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RESEARCH ARTICLE

NURSING SCHOLARS' LEARNING PREFERENCES AND TEACHING IMPLICATIONS: A SYSTEMATIC REVIEW

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ABSTRACT

The aim of this review is to appraise, synthesize, and compile available studies that focused on exploring the nursing scholar learning preference and teaching implication. The finalized search for data for the systematic review was compiled in January 2020 using three databases: Web of Science, PubMed and Google Scholar. The *Preferred Reporting Items for Systematic Reviews and Meta-Analysis* (PRISMA) guidelines were followed during all stages of this review. Studies that focused on exploring the nursing scholar learning preference and teaching implication were eligible. The methodological quality of the included studies was assessed with use of the Best Evidence Medical Education (BEME) systematic review criteria. A total of eight studies were found eligible and data from each study were extracted into a manageable framework. The results of the review indicate that most learners prefer to learn by assimilating while the least preferred learning method is divergent learning. Further, our findings highlight that nursing scholar learning preferences cannot be underestimated; this is supported by the overwhelming evidence provided. Faculty members need to examine the preferred study methods among the students and help in ensuring they have an inclusive and targeted learning experience.

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INTRODUCTION

The essence of education is assisting learners in achieving an understanding of the presented topic of study, and teaching outcomes have become the primary measure for determining the impacts of learning. The outcomes are highly dependent on several factors, among which a student's preferred learning style is one of the most considered. Learning style refers to the ways and situations by which a learner best perceives, processes, accumulates, and aptly recalls the subject matter (James, 1995). Individual nursing students have varying learning styles, due to aspects of each student's individuality, that affect their overall learning outcomes, thereby affecting the learning outcome curve among students. While there are many factors that influence learning outcome, the overall impact on teaching varies depending on the effect such factors have on the student (Ojeh, 2017). Research has shown that learning outcomes are improved when students' learning style preferences are facilitated by the teacher. According to a study in clinical facilitation, it is greatly important that students are consulted regarding what method of facilitation they find most elemental. While involving students seems like the best approach, Muthathi *et al*. (2017) argued that students' decisions tend to harm their learning outcomes. Often, students have no idea what is right for them, and even if they do, they tend to go for the easy way out, amounting to a situation where the students choose non-beneficial yet easy models. Therefore, educators must act as the final decision-makers to make the most out of students' choices (Murphy, 2004). There is a need for educators to appropriately evaluate all the learning avenues while accounting for the students' preferences. One of the factors with teaching implications is students' satisfaction with the learning environment and curriculum. A student's satisfaction with these two factors implies a boost to their overall performance. A recent study of dental medical students indicated that many of the learners preferred to be taught via a visual approach compared to the other methods investigated (Aldosari, 2018). As such, the authors prescribed a teaching approach based on the deduced data. Rezigalla and Ahmed (Rezigalla, 2019), alternatively, strongly argued against the collective choice of teaching methods since students differ, and hence, what works for one student does not necessarily apply

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to another. Therefore, instructors should consider individuality when designing teaching models that are aimed at achieving the utmost implication. However, a contrary view on the alleged relationship between learning style and learning outcome was presented by Liew *et al*. (2015). In their view, a study conducted with nursing students indicated that, despite the existence of a relationship between those two variables, the impact is relatively minor. That is, other factors, such as the teacher's suitability for the program, seem to be more significant than learning styles (Boström, 2013). Henceforth, learning styles have been seen as having no direct impact on students' learning outcomes. This theory implies that knowing the preferred method of learning is only a bridge to discovering viable ways of presenting information to students (Khanal *et al.*, 2019). Consequently, educators should not entirely rely on the students' depicted preferred methods of learning but should attempt to establish a baseline by which every student benefits from the program in all ways possible.

