2016). In 2017, they published an article about creating a new measurement tool that aims at measuring emotional behavior abilities of meaningful learning, using Fink's Taxonomy (Cadorin, Bagnasco, Tolotti, Pagnucci, & Sasso, 2017). The scale contains six subcategories including foundational knowledge, application, integration, human dimension, caring, and learning how to learn (Cadorin et al., 2017). The measurement tool has not been tested yet. Therefore, as per the evidenece, there is no reliable and valid tool to measure meaningful learning.

Conclusion

In conclusion, meaningful learning is a highly abstract concept. The analysis conducted generated the conclusion that meaningful learning occurs when a student perceives the knowledge gained to be meaningful to their life experience and career. The meaningful learning process is influenced by the teacher, the learning materials, the student's commitment, and ability to assimilate knowledge. Meaningful learning is evident by the cognitive and behavioral

changes of the students. It is believed that the integration of meaningful learning in the education system will enhance the graduate nursing students' knowledge and skills and empower them to translate their theoretical knowledge into practice. The outcomes of meaningful learning will advance the nursing practice and research through the clinical reasoning, critical thinking and reflective thinking the students acquire during their education. Further research is required to examine, explore and measure meaningful learning process, requirements and outcomes.

References

Adema-Hannes , R., & Parzen, M. (2005). Concept mapping: Does it promote meaningful learning in the clinical setting? *College Quarterly, 8*(3).

Andersson, P., & Edberg, A. (2012). Swedish nursing students' experience of aspects for their learning process and their ability to handle the complexity of nursing degree program. *Nurse Education Today, 32*(4), 453 - 457.

Ausubel, D. (1963). *The psychology of meaningful verbal learning.* New York: Grune & Stratton, Inc.

Ausubel, D. (1978). *Educational psychology.* Milano, Italy: Franco Angeli Editore.

Ausubel, D., Novak, J., & Hanesian, H. (1978). *Educational psychology: A cognitive view* (2nd ed.). New York: Holt, Rinehart and Winston, Inc.

Bagnasco, A., Cadorin, L., Tolotti, A., Pagnucci, N., Rocco, G., & Sasso, L. (2014). Instruments measuring meaningful learning in undergraduate healthcare students: A systematic review protocol. *Jan Protocol*, 655- 664.

Benner, P., Hughes, R., & Sutphen, M. (2008). Clinical reasoning, decisionmaking, and action: Thinking critically and clinically. In R. Hughes (Ed.), *Patient safety and quality: An evidence-based handbook for nurses* (Vol. 1, pp. 87 - 109). Rockville : Agency for Healthcare Research and Quality .

Benner, P., Stuphen , M., Leonard, V., & Day, L. (2010). *Educating nurses: a call for radical transformation.* San Francisco, CA: The Carnegie Foundation.

Brajtman, S., Higuchi, K., & Murray, M. (2009). Developing meaningful learning experiences in palliative care nursing education. *International Journal of Palliative Nursing, 15*(7), 327 - 331.

Cadorin, L., Bagnasco, A., Rocco, G., & Sasso, L. (2013). Meaningful learning in healthcare professionals: Integrative review and concept analysis. *The European Conference on Education* (pp. 1-10). Brighton, UK: The International Academic Forum.

Cadorin, L., Bagnasco, A., Tolotti, A., Pagnucci, N., & Sasso, L. (2016). Instruments for measuring meaningful learning in healthcare students: A systematic psychometric review. *Journal of Advanced Nursing, 72*(9), 1972 - 1990.

Cadorin, L., Bagnasco, A., Tolotti, A., Pagnucci, N., & Sasso, L. (2017). Developing an instrument to measure emotional behaviour abilities of meaningful learning through the Delphi technique. *Journal of Advanced Nursing*.

Chapman, H. (2005). Towards effective group-work in nurse education. *Nurse Education Today, 26*, 298- 303.

Clayton, L. (2006). Concept mapping: An effective, active teaching-learning method. *Nursing Education Perspectives, 27*(4), 197- 203.

Correia, P., & Cicuto, C. (2014). Neighbourhood analysis to foster meaningful learning using concept mapping in science education. *Science Education International, 24*(3), 259-282.

Cosentino, A. (2002). *Constructivism and education.* Napoli: Liguori Editore.

Crookes, K., Crookes, P., & Walsh, K. (2013). Meaningful and engaging teaching techniques for student nurses: A literature review. *Nurse Education in Practice, 13*, 239 - 243.

Cutrer, W., Castro , D., Roy, K., & Turner, T. (2011). Use of an expert concept map as an advance organizer to improve understanding of respiratory failure. *Medical Teacher, 33*, 1018 - 1026.

Daley, B., Durning, S., & Torre, D. (2016). Using concept maps to create meaningful learning in medical education. *AMEE MedEdPublish*, 1 - 22.

De Sousa, A., Formiga, N., Oliveira, S., Costa, M., & Soares, M. (2015). Using the theory of meaningful learning in nursing education. *Revista Brasileira Enfermagem, 68*(4), 626- 635.

Dreifuerst, K. (2012). Using debriefing for meaningful learning to foster development of clinical reasoning in simulation. *Journal od Nursing Education, 51*(6), 326- 333.

Fink , L. (2007). The power of course design to increase student engagement and learning. *Peer Review, 9*(1), 13 - 17.

Galloway, K., & Bretz, S. (2015). Development of an assessment tool to measure students' meaningful learning in the undergraduate chemistry laboratory. *Journal of Chemical Education, 92*, 1149 - 1158.

Getha-Eby, T., Beery, T., Xu, Y., & O'Brien, B. (2014). Meaningful learning: Theoretical support for concept-based teaching. *Journal of Nursing Education, 53*(9), 494- 500.

Gonza´lez, H., Palencia, A., Uman˜a, L., Galindo, L., & Villafrade, L. (2008). Mediated learning experience and concept maps: A pedagogical tool for achieving meaningful learning in medical physiology students. *Advances in Physiology Education, 32*, 312- 316.

Hill, A., Davidson, B., & Theodoros, D. (2012). Reflections on clinical learning in novice speech–language therapy students. *International Journal of Language and Communication Disorders, 47*(4), 413 - 426.

Lillis, T., & Lynn, L. (2011). *Fundamentals of nursing: The art and science of nursing care* (7th ed.). Philadelphia: Lippincott Williams & Wilkins.

Lipe, S., & Beasley, S. (2004). *Critical thinking in nursing: A cognitive skills workbook.* Philadelphia: Lippincott Williams & Wilkins.

Mayer, R. (2002). Rote versus meaningful learning. *Theory into Practice, 41*(4), 226- 232.

Michael, J. (2001). In pursuit of meaningful learning. *Advances in Physiology Education, 25*, 145–158.

Novak, J. (1993). A view on the current status of Ausubel's assimilation theory of learning. *The Proceedings of the Third International Seminar on Misconceptions and Educational Strategies in Science and Mathematics.* Ithaca: Misconceptions Trust.

Novak, J. (2010). Learning, creating, and using knowledge: Concept maps as facilitative tools in schools and corporations. *Journal of E-Learning and Knowledge Society, 6*, 21 - 30.

Novak, J. (2011). A theory of education: Meaningful learning underlies the constructive integration of thinking, feeling, and acting leading to empowerment for commitment and responsibility. *Aprendizagem Significativa em Revista/Meaningful Learning Review, 1*(2), 1-14.

Novak, J., & Cañas, A. (2006). *The theory underlying concept maps and how to construct them.* Technical Report IHMC CmapTools 2006-01. Florida Institute for Human and Machine Cognition.

Rodgers, B. (2000). Concept analysis: An evolutionary view. In B. Rodgers, & K. Knafl, *Concept development in nursing: foundations, techniques, and applications* (2nd ed., pp. 77 - 102). Philadelphia: Saunders.

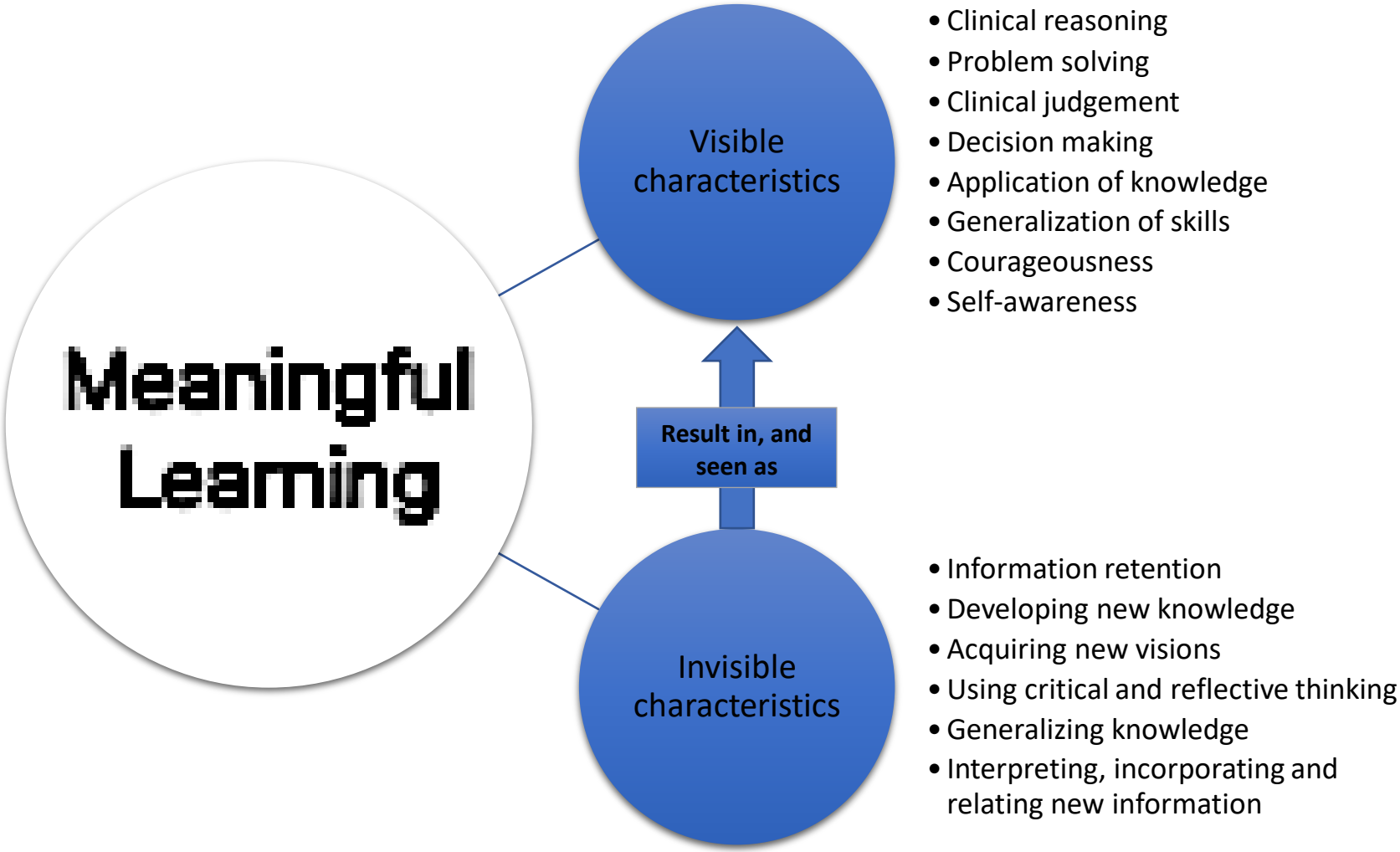
Standing, M. (2017). *Clinical judgment and decision making in nursing* (3rd ed.). London: Sage.

Thompson, C., & Dowding, D. (2009). *Essential decision making and clinical judgment for nurses.* St. Louis, MO: Churchill Livingstone.

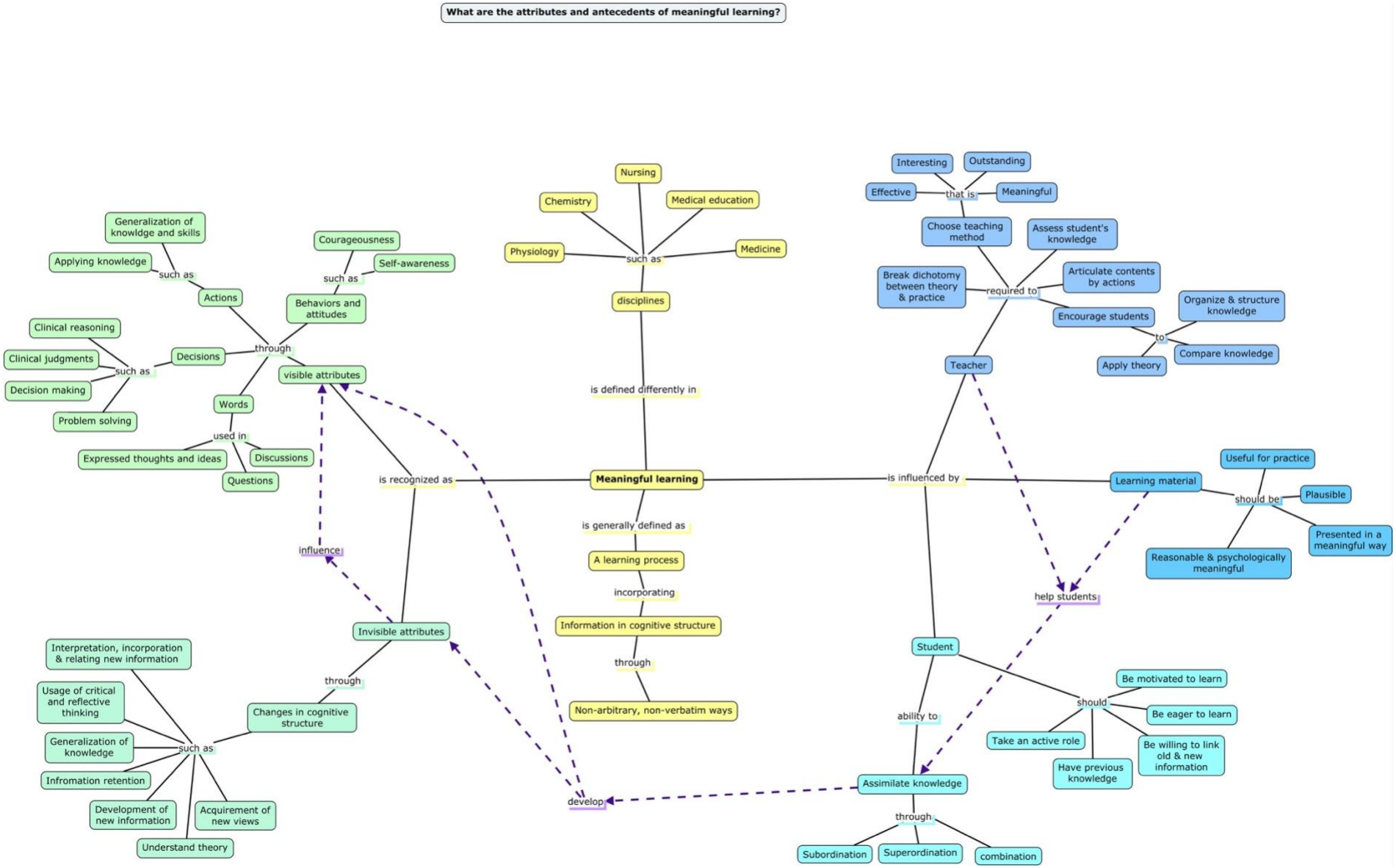
Walker, L., & Avant, K. (2011). *Strategies for theory construction in nursing* (5th ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Westin, L., Sundler, A., & Berglund, M. (2015). Students' experiences of learning in relation to didactic strategies during the first year of a nursing programme: A qualitative study. *BMC Medical Education, 15*(49).

