รูปแบบการเรียนรู้และการรับรู้ความสามารถด้านการเรียนในนิสิตพยาบาล
Learning Styles and Perceived Academic Self-Efficacy Among Nursing Students

นิพนธ์ต้นฉบับ

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วารสารไทยเภสัชศาสตร์และวิทยาการสุขภาพ 2566;18(2):125-131.

Original Article

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Thai Pharmaceutical and Health Science Journal 2023;18(2):125-131.

บทคัดย่อ

วัตถุประสงค์: เพื่อ 1) ศึกษารูปแบบการเรียนรู้และการรับรู้ความสามารถของตน ด้านการเรียนของนิสิตพยาบาล 2) เปรียบเทียบคะแนนรูปแบบการเรียนรู้และการ รับรู้ความสามารถของตนฯ จำแนกตามชั้นปีและผลสัมฤทธิ์การเรียน 3) ทดสอบ ความสัมพันธ์ระหว่างรูปแบบการเรียนรู้กับการรับรู้ความสามารถของตนฯ **วิธี การศึกษา:** การศึกษาแบบภาคตัดขวางมีตัวอย่างคือ นิสิตพยาบาลหลักสูตร พยาบาลศาสตรบัณฑิตชั้นปีที่ 1 - 4 อายุตั้งแต่ 18 ปีขึ้นไปโดยการสุ่มตามสะดวก จำนวน 385 คน ใช้แบบสอบถามเพื่อรวบรวมข้อมูลส่วนบุคคล รูปแบบการเรียนรู้ 6 รูปแบบ ได้แก่ แบบอิสระ แบบหลีกเลี่ยง แบบร่วมมือ แบบพึ่งพา แบบแข่งขัน และแบบมีส่วนร่วม และการรับรู้ความสามารถแห่งตนด้านการเรียน ทดสอบความ แตกต่างของคะแนนรูปแบบการเรียนรู้และการรับรู้ความสามารถแห่งตนฯ ตามชั้น ปีและระดับผลสัมฤทธิ์ทางการเรียนด้วย ANOVA และสหสัมพันธ์แบบเพียร์สัน **ผลการศึกษา:** คะแนนเฉลี่ยของรูปแบบการเรียนรู้ทั้งหมดอยู่ในระดับปานกลาง โดยแบบมีส่วนร่วมมีคะแนนสูงสุด (mean = 3.66) ตามด้วยแบบร่วมมือ แบบ พึ่งพา แบบอิสระ แบบหลีกเลี่ยง และแบบแข่งขัน (mean = 3.52, 3.38, 3.37, 2.95, และ 2.85 ตามลำดับ) การรับรู้ความสามารถแห่งตนฯ อยู่ในระดับสูง (mean = 33.24) เมื่อจำแนกตามชั้นปีและผลสัมฤทธิ์การเรียนพบว่ารูปแบบการเรียนรู้ ทั้งหมดยกเว้นแบบแข่งขันมีคะแนนแตกต่างกันอย่างมีนัยสำคัญทางสถิติ (P-value < 0.01) และชั้นปีที่สูงมีแนวโน้มมีคะแนนรูปแบบการเรียนรู้ที่พึ่งประสงค์ มากกว่า ส่วนคะแนนการรับรู้ความสามารถแห่งตนฯ แตกต่างอย่างมีนัยสำคัญ สถิติตามชั้นปีเท่านั้น โดยชั้นปีที่สูงกว่ามีการรับรู้ความสามารถแห่งตนฯ สูงกว่า พบว่าคะแนนรูปแบบการเรียนรู้ 4 แบบสัมพันธ์กับการรับรู้ความสามารถแห่งตนฯ (P-value < 0.01) ยกเว้นแบบพึ่งพิงและแข่งขัน **สรุป:** รูปแบบการเรียนรู้ที่พึ่ง ประสงค์และการรับรู้ความสามารถแห่งตนยังมีน้อยชั้นปีต้น ควรจัดกิจกรรมการ เรียนการสอนเพื่อกระตุ้นรูปแบบการเรียนรู้ที่พึ่งประสงค์และการรับรู้ ความสามารถแห่งตนด้านการเรียนของนิสิตพยาบาล