Yet several studies have produced results demonstrating the correlation between students' preferred learning styles and teaching outcomes. There is a consistent stream of information showing a positive correlation between teaching outcomes and students' preferred learning styles. Regardless of disparities in sources, it seems a majority of the literature suggests the need for individualization in the classroom set-up. To cover this niche, teaching models being designed today are aimed at addressing the concept of individuality in the learning environment (Clarke, 2010). Further, tutors are encouraged to engage students in the learning process by seeking out each student's preferred method of delivery. Indeed, addressing the issue of disparity in learning style preferences might marginally improve teaching outcomes. We aimed to use a review to appraise, synthesis, and compile available studies that focused on exploring the nursing scholar's learning preference and teaching implications using a systematic review method. We aimed to include studies published between 2010 to 2019 and designed the research using PRISMA guidelines (Moher, 2009).

METHODS

The reporting of this systematic review was done in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. The review has been registered in PROSPERO database as CRD42020159176.

Data sources and search strategy: A systematic computerized search was finalized in three different databases in January 2020: Web of Science, PubMed, additional strategy was to use manual research using Google Scholar to find larger studies in the field. Boolean operators like AND/OR/NOT were used to combine search terms, including "nursing," "education," "learning styles," "nursing student," "learning preference," and "systematic review."Identified studies were downloaded and reviewed using Endnote X7. Any duplicates were removed, and two independent reviewers selected studies for inclusion in the two-step process. Initially, identified studies were screened based on title and abstract; if the two reviewers were unable to agree on a study's inclusion, they were included in the second screening stage where in the full text was screened independently by the reviewers. In case of discrepancy of opinion, a resolution was determined by consensus with a third reviewer.

Study selection and eligibility criteria: The review included studies that focused in exploring the nursing Scholar learning preference and teaching implication studies were included if they met following inclusion criteria:the study was (1) related to nursing students; (2) a primary empirical article (including dissertations and theses) or theoretical article; (3) published in English; (4) published between 2010 and 2019;and (5) assessing and exploring student learning preferences and/or exploring teaching implications. Full-text available studies were rejected if they met the following exclusion criteria: they were (1) not related to nursing students, and (2) case reports, letters, pilot studies, or reviews. Once determining which papers appeared to fit the inclusion criteria, we retrieved the full text of each, which were independently screened by two review authors. In any case of discrepancy of opinion, a resolution was determined by consensus with a third reviewer.

Data extraction and synthesis: Data from each study were extracted into a manageable framework. One author extracted data, which were checked by another. Disagreements were resolved by consensus with a third reviewer to ensure suitable and accurate representation of the material.

Patient and public involvement: No patient involved

Quality assessment: We then performed quality assessments of the primary sources, as these resources used differing methodologies. The methodological quality of the studies was assessed by two independent reviewers using the criteria established by Buckley *et al*. (2009), which measures the quality of sources according to several indicators that measure appropriateness of study design, methods, analysis, results, and conclusions. Nine studies that meet more than seven determined conditions were considered high-quality studies and were included for consideration. All nine studies were independently evaluated.; based on evaluation process results, eight were found to be of high enough quality for final inclusion in this review (Figure 1).

The Study Problem: The review aimed to answer two questions: What is the most preferred learning styles of nursing students? What are the teaching implications of learning preferences?

RESULTS

The main search results produced172 articles, which all underwent initial screening. After checking for duplications, the inclusion and exclusion criteria were applied to the articles, based on their title and abstract. After excluding most according to the criteria stated in section 3.2, eight articles remained for the final review, as shown in Figure 1. We organized the data comparison using an interactive process to find common themes, patterns, and/or relationships across the primary resources, as described by Whittemore (Whittemore, 2005). The data were extracted and synthesized into a summary table (Table 1).