Appendix A: Meaningful learning attributes



Appendix B: Attributes and antecedents of meaningful learning



CHAPTER 4

PILOT STUDY

Promoting Meaningful Learning through the Use of Concept Maps

Using a naturalistic inquiry approach, this qualitative descriptive pilot study aims to explore and understand the experiences and perspectives of undergraduate and graduate nursing students, and nursing faculty in Saudi Arabia on the use of concept maps as a teaching, learning and assessment tool. Naturalistic inquiry is known to capture the experience of individuals "as it is" (Sandelowski, 2000, p. 337). Naturalistic inquiry requires the researcher to use techniques to help understand the phenomenon of study in its natural existance (Sandelowski, 2000). Qualitative research is described as "a naturalistic, interpretative approach, concerned with exploring phenomena 'from the interior' (Flick, 2009) and taking the perspectives and accounts of research participants as a starting point" (Ormston, Spencer, Barnard, & Snape D, 2014, p. 3). The definition of qualitative research as an interpretative method that helps understand the phenomenon from the inside will help answer my research question. Getting to know individuals and interviewing them to have a better understanding of their experiences will provide rich, detailed insight of the students' and faculty's experiences when using concept maps. The qualitative descriptive design will help in transferring these experiences with "low inference" interpretations (Sandelowski, 2000, p. 335). Qualitative methods will help "capture the individual's point of view" (Ormston, Spencer, Barnard, & Snape D, 2014, p. 9). Therefore, it will guide future research on the use of concept maps in the college of nursing in Saudi Arabia.

Background and significance

Nursing education in Saudi Arabia uses traditional teaching strategies which promotes rote learning, such as teacher-led and didactic lectures, and regular examinations (Aljohani, 2013; and Clerehan, McCall, McKenna, & Alshahrani, 2011). Rote learning techniques promote learning though memorization (Novak, 2011) and are known to limit the learners' creativity,

open mindedness and ability to apply knowledge into practice (Novak, 2011; Mayor, 2002; and Aljohani, 2013). Rote learning does not assist students to transfer the theoretical knowledge gained to their actual practice (Gul, Cassum, & Ajani, 2009). The rote learning techniques used in Saudi Arabia limit the development of knowledge, critical thinking and decision-making skills of Saudi Arabian nursing undergraduates (Fielden, 2012). The limited knowledge and essential practical skills are notably magnified as the acuity levels of patients' increase (Lauder, 1999), the technological changes (Sinuff, Kahnamoui, Cook, Luce, & Levy, 2004), and healthcare shifts towards a patient centered care (Huber, 2010). Given the gap between nurses' theoretical knowledge and practice (Shinnick, Woo, & Mentes, 2011), nurse educators face the challenge of helping students assimilate their theoretical knowledge into practice (Andersson & Edberg, 2012). Meaningful learning is known to encourage the learner to integrate the new knowledge with their relevant foundation of knowledge resulting in the development of critical thinking, problem solving and decision-making skills (Novak, 2011). Recent literature shows that the use of concept maps promotes meaningful learning (Gonza´lez, Palencia, Uman˜a, Galindo, & Villafrade, 2008), critical thinking (Hsu, Pan, & Hsieh, 2016), and clinical judgement (Schuster, 2002). It is vital to evaluate the educational methods used to teach Saudi Arabian nursing students and review the learning experiences provided to students. Consequently, it is hoped to develop and enhance the educational system in Saudi Arabia through promoting meaningful learning using concept maps.

Purpose

The purpose of this naturistic inquiry, descriptive study is to explore the experiences and perspectives of undergraduate and graduate nursing students and faculty on the use of concept maps as a learning tool by students, and as a teaching and assessment tool by faculty, offered at

the nursing college in a public university, Jeddah, Saudi Arabia. At this stage, meaningful learning is defined as the ability of students to make sense of the content learned in-class, and their ability to recall the information during the exams and clinical exposure.

Aims

1. Explore the perceptions of nursing students and faculty on the use of concept maps as a learning, teaching and assessment tool.
2. Understand the experiences of nursing students and faculty with the use of concept maps.

Research question

What are the experiences and perspectives of Saudi nursing students and faculty after the use of concept maps as a teaching, learning and assessment tool?

Review of literature

Four databases were searched, ERIC, CINAHL, PubMed and Science Direct using the following keywords: Ausubel, meaningful learning, concept map, nurse, nursing, and nurses. The search from databases revealed a total of 31 articles. The inclusion criteria were the use of Novak and Gowin's (1984) definition and scoring of concept maps, published studies since 2005, English language, all disciplines, undergraduate or graduate students, and accessible/ available in the UWM access to data bases and library. Only 7 studies met the inclusion criteria of the literature review.

The data analysis revealed four themes; students' training, students in groups, teachers' guidance and support, and effect on students. In only three studies, students were trained on the use of concept maps before the beginning of the semester (Hsu & Hsieh, 2005; Jaafarpour, Aazami, & Mozafari, 2016; and Martínez-Cañas & Ruíz-Palomino, 2011). Each study used a different method to introduce concept maps to students.

Five studies divided their participants into learning groups and concluded that having students in groups was more beneficial to the students (Hsu & Hsieh, 2005; Gonza´lez, Palencia, Uman˜a, Galindo, & Villafrade, 2008; Buldu & Buldu, 2010; Martínez-Cañas & Ruíz-Palomino, 2011; and Reiska, Soika, Möllits, Rannikmäe, & Soobard, 2015). The students engaged in discussions and shared ideas resulting in a better understanding of the content.

Four studies found that the students appreciated their teacher's support, guidance and discussions during the students' groups discussions (Hsu & Hsieh, 2005; Gonza´lez et al., 2008; Buldu & Buldu, 2010; and Jaafarpour et al.,2016). The use of concept maps encouraged reflective and critical thinking that helped students assimilate their knowledge (Hsu & Hsieh, 2005; Gonza´lez et al.,2008; Buldu & Buldu, 2010; Martínez-Cañas & Ruíz-Palomino, 2011; Jaafarpour et al., 2016; and Hsu, Pan, & Hsieh, 2016). Furthermore, the use of concept maps engaged the students in active learning and resulted in motivating them in their learning process (Gonza´lez et al.,2008; and Buldu & Buldu, 2010).

Students' scores in exams significantly improved with the use of concept maps (Gonza´lez et al.,2008; Reiska et al.,2015; and Jaafarpour et al., 2016). Contrarily, Hsu, Pan, and Hsieh, (2016) and Reiska and colleagues (2015) found that the students' scores in multiple choice exams did not improve with the use of concept maps but improved their understanding of course content. The construction of concept maps was time consuming to the students (Buldu & Buldu, 2010; and Jaafarpour et al., 2016) and there should be a consideration to the students' background and the course content (Reiska et al.,2015), so that students will be able to make the relevant connections between concepts and their lived experiences.

The inconsistency and lack of scientific rationale of the training is assumed to may have had an impact on the students' understanding and ability to create concept maps. However, there

is no evidence in the literature about the ideal duration of time for training students on the use of concept maps. Carnot, Dunn, and Cañas (2001) found that training differed between participants and there was not a specific period of training to be more effective than another. This point does not eliminate the importance of training; hence, it is vital to train participants on the construction of concept mapping (Jonassen & Wang, 1993). Cañas and colleagues (2003) suggested the use of software that would be available to both students and faculty to train on the construction of concept mapping, whenever needed. Furthermore, including the evaluation criteria in the training will be a good practice as it benefits the students, by making them aware of the learning objectives and the expectations of the teacher which in return will enhance their learning (Biggs, 2003).

According to the literature review conducted, concept maps' reliability and validity have not been reported in any of the studies. Concept maps are most commonly used by students to present their knowledge and current understanding, and by teachers to evaluate the students' understanding. Providing feedback to students on their concept maps is known to consume time for faculty to complete (Ingeç, 2009), and giving feedback is considered as an extra workload on faculty (Wu, Hwang, Milrad, Ke, & Huang, 2012). The use of concept maps has shown to improve students' learning achievements and adaptation to the learning materials (Wu et al., 2012; Clayton, 2006; and Irvine, 1995). There is a need for continued exploration of the different uses of concept maps in nursing education.

Theoretical framework

Meaningful learning was defined by Ausubel as "non-arbitrary, non-verbatim, substantive incorporation of new symbolically expressed ideas into cognitive structure" (Novak, 1993, p. 4). Ausubel assumed that meaningful learning only occurs when the learning material

has a potential meaning, where the learner has previously known or learned concepts and propositions to link new information and assimilate new ideas; and the learner has a desire to create links in a non-verbatim, substantive way (Novak, 1993). Ausubel, Novak and Hanesian (1978) explained that meaningful learning has different forms as viewed in the assimilation theory. Assimilation is viewed as the result of the interaction, that occurs in the cognitive structure, between new and pre-existing knowledge (Ausubel, Novak, & Hanesian, 1978). The interactions could take a form of subordination, superordination and combination (Ausubel, Novak, & Hanesian, 1978). Subordination is the process of incorporating new knowledge under a general pre-existing concept (Ausubel, Novak, & Hanesian, 1978). Super-ordination is the process of incorporating pre-existing knowledge under a general concept that is newly learned (Ausubel, Novak, & Hanesian, 1978). Combination learning occurs when the new knowledge cannot be subordinated nor super-ordinated, however, it is important and could be broadly related to the pre-existing knowledge (Ausubel, Novak, & Hanesian, 1978). Meaningful learning theory corresponds with the constructivists' view of learning as it shares the same main concepts of the constructivists' view.

Philosophical view. The philosophical basis for meaningful learning and concept mapping is constructivist. Constructivists view learning as a method of creating meaning (Merriam, Caffarella, & Baumgartner, 2007, p. 291), and that creating meaning depends on the individual's former and present knowledge structure. Constructivists view learning as an active process that requires conversation, sharing, and support (Merriam et al., 2007, p. 292). Concept mapping is one of the teaching and learning methods that is known to foster meaningful learning (Clayton, 2006). Concept maps provide a visual image of the students' thinking process, which allows the educator to identify the correct and incorrect connections the students have made

between new and old knowledge (Clayton, 2006). Additionally, concept maps have shown to be used by students as a guide during their practice and has given them confidence in making clinical decisions (All, Huycke, & Fisher, 2003). Concept maps are known to be the most effective tool to achieve long-term learning (Vallori, 2014).

Concept maps. Concept maps were developed by Novak and Gowin (1984) to accelerate meaningful learning. Novak defined concept maps as "graphical tools for organizing and representing knowledge" (Novak & Cañas, 2006, p. 1). Concept maps consist of a question, concepts, linking words, propositions and crosslinks. The concept map's question helps the learner to be precise in the construction of the map. The learner starts answering the question by identifying concepts that represent the main ideas, which are displayed in circles or rectangles and linked together with words on the lines that connect the concepts together. Links between the concepts represent the relationships between concepts, and thereby creating propositions. Crosslinks link new concepts to old concepts, based on the learner's understanding, perception, and experience. In order to accurately reflect the content that is being presented, concept maps may have different forms; hierarchical, spider, flow chart, and system maps (All et al., 2003).

Study design

This is a pilot descriptive study that aims to explore and understand the experiences and perspectives of undergraduate and graduate nursing students and nursing faculty on the use of concept maps as a teaching, learning and assessment tool during different courses provided by a public university in Jeddah, Saudi Arabia. The administrators of the college of nursing viewed the introduction of the use of concept maps as a quality improvement project. A pilot study was then conducted to explore the experiences and perceptions of the nursing students and faculty. Training sessions were conducted for students and faculty separately. Training sessions were

conducted for second year and graduate students. These 60 minutes sessions focused on the creation of concept maps. Faculty received intensive training for four hours. The session included training on the creation, uses, and scoring of concept maps. The faculty were encouraged to require students to create a minimum of four concept maps during the semester on different topics in the curriculum to qualify for the study. The faculty were encouraged to provide the students with the scoring rubric for each concept map. The concept maps scores were not included in the study, and the students' choice to participate or not, in the study, did not affect their grades. The faculty were encouraged to provide feedback to the students and discuss misconceptions with the students. The data were collected after the end of classes, and during final exams. Students' data were collected via focus group interviews. Faculty's data were collected via in-depth interviews. All participants were offered incentives. After the interview each participant received a $13 gift card.

Sample size

The literature on concept maps revealed studies that used quantitative or mixed methods designs, mostly with sample sizes of greater than 40 participants. However, the few qualitative studies used smaller sample sizes with, as examples six participants (Daley, 1996), 18 participants (Daley, Shaw, Balistrieri, Glasenapp, & Piacentine, 1999), and 14 participants (Wilkes, Cooper, Lewin , & Batts, 1999). Ragin (2012), and Adler and Adler (2012) suggest a sample size for qualitative studies that ranges between 12 and 60. In this study, 18 undergraduate and 4 graduate nursing students and 4 faculty were included in the sample (n = 26).

Recruitment

A convenience sampling method was used to recruit all participants from the public university. The initial inclusion criteria for the students was to have created a minimum of 4

concept maps throughout the fall semester. However, after determining that the majority of students did not create 4 concept maps, it was decided that any student who created at least one concept map would be included in the study as the intent of the study was to investigate students' perceptions of concept maps, not mastery. The second-year undergraduate students included in the sample were from the same cohort and taking the same classes (n = 18). The graduate students included in the sample were in the same cohort (n = 4), but in two different specialties. The faculty included in this study had a master's degree or a PhD and used concept maps as a teaching or assessment tool (n= 4).

To recruit faculty, the researcher communicated with head of departments in the nursing college and received permission to attend one of the departmental meetings to recruit faculty. The dates were set, and the meetings were attended. The researcher used the faculty recruitment script (Appendix A) to inform the faculty about the study. Faculty were given the choice to voluntarily participate in the study. Faculty who were interested were provided with the informed consent (Appendix B) to read at their convenience and bring along with them on the day of the interview. The day and time of the interview was arranged with the faculty via text.

The student participants recruited were a sample of undergraduate and graduate nursing students who took courses that implemented concept maps in the college of nursing at a public university, Jeddah, Saudi Arabia, during the fall semester. The faculty assisted in the recruitment process. The faculty who used concept maps during the semester were asked to introduce the researcher to their students, then leave the class room. Research aims, and methods were explained briefly using the students' recruitment script (Appendix C). To prevent students from feeling coerced to participate and their concern about course grades, students were assured that the faculty would not be informed of their participation or not. Each student who agreed to

participate provided their contact information, and were then given the informed consent form (Appendix D). The students were asked to read the consent at their convenience before the focus group interview and bring it along with them on the day of the interview. The team leader of the undergraduate students' cohort arranged and communicated between the researcher and the students the dates and times of the interviews. The graduate students date and time of the interview was arranged on the day of recruitment with them. The detailed information in the informed consent was explained thoroughly to the students on the day of the focus group interview.

Characteristics of the sample

The sample includes only females, because in Saudi Arabia there are separate schools and universities for females and males. All the participants are Saudi and Muslim, because Saudi Arabia is a conservative, Muslim country and the University admits only Saudi students. The 2nd year undergraduate students' age varies between 19 – 21 years old. Per the admission policy, the university does not accept any high school certificate that has been obtained more than three years ago. The English proficiency skills of the undergraduate students were generally poor. Undergraduate students graduated from public schools (72%) or private schools (28%). Some of the students attended the regular education or the annual system (22%) and others attended courses-based system (78%) According to the Ministry of Education, the annual system is characterized by one educational plan that all students must follow. Students would take an average of 17 different subjects per semester. There are different plans and tracks for males and females. The courses-based system is characterized by having a different educational plan for every student and school. Students take on average of 7 subjects per semester. The plans and tracks are identical for both males and females. The annual system follows traditional teaching

methods, whereas the course-based system uses different teaching methodologies and includes a lot of research and projects.

Graduate students have a bachelor's degree in nursing from public universities. Their undergraduate education was generally traditional. Their clinical experience varies between no experience to 7 years of experience. All four graduate students were in the 3rd level of the master's program. Two students were enrolled in the nursing administration program, and two were in the maternity program

The faculty have between 0 – 30 years of teaching experience. Three faculty have a PhD degree, and one has a master's degree. Two faculty taught graduate students and two taught 2nd year undergraduate students. All faculty have very good English proficiency. Sample demographic information is provided in Table 1.

Setting

Both the focus group interview and in-depth individual interviews were conducted at a public university. The focus group interviews with students were conducted in a private faculty office. No faculty were present or aware about the location of the interview, and the office door was locked to ensure confidentiality and privacy to students. The in-depth interviews with faculty were conducted in their own offices, to make sure it is convenient and comfortable for them.

After data transcription, the undergraduate students' data were confirmed through arranging with their team leader to meet with them after one of their classes for their convenience. The graduate students' data were confirmed by arranging a meeting with the students considering their availability in the college. The meeting was conducted in the college's

library. The faculty's data were confirmed by sending them emails or providing a hard copy of the transcript to them.