คำสำคัญ: รูปแบบการเรียนรู้, การรับรู้ความสามารถด้านการเรียนรู้, นิสิต พยาบาล

Abstract

Objectives: To 1) determine levels of learning style and perceived academic self-efficacy among nursing students, 2) compare scores of learning styles and perceived self-efficacy by year of study and academic achievement, and 3) test correlation between learning style and perceived self-efficacy. **Method:** This cross-sectional study had a sample of 385 nursing students studying in Nursing Bachelor's Program from years 1 – 4 who were 18 years old and over obtained by convenience sampling. A questionnaire was used to collect demographic characteristics, and to assess six learning styles (i.e., independent, avoidant, collaborative, dependent, competitive and participative styles) and perceived academic self-efficacy. Scores of learning styles and perceived self-efficacy by years of study and academic achievements were compared using ANOVA and Pearson's correlation analysis. **Results:** Overall learning style score was at moderate level with the highest one of participative style (mean = 3.66), followed by collaborative, dependent, independent, avoidant, and competitive (mean = 3.52, 3.38, 3.37, 2.95, and 2.85, respectively). Perceived self-efficacy was at a high level (mean = 33.24). Participants with different years of study and academic achievements most learning styles except competitive one had significant differences in learning style scores (P-value < 0.01). Participants in higher year of study were more likely to have higher scores of desirable learning styles. Scores of perceived self-efficacy were significantly different by year of study where those in higher year had higher scores. Scores of 4 learning styles, except those of dependent and competitive styles, were significantly correlated with perceived self-efficacy (P-value < 0.01). **Conclusion:** Desirable learning styes and perceived academic self-efficacy were low in the early year of study. Learning activities should promote desirable learning styles and perceived academic self-efficacy among nursing students.

Keywords: learning styles, perceived academic self-efficacy, nursing students

Introduction

Educational management for nursing students includes teaching and learning both in the classroom and clinical settings. A variety of teaching methods* are applied for teaching such as lectures, discussions, group activities, demonstrations, problem-based learning and practicing in the hospitals and communities. Various teaching and learning styles are employed in nursing education in order to support the learners, nursing students in particular achieve their

learning purposes by enhancing their knowledge, thinking process, critical thinking, creative thinking, and morality and ethics[1-3]

Learning development requires understanding characteristics and the nature of the learners. Instructors should take into account their students' background, interests, needs and learning styles to maximize the effectiveness of learning management and outcomes among the learners. Knowing the differences of learners' learning style helps teachers manage their teaching appropriately, corresponding with the nature of learners, especially their learning style. Therefore, understanding the learners' learning styles is very important since this could facilitate instructors as well as the institutions to respond to their various learning needs and styles[1,2,4]

The learning style is associated with learning behaviors or teaching and learning styles that the learners like and think they can learn well in that particular condition. The learners could achieve a better learning achievement than those who learn by teaching and learning methods that do not align with their learning styles.[2,5] Furthermore, the learners would be able to enhance their knowledge, have a positive attitude towards education or profession as well as be confident in their performance. It could also help enhance professional competency. On the other hand, the management of teaching and learning, regardless of learning needs of the learners, will have reduce negative effects on education achievement such as lack of confidence or low academic achievement.[6,7] Furthermore, the purpose of studying different learning preferences of the learners is to have a better understanding towards them.[3,8]

From previous Thai studies, nursing students had different learning styles.[2,3,9] For example, Wongrattanarak and Chittayanunt[2] examined the patterns of learning styles among students in the Bachelor of Nursing Science program at Boromarajonani College of Nursing using a learning style questionnaire developed by Grasha and Riechmann (1996).[10] The results showed that these nursing students had a high level of participative and collaborative learning styles. The independent and competitive learning styles were in moderate levels and the avoidant learning style was at a low level. Students in different years of study had different scores of collaborative and participative learning styles (P-value < 0.05). Regarding academic achievements, scores of independent, collaborative, and participative learning styles in students with

different cumulative GPA were significantly different (P-value < 0.05).[2] From the reviews, the most popular learning styles used in research are the concept of Grasha and Riechmann (1996)[10], which consists of independent, avoidant, collaborative, dependent, competitive and participative learning styles.