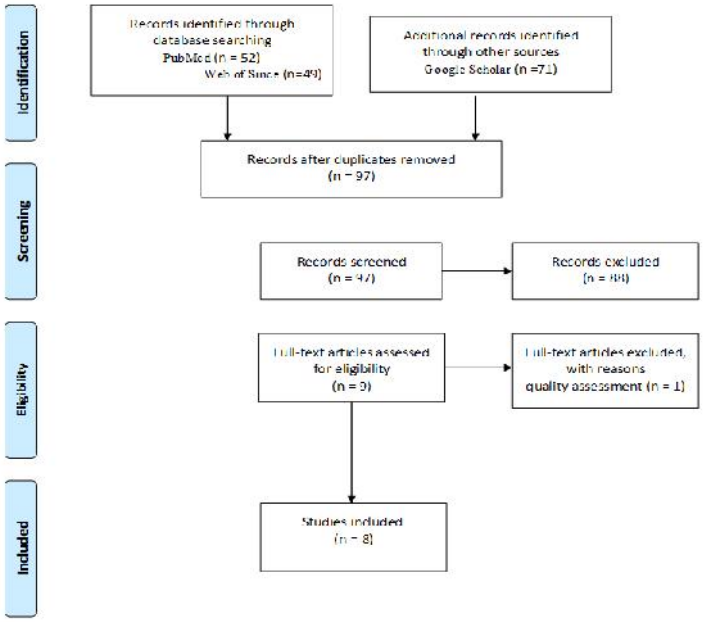

Figure 1. Flow chart of literature search

Table 1. Systematic review common themes, patterns and relationships across the primary resources in study of nursing learning techniques

No	Author (year), Country	Data collection method	Aim	Study population Number Nursing Student Participants, Gender, Mean Age±SD or range	Result	Teaching implication
1	AbuAssi&Alkorashy (2016), Saudi Arabia	Questionnaire	To determine the influence of learning styles on the decision to adopting a self-directed learning style from the student perspective	230 Male 118 Female 112 Age SD22.14± 1.55	Mixed teaching methods are among most preferred learning styles. Self-directed learning ability is influenced by Age and academic level of students.	Nursing educators need to assess student preferred learning style before and throughout student enrolment and Apply a variety of teaching methods
2	Alharbi et al. (2017), Saudi Arabia	Questionnaire	To explore the student learning preferences regarding the various learning styles	56 Male 41 Female 15 Age not reported	Students' preference to visual and active learning styles. Non-significant association between student's academic achievement and learning preferences. No association between gender and learning preferences.	Educators have to be aware of their students preferred learning styles to advance learning opportunity
3	Celic et al. (2017), Turkey	Questionnaires	To identify the student learning styles in relation to certain individual features throughout the simulation Markets and practice education	03 Female: 82,5% Male: Not reported Age 21 ±1.4	Result showed variation in student learning style as 28,2% assimilating,27,2% convergent,26,2% accommodating and 18,4% divergent On the other hand 92,2% of the student the stated that the simulation influence their learning positively,79,6% feel more competent after the education although 53,4% of the student feel the duration was not sufficient,47,6% feel the simulation markets was not sufficient	Educators need To Consider student different learning style in education to contribute positively in their learning

Continue …….

4	Shirazi&Heidari (2019), Iran	Questionnaire Cross-sectional study	To assess the relationship between critical thinking skills, learning styles and the academic achievement	139 Gender: female, Age: 19–29	1—No significant relationship between critical thinking and academic achievement were found 2—Critical thinking subdomains were not significantly related to academic achievement. 3—No significant relationship was found between the total score and the subscales of critical thinking and marital status, age, or educational level. 4—A significant relationship was found between the total score of critical thinking and educational level. 5—A significant relationship between learning styles and academic achievement, with academic achievement.	obtaining information about the dominant learning styles of students may encourage and enable nursing instructors to create appropriate learning environments and prepare the areas for academic achievement of the students. Learning outcomes improve when training matches the learning styles of the students.
5	Yeh et al (2016), Taiwan	Survey	To evaluate nursing student preferences and perception interims of learning environment	124 Gender: Not reported, Age: Not reported	Most participants preferred learning in a classroom environment that combined problem-based and lecture-based instruction. However, a mismatch of problem-based instruction with students' perceptions occurred. Learning outcomes were significantly better when students' perceptions of their instructional activities were congruent with the preferred learning environment.	As problem-based learning becomes a focus of educational reform in nursing, teachers need to be aware of students' preferences and perceptions of the learning environment. Teachers may also need to improve the match between an individual student's perception and a teacher's intention in the learning environment, and between the student's preferred and actual perceptions of the learning environment.
6	Gonzales, LK, Glaser, D, Howland, L (2017), Not reported	Questionnaire	To describe the learning styles of nursing students and to describe the evaluation of factor structure and internal consistency of student responses to the index of learning styles to determine the appropriateness of the ILS in further investigations	202 Male: 34 Female: 125 Not reported: 43 Age21–56	Predominant learning styles: Sensing—82.7% of students described as fact-oriented, Visual—78.7% of students described as linear thinkers, Sequential—65.8% of students described as appreciating group work and trying things out, Active—59,9% of students described as preferring exploring or testing information	Different learning style of each student must be acknowledged and addressed. Students who are educated using the technique matched to their learning styles may be more satisfied with education
7	Hampton et al. (2016), United States	Survey	To understand student teaching and learning preferences in online courses across generations and which teaching strategies were most engaging and effective from students' perspectives	217 Male: 5% Female: 95% Age 45 +_10	Students preferred videos or narrated Power Point presentations and case studies as the most energizing and engaging method, while they reported the least preferred was group collaborative projects with other students and Wikis	Educators need to accommodate student learning differences and create options for learning choices by employing a variety of instructional strategies
8	Santhamma James et al (2015) Australia	Questionnaire	To examine the stability or changes in the student learning styles over one semester	96 Female: 89 Male:7 Age: 77% students aged 18–25	1—VARK Results showed that 43 students remained in the same learning mode; 29 either reduced their learning modalities or changed their learning preference completely 2—Kolb LSI Results showed that 43% of students remained in the same learning modality while 57% changed their preference	Educators need to assess student information processing styles throughout the program to ensure good student learning experience