Data collection

Data were collected using two different methods: focus group and individual interviews. Focus groups were used to collect data from students, because this data collection method is known to have less interference by the researcher, and more interaction among the group (Finch, Lewis, & Turley, 2014). In focus group interviews, participants listen to each other, discuss their ideas, opinions, experiences and thoughts (Finch, Lewis, & Turley, 2014). The discussion allowed students to react with one another and provide a deeper understanding of their experiences (Polit & Beck, 2013). Focus group interviews are efficient, because they provided in-depth data (different points of students' views) in a short period of time (Polit & Beck, 2013). It is known that the ideal number of participants in one focus group is six to eight persons (Finch et al., 2014). According to the sample size, five focus group interviews were conducted at different times that were convenient to the students. Each focus group consisted of four participants. One focus group had 6 participants because some students could not make it to their assigned focus group and still wanted to participate. Conducting interviews may lead to lack of clarity on who said what and may be difficult to follow and write field notes (Polit & Beck, 2013). To prevent clarity issues, focus group interviews were recorded. Each participant in the focus group used a pseudonym such as participant 1, participant 2…etc, before answering a question or engaging in the ongoing discussion. A research assistant took detailed field notes about what was happenning during the interview. There were two research assistants who assisted in the study. Both research assistants have master's degrees in health administration, work at a public hospital, and do not have any direct relation with either faculty nor students. For

every focus group, the research assistants decided together who would attend the focus group interviews according to their work schedule. The focus group interviews were steered using a students focus group guide (Appendix E).

Indepth interviews were used for faculty. This method gave the privacy and freedom to each faculty to express her thoughts and opinions on the use of concept maps. Private interviews eliminated any judgments that may be passed by colleagues, as neutrality will be maintained during the interview. Indepth interviews are known to be flexible, interactive and generative (Yeo, et al., 2014). These characteristics of in-depth interviews allowed depth and breadth in the exploration of the faculty's experience. In-depth interviews will give an opportunity to explore the faculty's underpinning philosophical view of teaching, values, beliefs, feelings and reasoning (Yeo, et al., 2014) which could have an impact on their experiences and perspectives. The faculty's interviews were recorded and field notes were taken to enrich the data with emotional and physical cues (Yeo, et al., 2014). The interviews were steered by using the faculty interview guide (Appendix F).

Ethical issues

It was emphasized to students that their participation was voluntary, and their grades would not be affected regardless of their choice to participate or not. This statement was clearly stated in the consent forms signed by the participants. Confidentiality and privacy of data could be a potential concern for the participants. Participants were informed that the recorded interviews would be heard only by the researcher for transcription. Raw data may be shared with the researcher's dissertation committee members and research assistants. The recordings of the focus group and individual interviews were stored in a secured document on the researcher's personal laptop and will be destroyed after the completion of the study.

Limitations

The methodological limitations in this study were related to sample recruitment, data collection, and data analysis. It may be challenging to recruit both students and faculty. It was anticipated that students and faculty may be reluctant to participate, because the data will be collected via recorded interviews. Culturally in Saudi Arabia, women do not record their voices, because they worry it could be used against them. Therefore, participants were assured that no male will have access or listen to the recordings. Also, participants were assured that the recordings were saved on a secured computer, accessible by the researcher, and recordings will be destroyed once the study is completed. During the recruitment and data collection periods, all participants were willing and comfortable to have the interviews recorded and did not ask any questions about access to recordings. Students may feel coerced to participate in the study during recruitment period. Hence, the faculty were asked to not be in the classroom during the students' recruitment process. In reality, the students were not worried about the faculty knowing that they were participating in the study. The undergraduate students were not interested in participating regardless of the incentives that were offered. The researcher visited 2nd year undergraduate students in their class room three times to be able to achieve the sample size, by highlighting to them the benefits of participating in the study. Faculty recruitment was challenging due to the resistance expected on the use of concept maps. Although all faculty were trained on the use of concept maps, the implementation and participation in the research was left optional.

Data collection was challenging because the time of undergraduate students' data collection was after the students had finished one of their final exams. The students were tired, sometimes emotional, and some of them forgot they had an interview. Collecting data from

faculty was challenging because of their availability. One of the faculty delayed the interview twice. As the timing of the data collection was during final exams, faculty were busy with exams and grading.

Data were transcribed and analyzed by the researcher only. Transcripts were shared with the research assistants to make sure the translation and transcription were accurate, and to include their notes on the transcripts. The data were shared with the participants for review to ensure that the transcriptions reflect what they said and meant, and the data were shared with the dissertation committee members to help with analyzing the data.

Scientific rigor

To ensure the trustworthiness of this study, four important elements must be considered; credibility, transferability, dependability, and confirmability (Shenton, 2004). Credibility answers the question "how congruent are the findings with reality?" (Shenton, 2004). Credibility is considered the most important measure for trustworthiness (Lincoln & Guba, 1985). The college of nursing was visited a couple of times during the semester by the researcher, to have a better understanding of the college's learning environment, faculty and students and build trust with the college as a whole, faculty and students. This allowed for "prolonged engagement" that is suggested by Lincoln & Guba (1985). Triangulation of data was ensured by conducting the focus group interviews among different students who may have different experiences. One research assisstant took field notes during the focus group interviews as well as the researcher. A comparison and merging of the notes was done to ensure that a complete picture of the event was included in the analysis. The transcribed data was shared with the participants for their review and approval of the data, before its analysis. These measures allowed for the triangulation of the data, which was recommended by Shenton (2004).

Transferability is to provide detailed information about the study sample, methods and context so that the reader is able to assess the ability to replicate or transfer study findings to other settings (Sandelowski & Leeman, 2012). To ensure transferability to other contexts, a detailed description of the participants and the context was included in the study sampling and setting sections. A detailed description of the training and process of the study was included in the study design section.

Dependability shows that "the findings are consistent and could be repeated" (Lincoln and Guba's Evaluative Criteria, 2008). To ensure dependability, the data were analyzed using different thematic analysis methods. The data were shared with the disseration committee members for review and re-analysis to ensure that the identified themes are similar and most appropriate. Detailed description of the process of the study, data collection and analysis were included in different sections of this paper.

Confirmability is defined as "the degree of neutrality" (Lincoln and Guba's Evaluative Criteria , 2008). To exclude bias and demonstrate neutrality, the transcribed interviews were shared with the participants for confirmation and the study results were reviewed by the disseration committee members.

Data analysis

While Arabic is the first language of all participants, undergraduate and graduate nursing programs are taught in English. It was expected that the participants may choose to use either or both Arabic and English languages according to their comfort. During data collection, undergraduates preferred using Arabic, graduate students and faculty used Arabic and English languages during their interviews. All Arabic data were translated, and transcribed by the researcher. The data were shared with both research assistants. Each assistant was given the

interview that she attended. Data was then confirmed by participants before the analysis process began.

Thematic analysis was used to analyze the data. Thematic analysis is known to involve "discovering, interpreting and reporting patterns and clusters of meaning within the data" (Spencer, Ritchie, Ormston, O'Connor, & Barnard, 2014, p. 271). The process of thematic analysis indicates analyzing the data sytematically using thematic coding (Spencer et al.,2014). Therefore, once the researcher felt fully immersed and familiar with the data, the researcher started the analysis process. Initially, students' data were divided into three major categories, according to the interview guide, previous experience, college experience and concept maps experience. Faculty's data were divided into previous teaching experience and concept map experience. The data were analyzed as a whole. All participants data were divided into two major themes; enablers and constraints. The participants' words were copied and pasted with no interpretation under corresponding themes. As the data was aggregated, each participant was reassigned a pseudonym; undergraduate from 1-18, graduate from 1-4, and faculty from 1-4. Then, the data was labelled and coded into subthemes. Because the data was rich, the data revealed 13 enablers' subthemes, and 9 constraints' subthemes. The subthemes were reviewed to group them under one subtheme. This process resulted in two subthemes under each theme: creation and value to learning, and a new theme guidance and support.

Results

The thematic data analysis revealed three major themes; enablers, constraints, and guidance and support (Appendix G). The enablers theme is defined as the conditions which enable participants to use concept maps, encouraged and motivated them to use concept maps, and the advantages of using concept maps. The constraints theme is defined as the difficulties

which hindered the use of concept maps, and the disadvantages of using concept maps. The guidance and support theme includes the circumstances that could be provided, improved or changed to enhance the experience of using concept maps. These themes applied to all participants when completing thematic analysis, and therefore participants were combined. Graduate students and faculty responded in English, and undergraduate students responded mostly in Arabic then their responses were translated. It should be noted that when participant quotes are used for illustration, the verbatim quotes may contain grammatical errors. To ease the reporting of the data, participants are referred to as; undergraduate student is (U), graduate student is (G), and faculty is (F), in addition to their assigned number. The translated quotes are referred to as (T), and direct verbatim quotes are referred to as (V) at the end of each quote.

Enablers

Two subthemes were identified under the enablers theme: creation and value to learning. The creation subtheme includes the factors that positively influenced the creation of concept maps. The values subtheme includes the determinants that made using concept maps valuable to participants.

Creation. Students who were visual learners like to write or draw while studying, and like to make connections, were the ones who more frequently used concept maps.

> U15: "My memorization is more visual than remembering the words. During the exam, I close my eyes and I can see the map and I can write" (T)
> U4: "It is very suitable for a person who likes to write" (T)
> U12: "I rely on drawing in my studying. If something I don't understand, I draw it. Creating a concept map makes it easier for me" (T)
> U9: "I use concept maps when I study because I like to connect and relate concepts together" (T)

Students found that the more they create concept maps, the more skilled they become, and the better maps they create. Some undergraduate students have been creating concept maps

for such a long time that they use it in their daily living activities, their "hands" got used to it, and they feel more comfortable using concept maps. Students who frequently created concept maps liked to use them because they are organized, and the colors and shapes made studying and reviewing more exciting. They felt that concept maps are non-traditional and creative.

> G3: "Because it's easy thing to do especially with practicing it is easier and takes less time. Yes, it gets better" (V)
> U16: "Since I am small, everything is map. Concept map, mind map, do a map, do a map. Even in my regular day I do a map" (V)
> U3: "I got used to it because I use it in everything. My hand got used to it, too" (T)
> U12: "I am used to it. I am comfortable creating it and it is the best way for me" (T)
> U2: "It mostly helped me when I review. This will lead to this and caused by this. So, everything is organized" (T)
> G1: "Then it is easier, and coming in nice shape, nice at the end with colors" (V)
> U7: "For me the looks of the map are very important to excite me to study" (T)
> U9: "I feel it is something creative and not traditional. It is nice" (T)

Few students felt that using the concept maps tool was easier than creating maps manually. The feature of saving the map as a pdf or image was beneficial to them. Most of the undergraduate students created concept maps manually. They preferred creating concept maps manually because it brought more ideas to them and they could bold lines and make different shapes. Some students also favored using concept maps as opposed to writing an essay because of their limited English literacy.

> U8: "When you showed us the program. I was thinking, oh things have developed, and I liked it. It is easier than drawing manually" (T)
> G4: "I know I can save as picture or pdf after I tried it. Its look nice and I can see the words" (V)
> U3: "When I create it manually, I have more ideas. For example, I bold the main idea, then the other ideas" (T)
> U16: "When I draw a thick line, I know this is important. A thin line means it is not very important" (T)
> U8: "I hate writing essays. I prefer a map and writing bullet points. Especially that our language and grammar do not help in writing essays. So, bullet points are better for our language" (T)

Students found that understanding the content and identifying the key words helped them in creating the connections between concepts in concept maps. Most undergraduate students declared that detailed and complex content became easier to study when a concept map was created. All participants thought concept maps helped them in summarizing chapters and lessons. They enjoyed creating the concept maps for studying and when they could organize the concept map the way they thought was most appropriate. One of the faculty used concept maps as a teaching tool and found that it helped her cover the content. Another faculty member thought that it was easy to use in theoretical classes, as well.

> U4: "I feel as long as you understand what you are reading, you will be able to make a concept map. Reading will make the choice of linking words much easier" (T)
> U9: "I think the keywords are very important in the map, not the details. I don't need to read the whole map. The keywords will help me remember things at the time of review. So, I don't have to read a lot" (T)
> U18: "I respect maps when the information is complex. It really really benefits me, it has its place" (T)
> G3: "The best thing is summarizing the whole chapter in one page" (V)
> G2: "But I think the concept map as a self, for the self-learning, for me to summarize and understand what I mean my concept map" (V)
> U15: "When I study from the book without a map, I feel lost. But when I go back to the map, I figure out what I forgot" (T)
> F1: "The pros, we covered the content, we understood it in depth, we made the link, we understood the concept mapping better than what we had" (V)
> F2: "I told you in the theory it is very easy to implement. In the lectures applicable" (V)

Value to learning. Although students thought creating a concept map was time consuming, they felt that it saved them time studying and reviewing, and in making presentations. Some students believed that it helped them organize, connect, and understand information, and to memorize and remember what they studied. Creating concept maps was useful to students because they were able to share information through concept maps. Also, graduate students found that creating concept maps helped them in their class participation and presentations.

U6: “In the final, I did not have time to review and look at the slides. I had a copy of the map and I reviewed from it. It really helped me save time. I finished reviewing in 15 - 20 minutes. All the ideas were in front of me. It was really nice” (T)
U14: “Even if the doctor does not require a map, I will organize my thoughts and create a map to make it easier for me” (T)
G1: “So in my exam really it was helpful to understanding, to remembering and to connecting and join the info together. Even not only for one lecture. Help me connect the data or information to other lectures” (V)
U12: “I feel like it saves time, and we are able to share information” (T)
U6: “I always do maps. When I am done, I make copies for my friends to study from them” (T)
F4: “I used to tell them to make the map and bring it to participate in the session. They used the maps. Because there are participation grades” (V)
G3: “When I am practicing it found it more easier. And I use concept map as a teaching tool in one of my presentation…. its saved time for presentation” (V)

One of the faculty teaching graduate students found that when a student answered one of the exam questions using a concept map, the student’s answer was inclusive and included inter-related concepts. Hence, the faculty expanded on the model answer according to the student’s answer. Another faculty member who taught undergraduate students, felt that the students responded better in the questions related to the content included in a concept map. The faculty felt that they could understand the students’ way of thinking and how they were able to process and connect the knowledge they learned. One of the faculty, who taught graduate students, thought that concept maps helped the students become more engaged in the class. She was able to assess their understanding of the content and communication skills in expressing their knowledge.

F1: “the person who chose to answer concept map had more inclusive answers more interrelated answers than those who used the narration… I validated the narration from the concept map. Because as an instructor, when you have a model answer. And I had a model answer. I was checking the things in the model answer, with the person answered with a concept map had more of the things knocked off the list. The checklist and they helped me to be honest there were things more than the checklist in the concept map. So, helped me expand my model answer based on her answers. So, I loved it” (V)
F2: “their grades were nice specially in the theory of psychology and history (where I required a concept map)” (V)

F2: “Although it takes time I enjoy when I read how they connect the information. You know what I mean. The process of their think the way of their thinking also… I liked how they presented the information. Not only that I am reading the information, I am reading their thoughts and how they processed it and how they have this concept here or there” (V)
F4: “It made them more engaged in the class” (V)
F4: “Good things, I could see the students who understands who doesn’t, read the chapter, who didn’t. did they come out with the important things or not, how to communicate the thoughts and knowledge” (V)

The students felt more accomplished, confident, and proud of themselves when they saw the concept maps they created. Some students expressed that creating concept maps required using critical thinking and thinking out of the box. Some students also expressed that their level of stress was decreased because they used concept maps in reviewing before the exams, which to them meant that they reviewed the whole content included in the exam.

U15: **“**So, every time I see the maps I created I feel my accomplishment. I feel like all this information in my head! So, every time I see them I feel proud of myself. Wow all this in my head. So, it is a good feeling” (T)
G3: “I think its encouraged in me the critical thinking. Especially in linking words and concepts, because it is not only words, its concepts and how you connect this concept together, and it encouraged me to use my critical thinking” (V)
G1: “it makes other think differently, different thinking, out of the box. It will make you brain to work more. Connecting and joining all the information” (V)
U14: “I figured out that if I started doing a concept map from the beginning, I wouldn’t have been stressed with all the information. Concept maps would have organized the information for me” (T)
U17: “You feel like all this information is in my head, and it is very organized, and it encourages me to study or review” (T)

Constraints

Two subthemes were identified under the constraints theme: creation and value to learning. The creation subtheme includes factors that hindered the use of concept maps. The value to learning subtheme includes the determinants that made using concept maps less valuable to the participants.

Creation. Some students did not like to use concept maps because they did not work for students' style, or the student doesn't like to write, draw, use the computer, or to connect information. Those students preferred going through details and to highlight and memorize while studying. Those students also categorized themselves as visual and/or auditory learners, yet they differed in the perception of usefulness of concept maps when compared to visual learners who felt concept maps enabled their studying.