A study in 724 nursing students across 4 years of study in Thailand using learning styles of Grasha and Riechmann (1996) showed that nursing students in each year of study used predominantly collaborative learning style (49.30 - 67.10%), followed by dependent learning style (13.40 - 18.50%).[3] In addition, learning styles in each year of study were statistically different (P-value < 0.05).[3] A study in Canada also found that nursing students in different years of study had different learning styles.[11]

Perceived self-efficacy is another factor that affects the human to compete a certain task or behavior. It is one of the cognitive mechanisms which is relevant to judging one's ability.[12] When individuals act or perform any behaviors, they assess whether they can use what is inherent and to what extent. Individuals' perception of competence was a factor indicating that they make the effort to overcome any obstacles or problems they might encounter. People with high self-efficacy view difficult tasks as more of a challenge than a risk or things to be avoided. People who recognize their own abilities are often the active ones. They usually pay attention to the work they do, have a demand for success as well as efforts and perseverance in working longer than those who perceive a lower level of perceived self-eff*icacy. Those with low perceived academic self-efficacy are more likely to give up when they had difficulty[12,13] Perceived self-efficacy is considered an individual factor associated with the person's learning style. This is consistent with a Thai study revealing that nursing students with different perceived academic self-efficacy had a statistically significant difference in self-direction learning.[14] Based on Zimmerman, individuals should have their own beliefs about some of their arrangement and legislation abilities for achieving academic performance.[15] Bandura stated that individuals believe that they perform their academic duties depending on their own abilities and academic self-efficacy is accepted as a motivational power.[12] Knowing the learning styles that have been adopted according to individuals' beliefs in their academic lives will allow them to be more efficient individuals during their education.[16] Nurse educators are expected to help nursing students to have high

levels of learning competence and to provide quality in the educational process.[17] The nursing schools in Thailand are giving intensive theoretical and practical lessons for nursing students during their 4-year education. With the importance of nursing students' learning styles and their perceived learning self-efficacy, it is promising in studying these aspects among nursing students.

This present study aimed to describe learning styles and perceived academic self-efficacy, to compare their learning styles and their perceived academic self-efficacy according to years of study and academic achievement, and to examine the relationships between the learning styles and academic self-efficacy. The results of this research can be used as a basis for helping nursing faculty design teaching and learning arrangements that take into account students' differences and meet learners' learning characteristics. In addition, the result*s of this study can be used as a guideline for educational administrators, nurses and faculty to develop curriculum and teaching and learning to be more efficient in the future.

Methods

In this cross-sectional survey study, the target population consisted of undergraduate nursing students of Burapha University in the years 1 - 4. Study sample was those in the target population who were willing to participate in the study. The number of sample size in this study was 385. This sample size was based on formula postulated by C*ochran (1977).[17] The 95% confidence was specified. With a type I error of 5%, sampling error of 5%, and proportions with the largest variability (i.e., p = q = 0.5), 385 participants were needed. Sample size for each year was proportional to the class size of each year. With the total number of 170, 194, 163, and 170 students in the first, second, third, and fourth year, respectively, the number of students to be sampled were 91, 104, 88, and 102, respectively. Students in each year of study were selected by convenience sampling method.

Research instruments

The questionnaire contained 4 parts as follows. The **first part** collected demographic characteristics of the participant including year of study, gender, age, and academic achievement (i.e., cumulative grade point average or GPA). Academic achievements based on cumulative were divided into 4 levels as low, average, good, and excellent (cumulative GPA of ≤ 2.49, 2.50 - 2.99, 3.00-3.49, and GPA 3.50 or above, respectively).