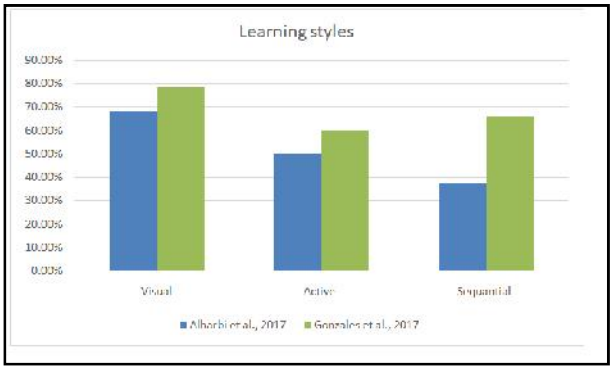

Figure 2. Student-preferred learning styles as determined by Alharbi et al. in 2017and Gonzales et al., also in 2017

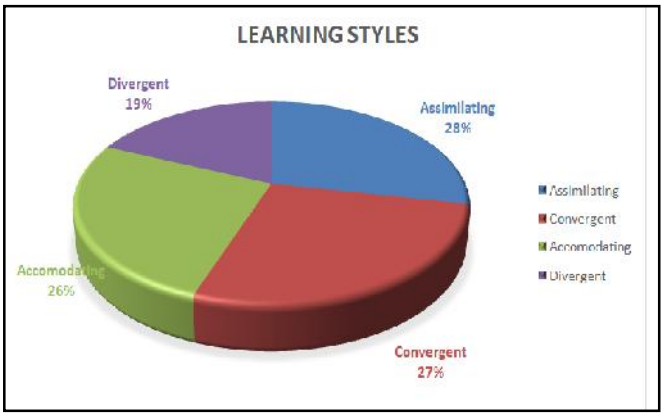

Figure 3. Student preferred learning styles reported by Celic et al. in 2017

Data comparison

General characteristics of the included studies: The studies described in Table 1 exhibit various similarities and difference as discussed below. Theywere conducted in different geographical locations, showing the variability of the data in terms of the characteristics of the population. The areas included were Saudi Arabia, Turkey, Iran, Taiwan, the United States, and Australia, but one study did not report its location. Only two of the studies have a similar location—Saudi Arabia. The reviewed research also included diverse participant populations. While some studies did not report the participants' ages, others have given an age range. A common characteristic is that the young adults were the target age, with most having participants in the age range 18 to 29 years. Only two studies involved participants over 30 years. The target population for all studies was nursing students; some were in college others were practicing in the field. All but two of the included works included more female than male participants. The study with the highest number of participants had 230 people; that with the least had 96 individuals.