> U11: "Honestly, I did not like it and I do not feel like it works for my style" (T)
> U4: "I want to read, understand, and memorize. I do not feel like writing, and I do not like to write" (T)
> U4: "I read, explain to myself, and then memorize. I am not a person who draws" (T)
> U4: "I do not like to use the computer. We are supposed to, but I do not like to. I am very bad with these things" (T)
> U11: "I like to take the info and summarize. But I do not like to put it in shapes and connect things. I feel it is very brief and I like details. I do not feel like I will benefit from it" (T)
> U11: "I cannot rely on it. I like to get the information all complete and in depth. I mark and highlight, but I don't put it in anything" (T)
> U18: "I am not a writing person. I am visual and auditory person but not by writing at all" (T)

Students also felt that it was difficult to create maps using the concept maps tool or Microsoft Word®. Students found creating a map on their own was challenging. As the complexity of the map increased, students felt it became difficult to fit the map onto one page and they get mixed and lost. Some students also found creating links challenging and difficult, because they did not know what linking word should be used due to their low vocabulary knowledge. Other students did not like to create maps and did not know how to create them. Some students also felt that the content was very complex and creating maps from the book was difficult. Lastly, students did not like to create maps that were required by the faculty because the faculty expected specific details and sequence which limited the students' creativity.

U17: “I had to use the program. I don’t like the program. I like to do it manually… But I do not like the program, I got lost. Also, I found it difficult to connect things” (T)
U9: “I first thought that we will do it in a group so that we all have our input together and become complete, and when it was not I panicked” (T)
U13: “Sometimes things get mixed together or the space is not enough, so I need a bigger paper” (T)
G3: “I back to reality and I download the concept map program. I found it kind of difficult to deal with especially with the link words, because I didn’t have much vocabulary to use it as link words” (V)
G4: “From the book it is very difficult. And I don’t know how to put linking word and what the important word I can put. I never put all the paragraphs in the concept map” (V)
U18: “The only thing that stopped me is that I do not know how to do it. I think it is different from course to course how to divide the ideas and the information is a lot. What made it is difficult the way of doing it” (T)
U18: “They wanted us to do the same sequence in their heads, they want it complete. Or why did they deduct points on information or words. I do not feel it’s for them to know what is in our minds or our summarization. It’s about what is in their minds or the information they want, not according to what we understand or benefit” (T)
U16: “Maybe if it was not a requirement. I do not like it when it is required, as if she wants to force me on something. I want to show you how my mind works, how I function. I don’t see this headlights are important, I see something else is. So, if the topic was something major, I want to do something more details. So that’s why if someone asks me to do it, I don’t like to do it, it’s different when I choose to do it” (T+V)

Students felt that creating concept maps required concentration to not miss information. Graduate students thought that they had to create a lot of maps during the semester, because some of them had to create between 10 - 15 maps. Faculty acknowledged that creating concept maps required a lot of thinking, practice, and preparation. Faculty also felt that scoring the map was challenging because they were looking at all of the details on the maps to be fair to the students. Faculty also assumed that concept maps were difficult for the students, seeing that they had missed examples and crosslinks in their maps. Most of the faculty felt that the students did not want to invest the effort required to create the maps, and submitted the maps solely for the sake of the grades.

U6: “When you do a map, you need to concentrate so you could put all the information and you don’t miss anything” (T)

G1: “The second 3rd 4th to 10th I think is good. I feel its look good. I don’t know if it’s perfect or the correct way, but it looks good. The last 3 because I don’t have time and I feel boring for that, what I did at the end I start to make copy paste whole slide.” (V)
G4: “The thing I don’t like it the instructor. When she asked us to perform to do concept map in every lectures” (V)
F3: “I couldn’t manage it because of my time and because it needs a lot of thinking” (V)
F3: “I feel like the concept maps need practice and preparation” (V)
F1: “It takes a lot of preparation Duaa. Now I don’t know if every lecture with concept map you have to spend that much of time…You have to plan for it. I’ll be very honest, the planning time that I consumed in order to present this lecture was two days like I said” (V)
F2: “The only problem is the time for correction, if I didn’t have anything else and the time is counted on me. So, for me to grade the maps so I can take my time and be fair to the students, I took them home. It is difficult to do it here. A map may take me more than 15 minutes especially the ones who wrote a good map” (V)
F3: “I was worried that the level of second-year students doesn’t help them do this thing”
F1: “Concept maps consists of multiple items (title, connect word and so forth) but what the students missed was cross link. I told them to write example, write any idea while you are writing, reminded of of any experience, make it as a crosslink. So, until now the point of a concept map they missed. They all missed the crosslink. Although I tried, and I continuously made discussions with them but still they are unable to imagine the crosslink” (V)
F2: “I think it is possibly two things. Maybe they were not interested (not in the subject itself) in the school of nursing generally it is like an assignment that they want to submit, no matter what I write. Another thing the biggest obstacle is the language. They do not know the proper connecting word and link that they could write” (V)

Value to learning. Generally, all participants believed that creating concept maps required substantial time, time that they could not fit into their busy schedules. Some students felt that creating a concept map using the concept map tools took a long time and it is a waste of time to divide the information in a concept map. Faculty also felt that scoring concept maps was time consuming.

F3: “As a full map I feel it’s difficult. Maybe sometimes I said if I had time, but I dint have time, of course that I make the whole lecture, but I need time to design especially that it is information. Complete lecture as a concept map. But I couldn’t manage it because of my time and because it needs a lot of thinking” (V)
F2: “The only problem is the time for correction, if I didn’t have anything else and the time is counted on me” (V)
U7: “I do not like to use it, it takes a lot of time” (T)

U13: “In the beginning because I lack experience in using it and lack of experience on how to divide the ideas of the content. So, I found it difficult and wastes my time on how to divide the information” (T)
G2: “This is a problem we face, they are busy, and we are busy” (V)

Some students doubted the feasibility of the concept maps they created because of the lack of details included in the maps. These students did not use their maps while studying. A student raised her concern about creating concept maps in groups and believed that only a couple of students benefit from the discussion rather than the whole group. Some students felt that it was difficult to create concept maps that others would understand, in their opinion, this limits the applicability of concept maps. Graduate students felt that concept maps were over used during the semester, since they were asked to create a concept map in their exams. Faculty had concerns about the students’ abilities to create concept maps, and worried about the students’ acceptance of using concept maps as a teaching and assessment tool. This, in return, limited the faculty’s use of concept maps in their classes.

U17: “Honestly, when I study I do not like to make the map to come back to it. I do it to organize the information and my thoughts so that I can make the connections and memorize at the same time. I do not like to go back to it because it is all brief points, right? And I am a little suspicious and I do not like bullet points. I like to review everything” (T)
U7: “I do not like to use it. It takes a lot of time. Honestly, I do not trust the information I put in the map…But I do it just like this. I do not know, I do not have time. I will not do it, because even during revision I will not consider it as a trusted resource” (T)
U5: “I remembered! We were divided in groups of 5 per map. Some students do not even participate and only two students work on the map. So, the problem is that there is no good division. Only two students will benefit. So, when the doctor divides us, she thinks all the five students benefit. No, only two” (T)
U4: “I felt like there is no need, and it will not benefit me. But I figured out that it will benefit me” (T)
G2: “I think the concept map as a self for the self-learning for me to summarize and understand what I mean my concept map. Maybe others don’t understand unless I explain it” (V)
G1: “I think it’s difficult even with narrative once we put it in the concept map there is so many people who will read it in a different way. Sometimes they didn’t understand, you

understand your concept map but other don't understand your concept map. That makes other confused especially in clinical if we work on one case" (V)
G4: "They give us a big number of concept maps to make we have reached a level where that's it" (V)
G1: "Some they are asking us to do it in our exam. So, at the beginning before answering and write the narrative you have to put your concept map first then after that start to answer" (V)
F3: "Also, honestly, I was worried about the second-year students a lecture as a concept map. And they would do drama on how they will study, and they don't understand, and how will they answer the questions in the exam with only arrows" (V)
F2: "The problem is in the correction and grading and the rubric I changed it multiple times. I had a rubric to grade them then I changed It, so I can be more lenient. But in its grading, or scoring it takes time it's not only giving them feedback" (V)

Some undergraduate students preferred using mind maps instead of concept maps, because information is divided into different sections, making it easier to read. One of the undergraduate students felt that she was "forced" to create concept maps which resulted in limiting her creativity. In agreement, most of the undergraduate students felt obligated to create concept maps, because it was graded. Some undergraduate students did not like creating the concept maps because the faculty asked for a specific topic with specific details and sequence that she required.

U10: "The choice between concept map and mind map, I would choose mind map because everything is in a different section and on its own. But concept map, everything is connected, and my eyes keep going here and there" (T)
U11: "I tried both concept maps and mind maps. The mind map is way easier. The concept map needs work, and I feel it takes time when I use it to study. I do not feel like I have time to do a concept map, then study it then study the details. I do not have time" (T)
U18: "I am forced to use a map, so that when I close my eyes as U_{15} said I will be able to feel it or understand it. But when I cannot understand an information through I am forced to use a map" (T)
U13: "I do not like it when someone requires me to create a map, and then they look into details. I will not be creative. This is what discouraged me" (T)
U18: "They wanted us to do the same sequence in their heads they want it complete. Why did they deduct points on information or words? I do not feel it is for them to know what is in our minds or in our summarization" (T)

Some students felt lost and scattered when looking at a map because there were a lot of lines, and they had to go in different directions to find the information, which was not in detail. A few students felt that they could not understand concept maps. Some students did not know what information should be included or excluded from the concept map. Some students also felt that others would not understand the map unless explained to them. One of the students felt confused when she wanted to choose the color, font, and arrows in her maps, because the look of the map mattered a lot to her. In almost all focus groups, students asked about the differences between mind maps and concept maps.

> G2: "I think too much lines. I feel like it makes you get lost" (V)
> U10: "I may read it better. But still I get mixed up and scattered because my eyes go everywhere" (T)
> U11: "it looks organized, but I do not understand it" (T)
> U9: "The first map had a lot of information, so I did not know what to include and what to exclude. But the next map was simpler because the information was very simple" (T)
> G2: "I think the concept map as a self for the self-learning for me to summarize and understand what I mean my concept map. Maybe others don't understand unless I explain it" (V)
> U2: "The thing I really didn't know what to do about, and went and asked my sister, is what should I color the arrow? Which font should I write the word?… Even the arrow how should the arrow look like? I always do not know what to do, use the pencil and color and all" (T)

Faculty felt that they had a vague understanding of concept maps. One of the faculty who taught undergraduate students felt that regardless of the detailed instructions and feedback she gave the students, the maps were not to the standard she expected.

> F1: "My level of understanding, it moved from 10% to maybe 30%. But I still had a lot of vague" (V)
> F2: "Although I gave them very clear instructions on what I exactly need, but when they submitted the maps they have made changes and the information included is different… Although I tried, and I continuously made discussions with them but still they are unable to imagine the crosslink" (V)

Guidance and support. Most participants believed that they need more practice in using concept maps. Students wanted more guidance on what to include and exclude from concept maps and clarification on the expectations of faculty. One of the undergraduate students suggested having an example of a concept map to follow. Another student suggested that faculty distribute a concept map for the lectures, as a "trustable source".

> F1: "Still, like I said, I need more practice to be more confident" (V)
> U4: "I attended the training. It was enough, but it needed practice. We should have messed around with the program after your training. But I did not" (T)
> U3: "How could I connect something slightly related, or something small to something big. For example, I make a concept map for 5 slides. So how could I relate 60 slides together? I need some help" (T)
> U18: "The map I need, I know what info I want to include. I know what I want to organize, and what I want to reach. But when it is a required map, they do not explain what they want. They just tell us do this using the example. I need more clarification…The bad thing, is that I still feel lost. I want someone to show me the way to do it and I will boost" (T)
> U7: "In high school, sometimes (very rarely) our teacher created a map and distributed it. So, that I use to study from. I used it to study because it is trusted. But, the ones I do and choose the information, I would not trust … If the map is ready, it makes it easier to recall the information even if I was not the one who created the map. If the doctor gave me a simple map I will go back to reading everything, because I want to know why is it like this" (T)

Students expressed their preference to do concept maps as homework rather than in-class activity, and to have submission and topics options. From their experience with in-class activities, the classroom gets out of control. Furthermore, students and faculty explained that classrooms have fixed seating set up in rows, therefore, dividing the students into groups is not convenient for groups in-class activities. One of the faculty recognized the importance of having updated technology and internet available in classroom to be able to implement concept maps. Students showed interest in receiving feedback from faculty to understand not only their grades, but to enhance their learning, but both they and faculty were busy.

U18: “I prefer homework, because in class we will be forced to use the information they give us. If it was homework, I can use my style, her style, my way, her way, I can gather more information. I will benefit more, and it will be more comfortable” (T)
F3: “They want it, if you give them the grade. If it was in the classroom with no books, no don’t give it. But if you give it as a homework we do it at home we think copy from here and discuss then you want to grade us yes” (V)
U16: “I feel homework. And they should not limit us to a specific subject and let us expand even if we google. The most important thing is how I understood the whole subject. Not how they understood it or how they want me to understand it. When they limit me that’s it, my mind stops, I can’t live” (T+V)
“U8: Here in the college? I don’t think it will work
U7: No time
U6: difficult
U8: We are 100 something students. Difficult to control us in silence
U6: If we are to be in groups and the doctor gives us 5 minutes to create them, we take 10 minutes
U8: Some students do not take group work seriously. They talk and laugh
U6: Very difficult to bring us back to the lecture
U8: If it was an assignment, it will be ok. But as an in-class activity, it won’t work
U7: As in-class activity, it is perfect…If it was, it would be nice. But it is difficult because of the time and the chairs” (T)
F4: “The facilities, honestly, doesn’t help. We can’t construct groups, but we made them in lines” (V)
F1: “Concept map is much fruitful when the seating of the students are in an environment that enhance group discussions, and group validation of what we are saying, you know. That I didn’t have because they were seated class room structure was not helpful, the internet present was not helpful… Our classrooms our technical resources have to be updated to the level of demands of the concept map, not only concept map thinking based learning and new teaching methodology today it is linked to artificial intelligence” (V)
G2: “Doctor said who wants feedback come to my office. But we didn’t have time, she didn’t find time, we didn’t find time either. This is a problem we face, they are busy and we are busy” (V)
U18: “After they correct it, they do not tell us our mistakes. So that we learn from them. Even when they deduct any grade, I wish they would tell us what is the mistake? was it the arrow? was it what?” (T)

Faculty felt that there is a need for better faculty preparation through more training on scoring and how to use concept maps in large classrooms. Faculty suggested having a resource person to conduct formal and informal meetings to provide guidance, support, and coaching. Faculty recommended collecting data on students’ results and satisfaction with the use of concept maps. Students’ voices are very important in the college of nursing, and this data will

encourage or discourage faculty from using concept maps. Faculty felt that it is challenging to manage their time with the administrative responsibilities, large classes, and the short lecture time, and believe that those may be reasons for other faculty to use traditional teaching methods.