The **second part** assessed learning styles. The questions were originally developed by Grasha and Riechmann[10] and later were translated into Thai language by Visudtibhan and Disorntatiwat and used in their study to examine the learning styles of nursing students at a nursing school in Bangkok.[3.] This questionnaire contained 60 items measuring 6 learning styles including independent, avoidant, collaborative, dependent, competitive, and participative styles, with 10 questions for each. The response was a 5-point Likert-type rating scale ranging from 1-strongly disagree to 5-strongly agree. Based on the total score of 1 – 5 points, levels of learning style were categorized as low, moderate, and high (1.00 – 2.33, 2.34 – 3.66, and 3.67 – 5.00 points, respectively). The questions had acceptable internal consistency reliability with Cronbach's alpha coefficients for the 1 – 6 learning styles were 0.70, 0.71, 0.78, 0.75, 0.80, and 0.75, respectively.

The **third part** assessed perceived academic self-efficacy. The questions were originally developed by Rowbotham and Schmitz[13] and translated into Thai using back translation technique by the researcher. This questionnaire contains 10 items to assess 4 aspects of academic self-efficacy including academic learning, knowledge and skill development, social interaction with the instructors, and dealing with the stress caused by studying. The response is a 1-point rating scale ranging from 1-hardly, to 2-moderately, 3-very true, and 4-mostly true. With the possible total scores of 10 – 40 points, higher scores indicate higher academic self-efficacy. The Thai version in our present study, internal consistency reliability was high with a Cronbach's alpha coefficient of 0.82.

Translation process

Questions of academic self-efficacy were translated into Thai using a back-translation technique by two bilingual translators who were* Thai native speakers from the Faculty of Nursing. Each translated Thai version was later blind back-translated independently to English by another two bilingual translators. These two translators had not seen the original English version. Finally, the researchers compared the original and back-translated English versions for cultural acceptability, grammatical consistency, and structure of each item.

Participant protection and data collection procedure

This study was approved by the Burapha University's Human Research Ethics Committee (HU 019/61). The researcher then submitted a letter to the Dean of the Faculty of Nursing, Burapha University to seek permission for data collection. The research team approached the students to introduce the study. Voluntary nature of the study was ensured. Information relevant with this study as well as human right protection for the participants were explained to the nursing students who voluntarily participated in this study. Students were asked t*o answer questionnaires online. The researchers clarified the details for online access and procedure for answering online questionnaires and provided instruction for completing these online questionnaires. By completing the questionnaires online, students consented to participate in this study.

Data analyses

Descriptive statistics including frequency with percentage and men with standard deviation (SD) were used to summarize demographic characteristics and study factor scores of the participants. One-way analysis of variance (ANOVA) was used to compare scores or the behavior and perceived efficacy of the participants in different years of study and with different academic achievements based on cumulative GPA with Sheffe's method for pairwise comparisons. Correlations between scores of each learning style and scores of perceived academic self-efficacy were tested using Pearson's product moment correlation analysis. Statistical significance was set a type I error of 5% (or P-value < 0.05). All statistical analyses were performed using software program SPSS 20.0.

Results

Of the 385 participants, majority of them were women (95.10%). Their age was 20.72 years (SD = 1.23) by average. The number of participants in 1st to 4th academic years was relatively comparable with 23.60%, 27.00%, 22.9%, and 26.5%, respectively. For academic achievement based cumulative GPA, most participants were with good (41.20%) and average (40.00%) level, followed by excellent (9.40%) and low (9.40%) level.

Scores of the 6 learning styles were in the moderate level. Style with the highest score was participative (mean = 3.66;

SD = 0.49), followed by collaborative (mean = 3.52; SD = 0.59), dependent (mean = 3.38; SD = 0.57) 5), independent (mean = 3.37; SD = 0.45), avoidant (mean = 2.95; SD = 0.54) and competitive (mean = 2.85; SD = 0.66). Perceived academic self-efficacy was at a high level with a mean of 33.24 points (SD = 3.67) (Table 1).

Table 1 Descriptive statistics of the learning styles and perceived academic self-efficacy (N = 385).