Instruments for data collection: Various instruments can be used in data collection, including interviews, questionnaires, and focused group discussions, among many others. The dominant method of data collection was the use of questionnaires (used by six of the included studies). Questionnaires follow a standardized format for the purposes of collecting data through an instrument consisting of a series of questions and prompts to receive a response from individuals ,survey is the process of data gathering involving a diversity of data collection methods including questionnaire and interviews (Gerrish, 2015). The remaining two studies used surveys. Study variable: The common variable among all the studies was learning style; other variables examined readiness for self-directed learning, simulation markets in nursing education, and critical thinking.

Aim and Data Reliability: All the studies aimed at relating various aspects of individuals and society to the various learning styles. More so, other studies focused on exploring and evaluating different learning styles used by students. All the studies were done within the last five years; hence, the data is current reflects the current situation. The oldest study was conducted in 2015; the most recent study was conducted in 2019.

Findings

Regarding learning styles among nursing students in various geographical locations,in the research of AbuAssiand Alkorashy (AbuAssi, 2016) and of Shirazi and Heidari (2019), most of the nursing students showed preferences for diverging learning styles. This is in contrast with what was reported byCelik*et al.*'s (2017) study showing only 18.4% of the participants preferred divergent learning styles. AbuAssiand Alkorashy (2016) used a sub-scale to determine that the willingness of self-directed learning had a high score compared to the scale of self-management and desire for learning. The study, however, found no statistically significant relationship between the learning style and self-directed learning readiness. They revealed that majority of students had little interest in self-directed learning. As reported by Alharbi *et al*. (2017), the most commonly preferred earning styles among the nursing students were visual (67.9%), followed by active (50%), and sequential (37.5%). This is similar to what İbrahim Celic*et al.*'s (2017) findings with 71% of students stating that the laboratory was suitable for skills' education. Shiraziand Heidari, (2019) and Yeh *et al*. (2016) reported learning outcomes were significantly better when students' perceptions of their instructional activities were congruent with their preferred learning environments. Further, the two studies showed that critical thinking (problem-solving) was commonly used in the learning environment and highly preferred by the learners. Alharbi *et al*. (2017) and Gonzales *et al*. (2017) assessed similar learning styles. The results are indicated by Figure 2.

From the two studies, it's evident that the most preferred learning style was visual. This was similar to what was reported by Hampton *et al*. (Battle, 2018), in which the preferred teaching/learning methods for students were videos or narrated PowerPoint presentations. There was a variation in the desirability of active or sequential learning styles among the learners in which while most of the students in Alharbi *et al*. (2017) studies preferred to learn actively more than sequentially; those in Gonzales *et al*. (2017) preferred to learn sequentially more than actively. Various conclusions were drawn from the studies. There are no associations between gender and learning preference. Secondly, there was no relationship between critical thinking and academic

achievement. The study conducted by Alharbi *et al*. (2017), revealed that verbal learning was the least preferred learning method. The other learning styles reported by Celic *et al*. (2017) are illustrated in Figure 3. Most learners prefer to learn by assimilating, while the least preferred learning method is divergent learning. The second preferred method of learning is accommodating (26.2%),. This echoes the findings of Shirazi and Heidari (2019), who showed that the highest academic achievers were among those learners who adopted an accommodating learning style. One of the studies reported that there were different learning styles preferred in a different environment. Most participants preferred learning in a classroom environment that combined problem-based and lecture-based instruction.

DISCUSSION

The profile of new students in schools is constantly changing; hence, the importance of learning styles among the learners cannot be underestimated, as evidenced by the results indicating universities need to adapt to changes in student learning styles. In nursing classes, it is evident from all the studies we reviewed that there is a mix of learners from all backgrounds; this was verified by the demographic data. Hence, one of the major conclusions is that the nursing faculty in all the schools need to examine the preferred study methods among the students and help in providing targeted learning for all of them. Further, the results highlight the importance of instructors employing a variety of teaching methods in the classroom. While some students prefer to learn by hearing, others prefer to learn by seeing, doing, or reading while some learn by asking questions. The most common interpretation is that all the students learn well when they incorporate items and topics that they find interesting in their studies. Most of the students tend to favor more than one learning style and are able to develop new learning patterns. It is critical that all instructors understand how their students learn and that they can choose the best combination of methods for attaining quality grades. The studies have proved that the learning styles of students change with time and hence the need to ensure that continuous assessment is done frequently to accommodate learners at all times.