> F4: "Maybe in the scoring. The scoring part. To be honest, I planned to score but I felt not confident. So, I said no I won't score them. Maybe if we received another training for the second time, maybe advanced. I think, yes, it would be better" (V)
> F4: "Because the training we took introduced concept maps, how to use it. Maybe also, the advance is how to use it as a teaching tool. How to use it in assessment. How to score. What are the uses of concept map. How you can apply it in class. Especially if there is a big class. This is a challenge. When now I have a large number of students, no, I don't want a burden" (V)
> F1: "I mean there are obstacles still for us in the college, I see as a whole, because of the resources and mainly because the faculty preparation" (V)
> F3: "But if you or any expert was here and gave other ideas. You or she will attract my attention and make say wow I never thought about. It would be nice to have an expert with us, and from time to time gives us new" (V)
> F2: "It is, as I told you, shortage of the time because we, as faculty, we are engaged in a lot of thing. Some academic and some non-academic. As you saw we have a meeting and urgent meeting. So, for them to correct for the big number of students it needs time. But I think if they distributed the maps to multiple of the faculty. Not all on one" (V)
> F1: "When u come back, constantly say: once a month we will meet just for concept mapping for whoever want to come. Maybe at the beginning your audience will be 10% then eventually will increase, especially if every meeting you share evidence with them. The word will get to spread" (V)
> F1: "Tangible, in your hands which would be the outcome, and evidence of outcome. Higher scores in students, better satisfaction students. Student is the biggest strongest word of mouth that will advertise for your mission and your methodologies. But that gives me a satisfaction and that word of mouth is enough to give you the reputation that you.. and the power for what you're doing to be more spread. So, I think go to the authority with an evidence of what you're doing.. It is better if you aggregate your evidence with other, so it will not be youred, your idea or yours only. Share that I swear we found this, and this, and this, look at this result, look at this comment, look at this evaluation, that would be much stronger to make it a policy… (consistent)" (V)
> F4: "Maybe for the staff because most of the staff use traditional methods in classes. I mean lectures and that's it. And, to be honest, the students, I feel that they don't like the traditional or lectures with all these numbers. And for me to give the lecture only for an hour or two. I really can't. I think the challenge is the staff not the students" (V)
> F3: "Even, you know, discussion while passing by. By the way there is a new way we can do this, do that, I tried it. Doesn't have to be in a workshop or something big, no one will come, no one will be committed, could be having coffee" (V)

Discussion

This study was designed to understand the perspectives and experiences of using concept maps of Saudi nursing students and faculty at the public university. The results of this study are in congruence with results of other studies and Ausubel's meaningful learning theory (1963). The data revealed three major themes: enablers, constraints, and guidance and support. The study differs in the application of concept maps in a different context. This study adds to the literature by highlighting the differences between students' and faculty's perceptions on the value of concept maps. The study showed the effect of the generational differences between graduate and undergraduate students on their perceptions and experiences on the use of concept maps. From the literature review conducted for this study, four themes emerged: students' training students in groups, teachers' guidance and support, and effect on students. Although the themes' labels may differ, the content or underlying ideas are similar in many ways. The data are discussed using Ausubel's meaningful learning theory (1963) as a lens.

As in other studies (Hsu & Hsieh, 2005; Jaafarpour, Aazami, & Mozafari, 2016; and Martínez-Cañas & Ruíz-Palomino, 2011), this study started by training the participants, both students and faculty, on the use of concept maps as a learning, teaching, and assessment tool. As much as the students training was important, students never expressed any concerns with creating concept maps. The faculty expressed a lot of concerns on scoring concept maps and being fair to the students. Faculty also expressed their need for further training and practice on scoring concept maps. This issue may have surfaced because the faculty at the public university are grades oriented and are used to more traditional teaching methods. As this area has not been explored in depth in the literature, Daley, Morgan, and Beman (2016) have highlighted the need to understand different scoring methods such as hierarchical and relational scoring, and choose

one to use, because each scoring method leads to different results. This implication has brought attention to the faculty's awareness of different scoring methods. Although they were trained on using the hierarchical scoring, the faculty may have found it difficult and challenging to score concept maps because they were combining both relational and hierarchical scoring methods while scoring students' concept maps.

The student participants did not feel that they benefited from creating concept maps in groups, differing from other studies' findings (Buldu & Buldu, 2010; Martínez-Cañas & Ruíz-Palomino, 2011; and Reiska, Soika, Möllits, Rannikmäe, & Soobard, 2015). One possible explanation to this finding may be the size of the group. some students explained that they were assigned to groups of 10 – 17 students, making it difficult for them to effectively communicate and complete the task. Per the literature review, the students were able to understand content better when they engaged in discussions. The student participants in this study felt that when a concept map was assigned as homework, they would then have enough time to complete their work and to have discussions with colleagues. This finding could lead us to an assumption on the importance of discussions among students before and while creating a concept map, regardless of their assignment in groups. It also highlights the importance of providing students with space and time for discussions to come to their own conclusions. In return, this will help them in better understanding the content and in the creation of an individual concept map.

As other studies (Buldu & Buldu, 2010; and Jaafarpour et al.,2016), the participating students felt that they needed the guidance and support of their faculty, especially when the concept map was a graded assignment. Students felt more confident in creating the concept maps for themselves. Students felt that concept maps encouraged them in studying and reviewing for their exams, which is similar to the findings of Buldu and Buldu (2010). Students felt that

creating concept maps has developed their critical thinking skills and thinking processes generally when making connections between information they knew and they were learning. This finding coincides with other studies (Martínez-Cañas & Ruíz-Palomino, 2011; Jaafarpour et al., 2016; and Hsu, Pan, & Hsieh, 2016). Furthermore, these finding support Ausubel's assumptions about meaningful learning occurring when the learner wants to create links in a non-verbatim and substantive way, and the learner has previously known or learned concepts and propositions to link new information and assimilate new ideas (Novak, 1993).

Buldu and Buldu (2010) and Jaafarpour and colleagues (2016) found that creating concept maps is time consuming, which is an identical result to what was found in this study. The students value of the time and benefits from using concept maps varied among participants. Most student participants agreed that the use of concept maps has helped them understand complex content, memorize, review, and remember information. The student participants seemed to find the course content useful to them because they were eager to receive faculty's feedback to understand and learn from their mistakes. The students expressed their eagerness to learn from their courses and to understand them in depth because they believe it will help them in their careers. This fact corresponds with Ausubel's assumption that meaningful learning occurs when the learning material has a significant meaning to the learner (Novak, 1993).

Ingeç (2009) and Wu and colleagues (2012) found that faculty thought providing feedback on concept maps to students is time consuming and caused work overload. In this study, all faculty found providing feedback is a burden especially with the large number of classes they taught. The faculty provided feedback only to the students who reached out during office hours. Keeping in mind the busy schedules of faculty and students, only a few number of students received feedback on their concept maps.

The data of this study confirms the need to understand and differentiate between concept maps and other forms of maps. Because student participants have expressed their inability to differentiate between maps and corresponded it with the faculty's knowledge about different types of maps. This finding could be explained by what Daley, Morgan, and Beman (2016) concluded in their literature review. They found that there have been modifications to the use of concept maps that have led to this confusion. Those modifications have blurred the lines between concept maps and mind maps, because they omitted the use of linking words and eluded the use of cross-links. Daley, Morgan, and Beman (2016) emphasized the importance of conceptually understanding and differentiating between different types of maps including concept maps, mind maps, and conceptual diagrams.

Study implications

This study is anticipated to influence nurse educators' practice in Saudi Arabia. The results help faculty learn more about the nursing students and their learning needs. Understanding the students' needs may influence the faculty's choice of teaching methods when planning for their courses and lessons. This study sheds light on the challenges faced by students during the semester when creating concept maps. Knowing the challenges will help faculty in training the students to minimize the obstacles. The students found it challenging to create concept maps because they lacked guidance and did not understand the expectations of the faculty. It is recommended that faculty provide students with detailed guidelines by providing a rubric with clear specific criteria. Faculty should consider the number of concept maps required from the students, because, as per the results of this study, it is time consuming. Concept maps should be assigned to support pedagogy not as an absolute number. As scoring concept maps has been a significant challenge to all faculty, it is recommended to not grade the students according

to the score of the concept map, rather grade the students on the efforts they have exerted to create the map. The aim of creating concept maps is to assess the students' understanding and ability to make connections between new and old knowledge.

This study opens doors for other studies on concept maps. The results of this study need to be complemented by empirical evidence on the use of concept maps by Saudi Arabian nursing students and faculty. There is a need to explore how the use of concept maps impact the students grades and practice during their clinical exposure. Furthermore, studies could be conducted to explore the effect of using concept maps on the students' cognitive skills; such as critical thinking, problem solving, decision making, and clinical judgment.

This study has implications on faculty development and motivation policies. Faculty who participated in this study have showed high interest in developing and learning new teaching methodologies. They have also expressed that other faculty may be interested if they had less non-academic responsibilities. On the other hand, the literature indicates professional development that leads to a higher quality of faculty has shown to be vital in the improvement of students' learning outcomes (National Research Council, 1999; and Sullivan, 1999). Hsieh (2007) assumes that if faculty enjoy how they teach they will be motivated to apply the method to other courses they teach and share it with their colleagues. It is vital to review current policies, apply them to encourage faculty development and increase their motivation levels to use different teaching methodologies that would foster and promote meaningful learning.

Dissemination of findings

The plan is to submit the study to high impact journals; such as Nurse Education Today, Journal of Nursing Scholarship, Nurse Education in Practice, Nursing Education Perspectives, and the Journal of Nursing Education. Journals that are interested in nursing education were

deliberately chosen to ensure their interest in the same area of research. The plan is to initially submit to Nurse Education Today by following their author guidelines for writing up the dissertation chapter. Their author guidelines are clear to follow. The word count is 3500-5000 including abstract and references. They have no specific guidelines for a referencing system. They require consistency in referencing, and they will apply their own referencing style at the proofing stage. If after review and resubmission, the manuscript is not accepted, the plan is to submit to the Journal of Nursing Scholarship.

Conclusion

This study makes two major contributions to the research on the use of concept maps in nursing education. First, the study fills a gap in the literature about nursing education in Saudi Arabia. This study adds to the literature by highlighting the differences between students' and faculty's perceptions on the value of concept maps. The literature about nursing education in Saudi Arabia is minimal and limited. As Saudi Arabia is considered a developing country, conducting research is fundamental for its development. It is known globally, that education fosters and promotes development. Therefore, conducting a study that aims at enhancing the educational system will be beneficial for the development of the society and their practice. Second, the study contributes findings to the literature on meaningful learning using concept maps. Meaningful learning is known to develop, improve and enhance cognitive skills such as critical thinking, problem solving and decision making. Promoting meaningful learning will empower and equip individuals with the skills needed in practice. When meaningful learning is used in nursing education, nursing students will be able to better translate theoretical knowledge to practice. ideally, the outcome will be improved patient outcomes.

References

Adler, P., & Adler , P. (2012). Expert voices. In S. Baker, & R. Edwards, *How many qualitative interviews is enough? Expert voices and early career reflections on sampling and cases in qualitative research* (pp. 8-11). Southampton: The National Centre for Research Methods Review Paper.

Aljohani, W. (2013). The effects of teaching strategies on Saudi nursing students' critical thinking and academic performance: Introducing PBL elements into a traditional course. *White Rose: eThesis Online*. Sheffield, UK: University of Sheffield.

All, A., Huycke, L., & Fisher, M. (2003). Instructional tools for nursing education: Concept maps. *Nursing Education Perspectives, 24*(6), 311 - 317.

Andersson, P., & Edberg, A. (2012). Swedish nursing students' experience of aspects for their learning process and their ability to handle the complexity of nursing degree program. *Nurse Education Today, 32*(4), 453 - 457.

Ausubel, D. (1963). *The psychology of meaningful verbal learning.* New York: Grune & Stratton, Inc.

Ausubel, D., Novak, J., & Hanesian, H. (1978). *Educational psychology: A cognitive view* (2nd ed.). New York: Holt, Rinehart and Winston, Inc.

Biggs, J. (2003). *Teaching for quality learning at university* (2nd ed.). Buckingham: Open University Press.

Buldu, M., & Buldu, N. (2010). Concept mapping as a formative assessment in college classrooms: Measuring usefulness and student satisfaction. *Procedia Social and Behavioral Sciences, 2*, 2099 - 2104.

Cañas, A., Coffey, J., Carnot, M., Feltovich, P., Hoffman, R., Feltovich, J., & Novak, J. (2003). *A summary of literature pertaining to the use of concept mapping techniques and technologies for education and performance support.* The Institute for Human and Machine Cognition, Pensacola.

Carnot, M., Dunn, B., & Cañas, A. (2001). Concept map-based vs. web page-based interfaces in search and browsing. *Proceedings of the Nineteenth International Conference on Technology and Education.* Tallahassee: Institute for Human and Machine Cognition.

Clayton, L. (2006). Concept mapping: An effective, active teaching-learning method. *Nursing Education Perspectives, 27*(4), 197 - 203.

Clerehan, R., McCall, L., McKenna, L., & Alshahrani, K. (2011). Saudi Arabian nurses' experiences of studying Masters degrees in Australia. *International Nursing Review, 59*, 215 - 221.

Daley, B. (1996). Concept maps: Linking nursing theory to clinical nursing practice. *The Journal of Continuing Education in Nursing, 27*(1), 17-27.

Daley, B., Morgan , S., & Beman, S. (2016). Concept maps in nursing education: A historical literature review and research directions. *Journal of Nursing Education, 55*(11), 631 - 639.

Daley, B., Shaw, C., Balistrieri, T., Glasenapp, K., & Piacentine, L. (1999). Concept maps: A strategy to teach and evaluate critical thinking. *Journal of Nursing Education, 8*(1), 42 - 47.

Fielden, J. (2012). Managing the transition of Saudi new graduate nurses into clinical practice in the Kingdom of Saudi Arabia. *Journal of Nursing Management, 20*, 28 - 37.

Finch, H., Lewis, J., & Turley, C. (2014). Focus groups. In J. Ritchie, J. Lewis, C. Nicholls, & R. Ormston, *Qualitative research practice: A guide for social science students and researchers* (2nd ed.). Sage Publications Ltd.

Flick, U. (2009). *An introduction to qualitative research* (4th ed.). London: Sage.

Gonza´lez, H., Palencia, A., Uman˜a, L., Galindo, L., & Villafrade, L. (2008). Mediated learning experience and concept maps: A pedagogical tool for achieving meaningful learning in medical physiology students. *Advances in Physiology Education, 32*, 312- 316.

Gul, R., Cassum, S., & Ajani, K. (2009). Concept mapping strategy: An attempt to transform rote-learners into critical thinkers . *Pakistan Association of research and education Research Bulletin, 1*(1), 20- 29.

Hsieh, M. (2007). *Profitability and compatibility factors explaining faculty's post-adoption behaviors of teaching and learning innovations in research one universities.* Retrieved March 2018, from ProQuest Dissertations & Theses Global: https://search-proquest-com.ezproxy.lib.uwm.edu/pqdtglobal/docview/304822105/fulltextPDF/20B7D646C243452DPQ/1?accountid=15078

Hsu, L., & Hsieh, S. (2005). Concept maps as an assessment tool in a nursing course. *Journal of Professional Nursing, 21*(3), 141-149.

Hsu, L., Pan, H., & Hsieh, S. (2016). Randomized comparison between objective-based lectures and outcome-based concept mapping for teaching neurological care to nursing students. *Nurse Education Today, 37*, 83 - 90.

Ingeç, S. (2009). Analysing concept maps as an assessment tool in teaching physics and comparison with the achievement tests. *International Journal of Science Education, 31*(14), 1897- 1915.

Irvine, L. (1995). Can concept mapping be used to promote meaningful leaming in nurse education? *Journal of Advanced Nursing, 21*, 1175 - 1179.

Jaafarpour, M., Aazami, S., & Mozafari, M. (2016). Does concept mapping enhance learning outcome of nursing students? *Nurse Education Today, 36*, 129 - 132.

Jonassen , D., & Wang, S. (1993). Acquiring structural knowledge from semantically structured hypertext. *Journal of Computer-Based Instruction, 20*(1), 1- 8.

Lauder, W. R. (1999). Transfer of knowledge and skills: Some implications for nursing and nurse education. *Nurse Education Today, 19*(6), 480-487.

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry.* Newbury Park: Sage.

Martínez-Cañas, R., & Ruíz-Palomino, P. (2011). Concept mapping as a learning tool for the employment relations degree. *Journal of International Education Research, 7*(5), 23 - 27.

Mayor, R. (2002). Rote versus meaningful learning. *Theory into Practice, 41*(4), 226 - 232.

Merriam, S., Caffarella, R., & Baumgartner, L. (2007). *Learning in adulthood: A comprehensive Guide* (3rd ed.). San Francisco, CA: Jossey-Bass.

National Research Council. (1999). *Starting out right: a guide to promoting children's reading success.* Washington DC: National Academy Press.

Novak, J. (1993). A view on the current status of Ausubel's assimilation theory of learning. *The Proceedings of the Third International Seminar on Misconceptions and Educational Strategies in Science and Mathematics.* Ithaca: Misconceptions Trust.

Novak, J. (2011). A theory of education: Meaningful learning underlies the constructive integration of thinking, feeling, and acting leading to empowerment for commitment and responsibility. *Meaningful Learning Review, 1*(2), 1 - 14.

Novak, J., & Cañas, A. (2006). *The theory underlying concept maps and how to construct them.* Technical Report IHMC CmapTools 2006-01. Florida Institute for Human and Machine Cognition.

Novak, J., & Gowin, D. (1984). *Learning how to learn.* New York: Cambridge University Press.

Ormston, R., Spencer, L., Barnard, M., & Snape D. (2014). The foundations of qualitative research. In J. Richie, J. Lewis, C. Nicholls, & R. Ormston, *Qualitative research practice: A guide for social science students and researchers* (2nd ed.). London: Sage.

Polit, D., & Beck, C. (2013). *Nursing research: Generating and assessing evidence for nursing practice* (9th ed.). Philadelphia: Lippincott Williams and Williams.

Ragin, C. (2012). Expert voices. In S. Baker, & R. Edwards, *How many qualitative interviews is enough? Expert voices and early career reflections on sampling and cases in qualitative research* (p. 34). Southampton: The National Centre for Research Methods Review Paper.

Reiska, P., Soika, K., Möllits, A., Rannikmäe, M., & Soobard, R. (2015). Using concept mapping method for assessing students' scientific literacy. *Procedia Social and Behavioral Sciences, 177,* 352 - 357.

Sandelowski, M. (2000). Focus on research methods: Whatever happened to qualitative description? *Research in Nursing and Health, 23,* 334 - 340.

Sandelowski, M., & Leeman, J. (2012). Writing usable qualitative health research findings. *Qualitative Health Research, 22*(10), 1404 - 1413.

Shenton, A. (2004). Strategies for ensuring trusworthiness in qualitative research projects. *Education for Information, 22,* 63- 75.

Shinnick, M., Woo, M., & Mentes, J. (2011). Human patient simulation: State of the science in prelicensure nursing education. *Journal of Nursing Education, 50*(2), 65 - 72.

Sinuff , T., Kahnamoui, K., Cook, D., Luce , J., & Levy, M. (2004). Values ethics, & rationing in critical care task, force rationing critical care beds: A systematic review. *Critical Care Medicine, 32*(7), 1588 - 1597.

Sullivan, B. (1999). *Professional development the linchpin of teacher quality*. Retrieved 07 02, 2017, from ASCD: http://www.ascd.org/publications/newsletters/policy-priorities/aug99/num18/toc.aspx

Spencer, L., Ritchie, J., Ormston, R., O'Connor, W., & Barnard, M. (2014). Analysis: Principles and processes. In J. Ritchie, J. Lewis, C. Nicholls, & R. Ormston, *Qualitative research practice: A guide for social science students and researchers* (2nd ed.). London: Sage.

Vallori, A. (2014). Meaningful learning in practice. *Journal of Education and Human Development, 3*(4), 199-209.

Wilkes, L., Cooper, K., Lewin , J., & Batts, J. (1999). Concept mapping: Promoting science learning in BN learners in Australia. *Journal of Continuing Education in Nursing, 30*(1), 37 - 44.

Wu, P., Hwang, G., Milrad, M., Ke, H., & Huang, Y. (2012). An innovative concept map approach for improving students' learning performance with an instant feedback mechanism. *British Journal of Educational Technology, 43*(2), 217- 232.

Yeo, A., Legard, R., Keegan, J., Ward, K., Nicholls, C., & Lewis, J. (2014). In-depth interviews. In J. Ritchie, J. Lewis, C. Nicholls, & R. Ormston, *Qualitative research practice: A guide for social science students and researchers* (2nd ed.). London: Sage.

Appendix A – Faculty recruitment script

Faculty recruitment script

Good morning my dear colleagues. I am Duaa Amr Hafez. I am currently a PhD student at UWM university specializing in nursing education, and a future colleague of you. In fulfillment of the PhD requirements, I am conducting a research study on promoting meaningful learning through the use of concept maps.

The purpose of this descriptive study is to explore the experiences and perspectives of undergraduate and/or graduate nursing students and faculty on the use of concept maps as a learning tool by students, and as an assessment tool by faculty offered at the nursing college in a public university in Jeddah, Saudi Arabia. At this stage, meaningful learning is defined as the ability of students to make sense of the content learned in-class, and their ability to recall the information during their clinical exposure. Furthermore, concept maps are defined as a visual image of the student's cognitive structure that presents the student's understanding and ability to assimilate knowledge. Concept maps are known to be used as a teaching, learning, and assessment tool.

In this study, I aim to explore the perceptions of nursing students and faculty on the use of concept maps as a learning, teaching and assessment tool. Furthermore, I aim to understand the experiences of nursing students and faculty with the use of concept maps.

As per the arrangements done with the nursing college's administration, I have trained both faculty and students (2^{nd} and 4^{th} year, and graduate) on the use of concept maps. Faculty interested in the use of concept maps were encouraged to use concept maps as a teaching tool during their lecture. Furthermore, they were required to mandate the students to create 4 concept maps during the semester, provide feedback, and use the students' concept maps to assess the students' understanding.

To answer the question of my study "what are the experiences and perspectives of Saudi nursing students and faculty after the use of concept maps as a teaching, learning and assessment tool?", I plan to collect data from faculty through individual in-depth interviews. The interview will include questions about your teaching experience using concept maps. The interview will be scheduled with you according to your convenience of date, time and location. The interview will be audio recorded, translated (if needed), and transcribed. I will share with you the transcription, once it is completed for your final approval (after the break).

I would like to know:

1. How many faculty have used concept maps as a teaching tool during their lecture? (raise hands please)
2. How many faculty required students to create concept maps? (raise hands please)

The faculty who have not used concept maps could be dismissed. Thank you for your time, and I hope we cooperate in the future. The faculty who implemented concept maps will be asked if they were interested in participating in the study. Then I will ask the following questions, to be able to arrange with them to recruit the students:

1. Which student level did you implement the use of concept maps with?
2. How many times have you used concept maps as a teaching tool?
3. How many times have you used concept maps as an assessment tool? Or required students to create concept maps?

I would like to arrange with you to recruit the students. I would like you to introduce me to the students, then leave me with the students to introduce my study and recruit the students for the study. I would like to maintain the students' confidentiality; hence, you will not be informed about the names of the participating students. Furthermore, I would like to arrange with you a date and time for the interview as per your convenience. I would prefer it to be during the weeks of 12/17/2017 and 12/28/2017, please. I will provide you with the consent now, and will go over it and answer your questions before signing the consent on the day of the interview. I will also ask the faculty to provide the best way of contact, to confirm the interview appointment one day prior to it.

Thank you for your cooperation.

Have a good day

Appendix B – Faculty consent

University of Wisconsin – Milwaukee
Consent to Participate in Interview Research

Study Title: Promoting meaningful learning through the use of concept maps
Person Responsible for Research: Ms. Duaa Amr Hafez
Study Description: The purpose of this research study is to explore the experiences and perspectives of undergraduate and/or graduate nursing students and faculty on the use of concept maps as a learning tool by students, and as an assessment tool by faculty offered at the nursing college in a public university Jeddah, Saudi Arabia. Approximately 29 subjects will participate in this study. If you agree to participate, you will be asked to participate in an interview. During this interview, you will be asked questions about your teaching experience and perspectives on the use of concept maps during the semester. This will take approximately 30-45 minutes of your time. The interview will take place in a private location and it will be audio recorded.
Risks / Benefits: Risks that you may experience from participating are considered minimal. There will be no costs for participating. Benefits of participating include improving the teaching and learning experiences of the participants, the continuation of using concept maps as a teaching, learning, and assessment tool, and the improvement of the training used to introduce concept maps.
Once individual interviews are completed, each participant will be given a gift card, pre-paid phone card, or a beauty coupon. The value will be in 50 Saudi Riyals. No extra credits will be given to participants.
Confidentiality: During the interview your name will not be used. Your responses will be treated as confidential and any use of your name and or identifying information about anyone else will be removed during the transcription process so that the transcript of our conversation is de-identified. All study results will be reported without identifying information so that no one viewing the results will ever be able to match you with your responses. Direct quotes may be used in publications or presentations. Data from this study will be saved on my personal computer. The data will be secured by using different passwords to access the computer and recordings. The recorded data will be stored until the study is completed and published. Only Ms. Duaa will have access to your information. However, for translation, transcription, and analysis purposes the data may be shared with the research assistant and major professor.
Voluntary Participation: Your participation in this study is voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the public university or University of Wisconsin- Milwaukee. There are no known alternatives available to participating in this research study other than not taking part.
Who do I contact for questions about the study: For more information about the study or study procedures, contact Ms. Duaa Amr Hafez at d.a.hafez@hotmail.com and/or +966541403610.
Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at 414-229-3173 or irbinfo@uwm.edu. Please use English language if you contact UWM IRB. Also, you can contact KAU IRB at kauh.rec@hotmail.com.
Research Subject's Consent to Participate in Research:

To voluntarily agree to take part in this study, you must be 18 years of age or older. By signing the consent form, you are giving your consent to voluntarily participate in this research project.

_____

Printed Name of Subject/Legally Authorized Representative

_____ _____

Signature of Subject/Legally Authorized Representative Date

Appendix C – Students recruitment script

Students recruitment script

Good morning. I am Duaa Amr Hafez. I am currently a PhD student at UWM university specializing in nursing education, and a future faculty in the college of nursing. In fulfillment of the PhD requirements, I am conducting a research study on promoting meaningful learning through the use of concept maps.

The purpose of this descriptive study is to explore the experiences and perspectives of undergraduate and/or graduate nursing students and faculty on the use of concept maps as a learning tool by students, and as an assessment tool by faculty offered at the nursing college in a public university in Jeddah, Saudi Arabia. At this stage, meaningful learning is defined as the ability of students to make sense of the content learned in-class, and their ability to recall the information during their clinical exposure. Furthermore, concept maps are defined as a visual image of the student's cognitive structure that presents the student's understanding and ability to assimilate knowledge. Concept maps are known to be used as a teaching, learning, and assessment tool.

In this study, I aim to explore the perceptions of nursing students and faculty on the use of concept maps as a learning, teaching and assessment tool. Furthermore, I aim to understand the experiences of nursing students and faculty with the use of concept maps.

As per the arrangements done with the nursing college's administration, I have trained both faculty and students on the use of concept maps. Faculty interested in the use of concept maps were encouraged to use concept maps as a teaching tool during their lecture. Furthermore, they were required to mandate the students to create 4 concept maps during the semester, provide feedback, and use the students' concept maps to assess the students' understanding.

To answer the question of my study "what are the experiences and perspectives of Saudi nursing students and faculty after the use of concept maps as a teaching, learning and assessment tool?", I plan to collect data from students through focus group interviews. The focus group interview will include questions about your learning experience using concept maps. The interview will be scheduled with you during the weeks of your OSCE and OSPE exams according to your convenience of date, and time. The focus group interview will be audio recorded, translated (if needed), and transcribed. I will share with you the transcription, once it is completed for your final approval (after the break).

I would like to highlight that your participation in the study is voluntary. Also, your participation will not affect your grades in no way. The faculty will not be informed about who participated, and who did not. Lastly, I will recruit 20 – 25 students for this study. Each focus group will contain 4-5 students.

I would like to know:

1. How many students created 4 concept maps? (raise hands please)
2. How many students would like to participate? (raise hands please)

If the number of students was more than 20, I will follow the following procedure. I would like you to pass down this bowl and withdraw one paper. If the paper states "in the study" please stay in the room. If the paper states "not in the study", thank you very much for listening, and you can leave the room.

For students who remain in the room, I will arrange with them a date and time for the focus group interview as per their convenience and schedule. The focus group interview should be during the weeks of 12/17/2017 and 12/28/2017. I will provide you with the consent now, and

will go over it and answer your questions before signing the consent on the day of the focus group interview. I will also ask the students to provide the best way of contact, to confirm the focus group interview appointment one day prior to it.
Thank you for your cooperation.
Have a good day.

Appendix D – Students consent

University of Wisconsin – Milwaukee

Consent to Participate in Focus Group Research

Study Title: Promoting meaningful learning through the use of concept maps

Person Responsible for Research: Ms. Duaa Amr Hafez

Study Description: The purpose of this research study is to explore the experiences and perspectives of undergraduate and/or graduate nursing students and faculty on the use of concept maps as a learning tool by students, and as an assessment tool by faculty offered at the nursing college in a public university Jeddah, Saudi Arabia. Approximately 29 subjects will participate in this study. If you agree to participate, you will be asked to participate in a focus group. A focus group is a discussion with a group of people about a certain topic. In this focus group, you will be asked to discuss/share your experiences about your learning experience and perspectives on the use of concept maps during the semester. This will take approximately one hour of your time and the focus group discussion will be audio recorded.

Risks / Benefits: Risks that you may experience from participating are considered minimal. There may be some questions that make you uncomfortable and you can feel free not to answer those questions. With focus groups, there is always the risk that someone in the group will share your responses with others who were not in the group. In order to minimize this risk please do not share anything you do not want others to know. There will be are no costs for participating. Benefits of participating include improving the teaching and learning experiences of the participants, the continuation of using concept maps as a teaching, learning, and assessment tool, and the improvement of the training used to introduce concept maps.

Once focus groups are completed, each participant will be given a gift card, pre-paid phone card, or a beauty coupon. The value will be in 50 Saudi Riyals. No extra credits will be given to participants.

Confidentiality: In the focus group your name will not be used. Each participant will choose a pseudonym to use throughout the discussion. You will be encouraged to say your pseudonym before each time you speak during the discussion to decrease the confusion during translation and transcription of the focus group interview. Due to the group nature of the focus group, confidentiality cannot be guaranteed. Your responses will be treated as confidential and any use of your name and or identifying information about you or anyone else will be removed during the transcription process so that the transcript of the group conversation is de-identified. All study results will be reported without identifying information so that no one viewing the results will ever be able to match you with your responses. Direct quotes may be used in publications or presentations. Data from this study will be saved on my personal computer. The data will be secured by using different passwords to access the computer and recordings. The recorded data will be stored until the study is completed and published. Only Ms. Duaa will have access to your information. However, for translation, transcription, and analysis purposes the data may be shared with the research assistant and major professor.

Voluntary Participation: Your participation in this study is voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with the public university or University of Wisconsin- Milwaukee. There are no known alternatives available to participating in this research study other than not taking part.

Who do I contact for questions about the study: For more information about the study or study procedures, contact Ms. Duaa Amr Hafez at d.a.hafez@hotmail.com and/or +966541403610.

Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at 414-229-3173 or irbinfo@uwm.edu. Please use English language if you contact UWM IRB. Also, you can contact KAU IRB at kauh.rec@hotmail.com.

Research Subject's Consent to Participate in Research:

To voluntarily agree to take part in this study, you must be 18 years of age or older. By signing the consent form, you are giving your consent to voluntarily participate in this research project.

_____

Printed Name of Subject/Legally Authorized Representative

_____ _____

Signature of Subject/Legally Authorized Representative Date

Table 1 – Participants' demographics

Number of participants (n=26):

Group	No. participants	Total
Grad	4	4
Undergrad 1	4	18
Undergrad 2	4	
Undergrad 3	4	
Undergrad 4	6	
Total no. of students		22
Faculty	4	4
Grand total		26

School for undergraduates (n=18):

School	No.	Total
Public	13 = 72%	18
Private	5 = 28%	

Type of schooling for undergraduates (n=18):

Type	No.	Total
Curriculum	14 = 78%	18
Regular	4 = 22%	

College for graduates (n=4):

College	No.	Total
Public	4	4
Private	0	

Years of experience for graduates (n=4):

Years	No.	Total
7 years	1	4
5 years	1	
1 year	1	
No experience but internship	1	

Levels and specialty of graduates (n=4):

Specialty	No.	Total
3rd level administration	2	4
3rd level maternity	2	

Faculty's years of experience (n=4):

Years	No.	Total
20	1	4
30	1	
0	1	
3	1	

Faculty's level of education (n=4):

Level of education	No.	Total
PhD	3 = 75%	4
Masters	1 = 25%	

Students' levels faculty taught (n=4)

Students' level	No.	Total
Undergraduate	2 = 50%	4
Graduate	2 = 50%	

Appendix E – Students focus group interviews guide

Stage 1 Scene setting and ground rules	Hello, my name is Duaa Hafez, I thank you all for being here and agreeing to be a part of my research study. I would like to remind you that participation is voluntary and there is no right or wrong answer. I am interested to listen to and know all your points of views, so do not hesitate to participate. Also, please maintain respect for others, whether you agree or disagree and express that in a respectful manner. The discussion will be recorded because I will not be able to write all your words during the discussion. The recordings will be saved with me, and heard and transcribed by me and possibly by my research assistant and/or major professor for data transcription and analysis purposes. Therefore, it will be beneficial if you do not talk over each other. Please use the pseudonyms that were assigned to you at the beginning of the semester and used for your maps, that will ensure that your identity is anonymous. The discussion we have will stay in this circle and confidential. I, kindly, ask each one of you to not take the discussion out of this room, please. Lastly, I would like to confirm the language you prefer to conduct the discussion with; would you prefer Arabic, English, or both?