There is a need for educators to try and incorporate various methods in their teaching so as to reach a majority of students. Even though at the college level it is obvious that most of the students have learned how to accommodate various teachers, it is still appropriate for the teachers to factor in the various learning styles and come up with an integrated strategy. As noted, the most commonly preferred learning methods are visual, active, and sequential styles; thus, educators should keep those approaches in mind when developing lesson plans. For example, educators should teach concepts through simulations, discussions, and knowledge application. An interesting finding from the review is that most of the young age group learners were determined to be unimodal, while the older ones tend to be quasi-modal. Most importantly, considering the predominance of convergent and divergent learning styles, subjects must be taught using multiple methods, including problem-based learning, group discussions, brainstorming, role-playing, computerized simulations, and demonstrations. These are especially recommended for theoretical, clinical, and laboratory-skilled fields so the students can apply visualization to learn more and gain professional skills in new and objective situations. Furthermore, the results indicate the importance of instructors choosing appropriate methods based on different study topics, as this has a pronounced effect on learners. Clearly, most of the learners prefer learning by seeing; hence, the lack of visual approaches may have made them feel insufficient during the study's clinical trials. The period in which the learners stay in the laboratory should be considered since it either increased or reduced application time. Among the key findings across the studies was that there was no significant relationship between the different demographic variables such as age and marital status and the academic achievement of the students. The overall finding is that, to some extent, learning style plays a critical role in the success of the nursing students during training. These findings should encourage instructors and managers to consider the importance of learning and teaching styles used in the classroom. Taking the initiative to obtain information regarding the dominant learning styles of students is also important, as it may encourage people to create effective learning environments and better prepare learners for greater academic achievements. It is evident that learning outcomes improve when training matches the learning style of the students.

The review also suggests that the nursing professional's development for practitioners needs to work towards the incorporation of preferred learning styles into the curriculum development of nursing programs. There is a need for various formats that are essential in the success of nurses in the ever-changing health care environment. Efficient innovations in preparing the students in relation to on boarding, competency, and continuing education are key to engaging and retaining staff. Knowledge of preferred styles of learning of people working in an organization is another key, informing the planning, delivery, resource utilization, and evaluation of learning activities for staff. The main emphasis should be on evidenced-based approaches that best suit students' learning styles. There are various strengths and limitations associated with this study. The first strength is that the studies reviewed were all recent; hence, the data obtained is highly reliable. Secondly, the diversity of the studies enhances the randomness and reliability of the data collected. Several generalizations can be made from the data obtained, as the data is sparse. One of the common limitations of the study was the ability to access data. Most of the studies had limited responded and this contributed to limited data access. Most of the studies adopted a cross-sectional study design and, thus, the data collected is limited to apoint in time.

Conclusion

Nursing scholars' learning styles play a critical role in their successful education and training. The findings of this study should encourage educators to consider the learning and teaching styles as key to planning, sourcing, delivering, and evaluating the educational activities. While the review finding s are relevant to nursing schools and students, they also have implications for working nurses in assisting student nurses and in their approach to continuing education classes and seminars, both from the facilitator's perspective and the learner's

perspective. The ever-changing needs and scenarios in health care demand well-trained, capable nurses. Deepened awareness of how to effectively teach as well as how to effectively learn is valuable for everyone engaged in meeting the demands of modern nursing.

RELEVANCE AND CONTRIBUTION OF THE STUDY

This paper provides a strong message as to the importance of accommodating students' needs as to how they best learn and stay engaged. Although it takes more planning and effort to teach large groups of students while recognizing different learning styles and needs, it is critical, especially in times of nursing shortages and aging populations, that their education be as thorough and productive as possible.

Footnotes

Competing interests: None Declared

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Ethical Approval: No Ethical Approval was necessary because this was a review of published literature.

Data Sharing: The data is available from the corresponding author.

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