Stage 2 Individual introductions	I will switch on the recorder, then I will ask the participants to introduce themselves. I will ask them to use the pseudonyms in their introduction and talk about the following: age, type of school of graduation (private, public), no. of years in the school, no. of years of experience, and any other information they would like to share. I will welcome them in the session and introduce my research topic: "Welcome everyone, the group here is versatile. Most of you seem to be in the same cohort, similar age, and experience. It seems like you have studied in different types of schools, also. This will be very beneficial for the discussion and will allow a variety of opinions and experiences. We may learn a lot from each other". I will also say: "Today, I would like to know and understand your experience with learning during high school, college, and after using the concept maps as a learning tool. I would like to explore your perspectives on the use of concept maps, and if you think you would like to use them in the future".
Stage 3 The opening topic	• I would like you to tell me about your learning experience in high school. (How did teachers teach you? How did you learn / study?) • I would like you to tell me about your learning experience in the nursing college (How do teachers teach you? How do you learn / study?) • How are they similar or different? Which learning experience is more significant? Or which learning/ teaching method do you prefer?

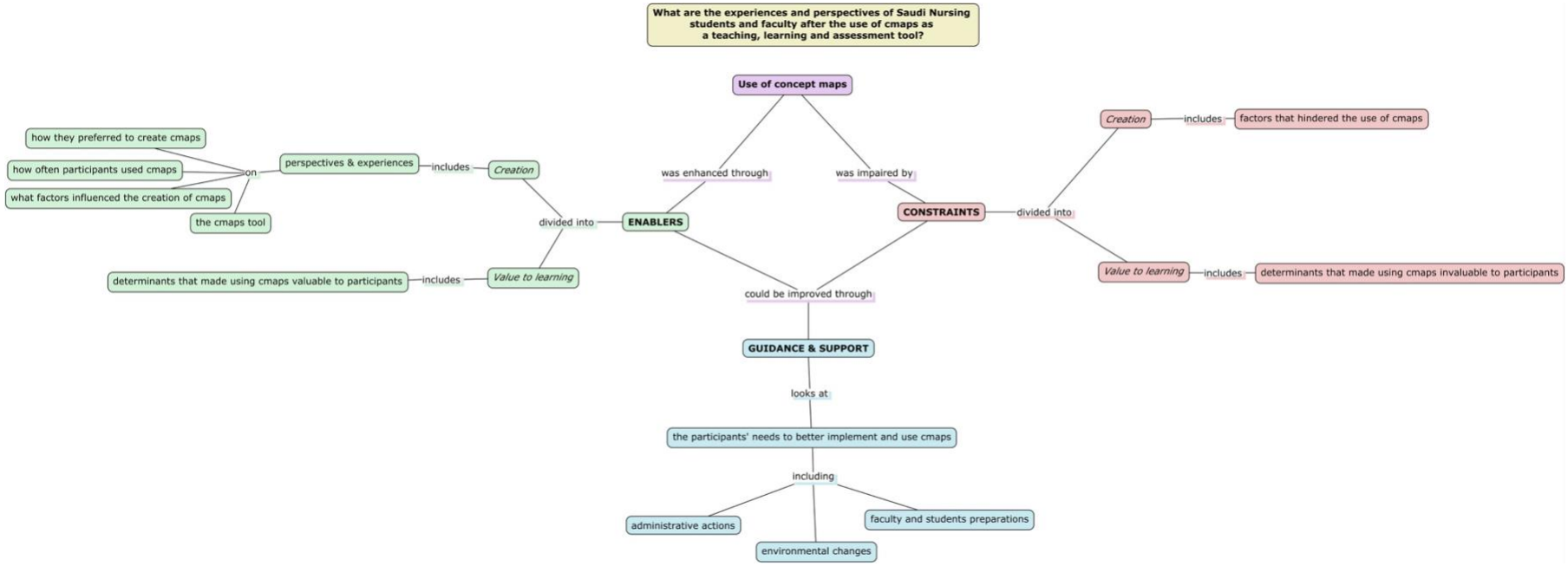
Stage 4 Discussion	• Tell me about your experience with concept maps. • How did the use of concept maps make a difference in your learning experience? • How did it affect your learning experience? • How did you feel while creating your first concept map? • Did those feelings change over time? Explain please • What were the challenges you faced while creating concept maps? • What support and guidance you suggest to be offered to you on the use of concept maps? • What could have been done differently in introducing concept maps to you? • What was the best and worst thing about using concept maps as a learning tool? • What was the influence of using concept maps on your clinical exposure? • What was the effect of the feedback you received on your learning and understanding of course content? • Would you choose to use it in your future learning? Why and why not? • Would you recommend using concept maps for other courses? Why and why not? Would you recommend using concept maps to your colleagues? Why and why not?
Stage 5 Ending the discussion	• Is there any more information you feel you would like to share? • How do you feel/ think the flow of the interview went? Thank you very much for sharing your experience. I will provide you with my feedback once the transcribing is complete, for your approval. Please let me know if I could be of any assistance.

Appendix F – Faculty individual interviews guide

Stage 1 Introduction	Hello, my name is Duaa Hafez, I thank you for being here and agreeing to be a part of my research study. How has your day been? I hope you had a pleasant one.
Stage 2 Introducing the research	I am interested in exploring and understanding your experience and perspective on using concept maps as a teaching and assessment tool. Therefore, I will be asking you questions pertaining to that aim. I would like to remind you that participation is voluntary and there is no right or wrong answer. I am interested to know and understand your points of view and experience. The interview will be recorded because I will not be able to write all your words during the discussion. The recordings will be saved with me, and heard and transcribed by me and possibly by my research assistant and/or major professor for data transcription and analysis purposes. I will use pseudonym that will ensure that your identity is anonymous. Lastly, I would like to confirm the language you prefer to conduct the discussion with; would you prefer Arabic, English, or both?
Stage 3 Beginning the interview	• What is your philosophical underpinning to your teaching? Tell me more about that • Tell me about your experience as a teacher • Give me an example/ story where you were satisfied with your teaching • Give me an example/ story where you were unsatisfied with your teaching • Give me an example/ story where you were satisfied with your students' results • Give me an example/ story where you were discouraged/ disappointed with your students' results

Stage 4 During the interview	• Tell me about your experience with concept maps. • How did the use of concept maps correspond/ relate to your teaching philosophical underpinning? • How did the use of concept maps influence/ impact your teaching experience? • How did you feel while creating your first concept map? • Did those feelings change over time? Explain please • What were the challenges you faced while creating concept maps? • What could have been done differently in introducing concept maps to you? • How do you think the use of concept maps influenced/ impacted the students' learning and clinical experience? • How do you think the use of concept mapping influenced the students' grades? • Tell me about your experience with grading the students' concept maps • Tell me about your experience with using concept maps as an assessment tool • Tell me about your experience with giving feedback to students • What were the best and worst things about using concept maps as a teaching tool? • What were the best and worst things about using concept maps as an assessment tool? • Would you choose to use it in your future teaching? Why and why not? • Would you recommend using concept maps for other courses? Why and why not? • In your perspective, how do you think other faculty will react to the idea of concept mapping? • In your opinion, what are the challenges that may be faced in introducing the use of concept maps in the college of nursing for all the courses?
Stage 5 Ending the interview	• Could you please share your suggestions and recommendations on the introduction and use of concept maps? • Is there any more information you feel you would like to share? • How do you feel/ think the flow of the interview went?
Stage 6 After the interview	Thank you very much for sharing your experience. I will provide you with my feedback once the transcribing is complete, for your approval. Please let me know if I could be of any assistance.

Appendix G – Results concept map



CHAPTER 5

CONCLUSION AND IMPLICATIONS

Promoting Meaningful Learning through the Use of Concept Maps

This research explored meaningful learning and concept maps from different aspects. The aims of this research were to provide nurse educators with a review of the literature on meaningful learning and concept maps, and an indepth understanding of meaningful learning through a concept analysis. This research also aimed to explore the experiences and perspectives of Saudi nursing students and faculty after the use of concept maps. The research revealed significant data that has policy, practice and research implications. In this chapter, the implications and recommendations will be discussed.

Summary of findings

The results of the literature review indicate that there are several factors that could influence the students' experience with concept maps; students training, students in groups, and teachers' roles. Furthermore, the literature review showed inconclusive results of the effect of using concept maps on students hierarchical scoring. The analysis of the concept of meaningful learning indicates that meaningful learning is influenced by the teacher, the learning material, and learning abilities of the student. It also shows that meaningful learning is the starting point for other cognitive skills to develop and grow within the cognitive structure. Meaningful learning cannot be seen because it is a cognitive process, however, could be recognized through visible attributes, including clinical reasoning, clinical judgment, decision making, application of knowledge and generalization of skills, and courageousness and self-awareness. The pilot study showed that there were enablers and constraints that influenced Saudi nursing students and faculty in using concept maps. Furthermore, there was a high need for guidance and support that could have made their experience more efficient and effective.

These results highlight the roles and responsibilities of the students, faculty, and administration in the educational process. The implications and recommendations should have an effect on the learning, teaching, and leadership experiences of all individuals involved in the educational process.

Implications on policy

Motivation. The constraints and guidance and support themes that were identified in the pilot study have shown that faculty motivation plays a role in the development and improvement of the educational experience of students and faculty. All 35 faculty in the college of nursing were trained on using concept maps. Only the 4 faculty who used concept maps during the semester participated in the study. The faculty have expressed that other faculty may have not used concept maps because they do not want to be over loaded with more work responsibilities, regardless of its benefits to students. This issue could be related to the internal and external motivators affecting the faculty's decision to use concept maps in their teaching and assessment of students. If faculty do not percieve a direct benefit to them (external motivator), and are not interested (internal motivator), they are more likely to resist making changes in their teaching and assessment methods.

Internal motivation is "when the source of motivation lies within the individual and task" (Ormrod, 2012, p. 428). External motivation is "when the source of motivation lies outside the individual and the task being performed" (Ormrod, 2012, p. 428). The literature highlights the importance of considering the internal and external motivators affecting faculty to be able to professionally develop the faculty and educational programs, which in return improve students outcomes (Abdul Cader, 2012; and Lian, 2014). Abdul Cader (2012) found that faculty of different Saudi universities were internally motivated to teach, because they were passionate

about teaching, they felt proud to teach, and because of students' achievements. Faculty were not externally motivated to participate in any activity outside their classrooms, for example improving the educational program in which they were teaching (Abdul Cader, 2012). Abdul Cader (2012) identified financial incentives as one of the strongest external motivators for the faculty included in his study. Abdul Cader (2012) acknowledged that administrative support and recognition play a huge role in motivating the faculty to participate in making decisions and changes in the educational programs. Celikoz (2010) found that external motivators affect the faculty's performance and productivity.

Although there is a knowledge deficit, unless attention is paid to motivating factors, successful implementation is unlikely. As financial incentives seem to be one of the main external motivators consistent with cultural norms, the administration could consider providing faculty with gift books, luncheon, or gift cards. Each faculty could be given an opportunity to attend a symposium, conference, or a training outside the university that is fully sponsored where travel, accommodation, and fees are paid by the college of nursing. Recognition by administrators is another external motivator that was identified from the pilot study. Administrators should consider creating a policy that explains the criteria for "the teacher of the semester" honors. The criteria could include students' evaluations and achievements, and the supervisor's evaluation or recommendations. The administration could have a board that is designated for the honors, and post the faculty's picture every semester or year. The feeling of being recognized by the administrators and students may encourage and motivate faculty to participate in and outside of classrooms and have greater input in the college. The support of administrators is another identified issue in the pilot study. Administrators should dedicate time to meet with faculty and discuss issues and achievements of the faculty. Administrators should

also consider the faculty's opinions in decision making and use their proposals of new developments to enhance the educational experiences of both faculty and students. Administrative support and inclusion of faculty in decision making will result in feeling a sense of belonging and achievement by the faculty, hence, encourages the faculty to be involved in different activities outside the classroom (Abdul Cader, 2012).

Professional Development. Professional development has shown to be important to the faculty of the college of nursing from the results of the pilot study. Faculty were eager to learn about new teaching methodologies. They expressed the need to receive further training on concept maps. From the experience of conducting the pilot study, there should be changes made to the training provided to the faculty. The faculty should be provided with more hands-on practice on creating, scoring, and using concept maps. The literature showed that it is important to understand and recognize the difference between different types of maps and their uses (Daley, Morgan , & Beman, 2016). Professional development that leads to higher quality of faculty has shown to be vital in the improvement of students' learning outcomes (National Research Council, 1999; and Sullivan, 1999). Elliott and Oliver (2015) found that students' successes and perceptions of the faculty's effectiveness are affected by the participation of faculty in professional development activities. Therefore, it is important to create policies that encourage faculty to continue their professional development and to provide opportunities for professional development.

One strategy would be to develop a center of excellence in teaching and learning. The center could offer training opportunities on different and new teaching strategies throughout the academic year. The center could also provide online learning and training opportunities, including the use of blackboard, since it is available in the university and is under-used. The

center could offer teaching assessment and enhancement services. Individual faculty could request for one of the center staff to attend class and to provide constructive feedback. By creating a center within the University as opposed to within a specific college, faculty may be more comfortable seeking assistance and new knowledge from objective providers.

Providing in-service educational experiences is another mechanism to expose faculty to professional development. The literature does not indicate a specific number of training sessions per year. The training sessions should correspond with faculty's needs and interests to encourage them to attend. Hardre (2012) assumed that significance and value are vital to the success of professional development. Lian (2014) added the delivery method, speaker, and accessibility as factors that ensure the effectiveness of the program. The professional development program must coincide with the university's and college's mission and goals to be effective and valuable (Sorcinelli, Austin, Eddy, & Beach, 2006).

Adherence to attending professional development programs could be ensured by making changes in the annual evaluation of faculty. Guskey (2002) highlights the importance of evaluation because professional development is a "purposeful endeavor" (p.46). Furthermore, Guskey (2000) suggested evaluating professionals using five main criteria; participants' reactions, participants' learning, organiztion support and change, participants' use of new knowledge and skills, and students' learning outcomes. Guskey (1985) assumed that major changes in faculty's attitudes and behavior only occurs after they have seen or felt changes and developments in the students learning outcomes. It is suggested to use the participants' use of new knowledge and skills, and students' learning outcomes as assessment criteria.

Culture. For the purpose of this study, culture refers to the supportive teaching culture, where excellence in teaching and learning are the ultimate goals. The faculty who participated in

the pilot study brought up the idea of monthly meetings with colleagues to share experiences and ideas. Faculty also suggested peer evaluations of teaching methods. These two suggestions indicate that the faculty are seeking collaboration, interaction, and a sense of community and unity. Seminal research conducted in the 1990s, showed that providing opportunities of interaction between faculty is one of the characteristics of a culture that positively supports teaching (Feldman & Paulsen, 1999; LaCelle-Peterson & Finkelstein, 1993) This collaboration is vital because it helps improve teaching, inspires and motivates thinking, and decreases isolation among faculty (Austin & Baldwin, 1992).

Regular meetings between faculty should be established. The aim of the meetings is to share experiences, practice, ideas, thoughts, and feelings. The meetings should be a safe place where faculty are able to express concerns without judgments. Support and guidance from colleagues who had similar experiences should be encouraged. An administrative representative could attend the last meeting of each semester to report the outcomes of the meetings in terms of students' outcomes and satisfaction. Faculty should share their students' outcomes in terms of changes in grades to present the effectiveness of their teaching methods. While it is acknowledged that grades are not the only measure of students' success, grades are the traditional measure used in Saudi Arabia. The faculty members, who attend the meetings, could arrange for peer evaluations. Specific criteria of evaluation should be created and agreed upon during the meetings. Faculty should arrange for the peer evaluation during the meetings. Feedback to peer faculty should be given after class and on one-on-one basis for improvement and development purposes. Faculty could also arrange for co-teaching classes, where teaching roles would be pre-arranged during the meetings. The collaboration of faculty will provide an opportunity for creativity and innovation in teaching methods.

Implications on educational practice

Teaching methods. The findings of the pilot study indicate that the vast majority of faculty use traditional teaching methods. The students generally felt that concept maps were useful to them while studying and reviewing for exams. Most undergraduate students have used mind or concept maps during high school, and are skilled in creating maps. The faculty, however, felt that creating concept maps was difficult on students. There seems to be a gap between the faculty's perceptions about students and the students' needs and abilities. Elliott and Oliver (2015) claim that many college faculty are unfamiliar with their students' needs and use inefficient teaching strategies. Filling the gap and understanding the students' needs and abilities are vital in promoting meaningful learning. Concept maps are visual representations of the cognitive structure of students (Daley, Durning, & Torre, 2016). Concept maps facilitate discussions and sharing of ideas, thoughts, and knowledge, and therefore promote higher levels of thinking (Daley, Durning, & Torre, 2016). Faculty could use concept maps as a formative assessment throughout the semester.

Faculty should make efforts to assess the students' needs and abilities at the beginning of the semester. The assessment will help the faculty in planning learning activities and content (Drake, 2012). Faculty could assess student needs and abilities by distributing a short survey during the first class, or through an online course management system for the students to complete before class. Drake (2012) suggests a continuous assessment of the students' understanding throughout class time to prevent the accumulation of information and possible confusion, therefore, not achieving meaningful learning. This continuous assessment during class could be done by initially asking the students to individually identify concepts known about the topic being discussed. In the middle of class, students could go back to the concept map they

initially created and make changes according to what they learned during class. By the end of the class, students should be able to incorporate all they learned in the concept map and submit it to the faculty. The faculty should use the content of the concept map to assess the students' understanding. By the beginning of the next lecture, the faculty should present the findings and explain any misconceptions she found in the maps. Faculty could also present students with a concept map by the beginning or end of the lecture that summarizes the whole lecture, giving the students an opportunity to understand the connections. Curter, Castro, Roy, and Turner (2011) found that providing a concept map significantly improved the students' understanding of content compared to the students who only attended lectures. The concept map could relate other lectures or clinical exposure with the current lecture. Concept maps could be also used as an assignment to be completed by the students to assess the students' ability to make connection between theory learned in the classroom and their clinical practice. Undergraduate students in the pilot study preferred creating a concept map as homework because it will give them more time to do their work and discuss with colleagues. Using concept maps will help students develop thinking skills that will affect their decision making and problem solving skills in the clinical setting (Novak, 2011).

Students' autonomy. Autonomy could be defined as a student-centered value where "an instructor creates a safe learning environment where students feel comfortable interacting with instructors and peer; in this learning environment, students take responsibility for their own learning" (Smith & Darvas, 2017, p. 30). Cristina (2015) described the autonomous student as a person who is expressive, logical, engaging, confident, responsible, and takes initiative. Being an autonomous learner will lead to a better achievement of academic goals (Janeiro & González, 2015) and higher levels of engagement (Haerens, Aelterman, Vansteenkiste, Soenens, &

Petegem, 2015). Student autonomy could be supported by faculty. Griffin (2016) suggests engaging students in learning decisions, assignments, and in-class activities. Smith and Darvas (2017) suggests providing clear instructions and guidelines to the students, identifying the responsibilities of each participant.

The students included in the study raised concerns about understanding the faculty' expectations, which made them hesitant to create concept maps. The lack of clear expectation usually have a negative impact on the students' performance (Smith & Darvas, 2017). On the other hand, the students were more confident to create the concept maps for their own learning. For future use of concept maps, increasing the students' autonomy will help the students become generally more confident and motivated to create concept maps. The faculty should provide the students with a syllabus that explains to the learning outcomes of the course, and ways of achieving these goals. The syllabus should be written using clear, concise language. The faculty should discuss the syllabus with the students and answer their questions. The faculty could use a scavenger hunt or an in-class game to ensure students' understanding (Smith & Darvas, 2017). As for assignments, the faculty should provide a rubric that explains the criteria of evaluation. Faculty should also send the students reminders and tips during the semester that encourage the students to submit assignments on time, and engage in discussions with their colleagues (Smith & Darvas, 2017). The instructor should also explain to the students the level of feedback, guidance, and faculty availability that can be expected. By providing all this information, the student will be able to make deliberate decisions and become more autonomous in their learning process.

Environment. The physical environment of a classroom includes the equipment available in a classroom, design, color, air quality, and seating arrangements (Tanner & Lackney,

2006). The classroom seating depends on the teacher's role and teaching method (Rosenfield & Lambert, 1985). Ramli, Ahmad, Taib, and Masri (2014) assume that unplanned arrangements of classroom space leads to student misconduct. Moore and Lackney (1993) claimed that the over-crowding of a classroom results in "decreased attention, lower task performance, some behavioral problems like increased aggressive behavior, and social withdrawal" (p. 13). Participants in the pilot study raised the issue of seating arrangements. They expressed that seating arrangements in the college's classrooms did not support group in-class activities. Undergraduate students expressed lack of control during in-class activities, and some students do not take it seriously. Faculty indicated that one of the reasons preventing the use concept maps in their classrooms is hesitancy due to class size. These findings highlight the importance of classroom arrangements and size. The administration of the nursing college should examine the seating arrangements, and the size of classes. The classroom environment should ideally support the curriculum and the faculty's preference and teaching style or method. Large class sizes could be reduced by having more, smaller sections per cohort. These arrangements will help the faculty and students to become more productive and will be able to achieve the program learning outcomes.

Implications for research

The results of the pilot study support further research to understand the teaching and learning experiences of Saudi faculty and students. The use of concept maps could be introduced to other colleges of nursing in Saudi Arabia, where this learning startegy is virtually unused. Further qualitative research could be done in the universities to have a broader understanding of the perspectives and experiences of Saudi faculty and students. Qualitative research could be

conducted to explore the students' perceptions about using concept maps during their clinical experience.

Quantitative research is needed to provide empirical evidence on the effects of concept maps on students' grades in exams, in the clinical setting, and assessment of thinking skills. Students grades could be compared before and after the use of concept maps. Psychometric tools that measure students' clinical judgement and critical thinking skills could be used to measure the students' development over time as they use concept maps. As scoring of maps was a concern of the faculty, a scoring tool which includes hierarchical and relational scoring criteria could be developed and tested for reliability and validity.

Mixed methods research will be beneficial to provide a more holistic view of the effects of using concept maps on the students' thinking skills by incorporating the use of a psychometric tool and interviews. The literature does not reveal any studies that aimed at exploring the difference between creating a concept map in one language as opposed to the native language of participants. Conducting a mixed methods study that compares between student grades when the concept maps are created in Arabic and English languages in collaboration with a language and linguistics expert will fill this gap. The literature will be enriched with the effect of language literacy on the creation of concept maps.

Conclusion

Promoting meaningful learning requires multiple levels of engagement. All stakeholders, including administrators, faculty and students, who are involved in the teaching and learning process must be included in the plan. Each stakeholder should assume responsibility for their role in the teaching and learning experience. Administrative support and guidance are vital to the faculty's development and empowerment, which in return will impact the students' achievement

levels, knowledge and skills. The mission of the college of nursing is “to prepare nursing staff with high efficiency in research skills and providing safe nursing care in various health facilities” (Nursing college, n.d.). Promoting meaningful learning will develop the learning and thinking skills of the graduate students. The graduates will be able to provide safe and quality care to their patients.

References

Abdul Cader, A. (2012). Motivational issues of faculty in Saudi Arabia. ProQuest LLC.

Austin, A., & Baldwin, R. (1992). *Faculty Collaboration: Enhancing the Quality of Scholarship and Teaching.* Retrieved March 2018, from ERIC: https://files.eric.ed.gov/fulltext/ED347958.pdf

Celikoz, N. (2010). Basic factors that affect general academic motivation levels of candidate preschool teachers. *Education, 131*(1), 113 - 127.

Cristina, T. (2015). The teacher's role in building the student's range of autonomy. *Procedia - Social and Behavioral Sciences, 203*, 22 - 27.

Curter, W., Castro, D., Roy, K., & Turner, T. (2011). Use of an expert concept map as an advance organizer to improve understanding of respiratory failure. *Medical Teacher*, 1018 - 1026.

Daley, B., Durning, S., & Torre, D. (2016). Using concept maps to create meaningful learning in medical education. *MedEdPublish*, 1 - 22.

Daley, B., Morgan , S., & Beman, S. (2016). Concept maps in nursing education: A historical literature review and research directions. *Journal of Nursing Education, 55*(11), 631 - 639.

Drake, J. (2012). A critical analysis of active learning and an alternative pedagogical framework for introductory information systems courses. *Journal of Information Technology Education: Innovations in Practice, 11*, 39 - 52.

Elliott, R., & Oliver , D. (2015). Linking faculty development to community college student achievement: a mixed methods approach. *Community College Journal of Research and Practice, 40*(2), 85 - 99.

Feldman, K., & Paulsen, M. (1999). *Faculty motivation: The role of a supportive teaching culture.* Retrieved March 2018, from Wiley Online Library: https://onlinelibrary-wiley-com.ezproxy.lib.uwm.edu/doi/epdf/10.1002/tl.7807

Griffin, B. (2016). Perceived autonomy support, intrinsic motivation, and student ratings of instruction. *Studies in Educational Evaluation, 51*, 116 - 125.

Guskey, T. (1985). Staff development and teacher change. *Educational, School, and Counseling Psychology Faculty Publications , 42*(7), 57 - 60.

Guskey, T. (2000). *Evaluating professional development.* Thousand Oaks: Corwin.

Guskey, T. (2002). Does it make a difference? Evaluating professional development. *Educational. School and Counseling Psychology Faculty Publications, 59*(6), 45 - 51.

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students; motivation experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise, 16*, 26 - 36.

Hardre, P. (2012). Community college faculty motivation for basic research, teaching research, and professional development. *Comunity College Journal, 36*(8), 539 - 561.

Janeiro, M., & González, M. (2015). Developing students' autonomy and self-regulation through a co-teaching reseach methods experience. *Contemporary Issues in Education Research, 8*(1), 25 - 32.

LaCelle-Peterson, M., & Finkelstein, M. (1993). Institutions matter: Campus teaching enviroments' impact on senior faculty. In M. Finkelstein, & M. LaCelle-Peterson, *Developing senior faculty as teachers.* San Francisco: Jossey-Bass.

Lian, X. (2014). Factors that motivate faculty to participate in professional development activities. ProQuest LLC.

Moore, G., & Lackney, J. (1993). *Design Patterns for American schools: Responding to the reform movement.* Retrieved March 2018, from ERIC: https://files-eric-ed-gov.ezproxy.lib.uwm.edu/fulltext/ED375515.pdf

National Research Council. (2004). *How People Learn: Brain, Mind, Experience, and School.* Washington, DC: National Academy Press.

Novak, J. (2011). A theory of education: Meaningful learning underlies the constructive integration of thinking, feeling, and acting leading to empowerment for commitment and responsibility. *Meaningful Learning Review, 1*(2), 1 - 14.

Nursing college. (n.d.). *Nursing college*. Retrieved March 2018, from King Abdulaziz University: https://nurs.kau.edu.sa/Default.aspx?Site_ID=667&Lng=AR

Ormrod, J. (2012). *Human learning.* Upper Saddle River: Pearson.

Ramli, N., Ahmad, S., Taib, M., & Masri, M. (2014). Prinicals' perception on classroom physical environment. *Procedia Social and Behavioral Sciences, 153*, 266 - 273.

Rosenfield, P., & Lambert, N. (1985). Desk arrangement effects on pupil classroom behavior. *Journal of Educational Psychology, 77*(1), 101 - 108.

Smith, V., & Darvas, J. (2017). Encouraging student autonomy through higher order thinking skills. *Journal of Instructional Research, 6*, 29 - 34.

Sorcinelli, M., Austin, A., Eddy, P., & Beach, A. (2006). *Creating the future of faculty development: Learning from the past, understanding the present.* Bolton: Anker Publishing Company.

Sullivan, B. (1999, 08). *Professional development the linchpin of teacher quality*. Retrieved 07 02, 2017, from ASCD: http://www.ascd.org/publications/newsletters/policy-priorities/aug99/num18/toc.aspx

Tanner, C., & Lackney, J. (2006). *Educational facilities planning: Leadership, architecture, and management.* Pearson Allyn and Bacon.

Curriculum Vitae
Dr. Duaa Amr Hafez

Skills

- Education is my passion
- Well spoken, skilled writer in Arabic and English
- Good computer skills
- Self-motivated, determined and goal oriented
- Good team building skills
- Good time management skills
- Good communication skills

Work experience

- **Teacher Assistant**

University of Wisconsin Milwaukee – Since Fall 2015 to Spring 2016
My responsibilities included teaching undergraduate nursing students, facilitate their learning in the designated courses, tutor students, write exams, upload the grades on d2l system, and conduct simulation scenarios for different students' level.

- **Education consultant**

Almashfa Hospital – From October 2014 to December 2014
My responsibilities included creating orientation program for the human resources department, review the orientation program and competency checklists for the nursing department.

- **Acting Continuous Education Coordinator**

King Abdul-Aziz University Hospital - from January 2014 to November 2014
My responsibilities include the development, facilitation & coordination of educational programs inside and outside KAUH provided for all nursing staff, trainees and students.

- **Quality Consultant**

Fageh College – From September to December 2013
My responsibilities there included overviewing the self-evaluations performed by the faculty and leadership. This included the advice and guidance to improve and enhance their processes and procedures. I conducted surveys there and provided action plans. Quality unit staff were guided and supported through their collection of data and
evidence binders

- **Nurse Educator in Nursing Education Department**

King Abdul-Aziz University Hospital - From March 2013 to November 2014
I followed up the skills and knowledge of staff in designated units. Created training programs and workshops for hospital staff to ensure their proficiency in the delivery of care to patients. Created skills checklists, and policies & procedures that govern the implementation of skills. Wrote developmental plans and career plans for staff in the designated units, and help them in the growth of their skills, knowledge and career.

- **Training, education and research officer in Quality and Accreditation Unit in the Faculty of Medicine**

King Abdulaziz University - From June 2012 to Feb 2013
I entered data on the SPSS program and did statistical analysis. Wrote policies as needed for the faculty of medicine to ensure good communication between faculty members. Prepared training lectures for quality tools and a workshop about motivation. Conducted a research to explore the collaboration between physicians and nurses in the hospital, leading us to introduce a new module into the curriculum.

- **Risk Management Unit Coordinator**

King Abdul-Aziz University Hospital - Since June 2011 to June 2012
I was able to create a team of risk management officers. Worked as a team to achieve the Canadian Accreditation Standards. Worked on the implementation of the required organizational practices, reviewed and created policies, designed and applied plans, created and conducted lectures. Designed monitoring tools and data collection sheets, conducted surveys and audits, did root cause analysis of the problems being faced, and statistical analysis. worked with Key Performance Indicators with regards to collecting the data and submitting reports. We investigated sentinel and near missed events and clinically audit random cases to improve the quality of care.

- **Nurse Educator in Nursing Education Department**

King Abdul-Aziz University Hospital - Since October 2010 to June 2011
I gained and maintained the certificate of Basic Life Support provider and instructor. Trained staff to enrich their skills and knowledge including writing a developmental plan to facilitate the training. Wrote policies and created competency lists.

- **Staff Nurse in the Emergency Room**

King Abdul-Aziz University Hospital - Since April 2010 to October 2010.
I was able to triage patients in according to the Canadian Triage System and handled different cases such as patients with myocardial infarction, multiple fractures, hypoglycaemic, cerebral vascular accident, infectious diseases and different types of anemias.

Education history

- **University of Wisconsin Milwaukee – Milwaukee, WI:** Jan 2015 to May 2018
- **Cardiff University – Cardiff, UK:** Sep 2007 to Dec 2009
- **King Abdulaziz University – Jeddah, Saudi Arabia:** Sep 1999 to Sep 2005

Qualifications

PhD, Nursing
Masters, Nursing Studies
Bachelor, Nursing Degree
Kaizen Certificate
Six Sigma Green Belt Certificate

- **References**

1. **Miss. Pauline C T Tang**
   Supervisor
   Cardiff University
   Email: tangpc@cf.ac.uk

2. **Mr. Sabo Maccido**
   Nursing Education Coordinator
   King Abdulaziz University Hospital
   Email: maccidosabo@hotmail.com

3. **Ms. Layla Tabash**
   Director of Nursing Department
   King Abdulaziz University Hospital
   Email: laila_tabsh@hotmail.com

4. **Prof. Omayma Hamed**
   Quality and Academic Accreditation Unit Manager
   King Abdulaziz University
   Email: dr.omayma.aly@gmail.com

5. **Ms. Abeer Al-Hazmi**
   Nursing Assistant Director of Education and training
   King Abdulaziz University Hospital
   Email: akalhazmi@kau.edu.sa

6. **Dr. Kim Litwack**
   Dean of College of Nursing
   University of Wisconsin - Milwaukee
   Email: litwack@uwm.edu

7. **Dr. Barbra Daley**
   Professor - Adult & Continuing Education Leadership, Higher Education Administration
   University of Wisconsin - Milwaukee
   Email: bdaley@uwm.edu