Variables	Mean (SD)	Possible Range	Actual Range	Level
Learning styles				
Participative	3.66 (0.49)	1 - 5	1.90 - 4.90	Moderate
Collaborative	3.52 (0.59)	1 - 5	1.90 - 5.00	Moderate
Dependent	3.38 (0.57)	1 - 5	1.60 - 4.80	Moderate
Independent	3.37 (0.45)	1 - 5	2.20 - 4.80	Moderate
Avoidant	2.95 (0.54)	1 - 5	1.30 - 4.60	Moderate
Competitive	2.85 (0.66)	1 - 5	1.20 - 4.50	Moderate
Perceived academic self-efficacy	33.24 (3.67)	10 - 40	15 – 40	High

Table 2 Comparisons of learning style scores by years of study (N = 385).

Learning style (mean; SD) by year of study	ANOVA F	Pairs with significant difference[§]
Participative	104.720*	
Year 1 (3.15; 0.36)		Year 1: < Year 2, < Year 3, < Year 4
Year 2 (3.57; 0.48)		Year 2: < Year 3, < Year 4
Year 3 (3.87; 0.24)		Year 3: < Year 4
Year 4 (4.01; 0.30)		
Collaborative	115.042*	
Year 1 (2.86; 0.44)		Year 1: < Year 2, < Year 3, <Year 4
Year 2 (3.54; 0.47)		Year 2: < Year 4
Year 3 (3.64; 0.40)		Year 3: < Year 4
Year 4 (3.97; 0.38)		
Dependent	110.270*	
Year 1 (3.76; 0.58)		Year 1: >Year 2, > Year 3, > Year 4
Year 2 (3.62; 0.34)		Year 2: > Year 3, > Year 4
Year 3 (3.39; 0.35)		Year 3: > Year 4
Year 4 (2.76; 0.39)		
Independent	70.087*	
Year 1 (2.98; 0.37)		Year 1: < Year 2, < Year 3, < Year 4
Year 2 (3.31; 0.38)		Year 2: < Year 3, < Year 4
Year 3 (3.43; 0.33)		Year 3: < Year 4
Year 4 (3.72; 0.35)		
Avoidant	41.664*	
Year 1 (3.35; 0.44)		Year 1: > Year 2, > Year 3, > Year 4
Year 2 (2.98; 0.47)		Year 2: > Year 4
Year 3 (2.87; 0.46)		Year 3: >Year 4
Year 4 (2.61; 0.49)		
Competitive	1.328	Non-significant
Year 1 (2.95; 0.60)		
Year 2 (2.89; 0.64)		
Year 3 (2.78; 0.63)		
Year 4 (2.80; 0.73)		

* P-value < 0.01 based on ANOVA.
§ P-value < 0.05 based on Sheffe's method for pairwise comparisons.

Scores of most learning styles including participative, cooperative, dependent, independent, and avoidant among students with different years of study were statistically different (P-value < 0.01 for all); while such difference of competitive style scores was not (P-value > 0.05). Pairwise comparisons

showed that participants in higher years of study had significantly higher scores of participative, collaborative, and independent learning styles and lower scores of dependent and avoidant learning styles (Table 2).

Scores of most learning styles including participative, cooperative, dependent, independent, and avoidant among students with different academic achievements were statistically different (P-value < 0.01 for all); while such difference of competitive style scores was not (P-value > 0.05). Pairwise comparisons showed that participants with higher academic achievements had significantly higher scores of participative, collaborative, and independent learning styles. Participants with average academic achievement had the highest score of dependent style while those with low academic achievement had the highest score of avoidant style (Table 3).

Table 3 Comparisons of learning style scores by academic achievement (N = 385).

Learning style (mean; SD) by academic achievement[†]	ANOVA F	Pairs with significant difference[§]
Participative	16.772*	
Low (3.28; 0.59)		Low: < Average, < Good, < Excellent
Average (3.56; 0.47)		
Good (3.77; 0.43)		
Excellent (3.94; 0.36)		
Collaborative	11.546*	
Low (3.10; 0.70)		
Average (3.44; 0.60)		Average: < Good, < Excellent
Good (3.62; 0.51)		
Excellent (3.77; 0.44)		
Dependent	13.457*	
Low (3.42; 0.66)		
Average (3.56; 0.52)		
Good (3.27; 0.53)		Good: < Excellent
Excellent (3.01; 0.58)		
Independent	8.634*	
Low (3.17; 0.41)		Low: < Average, < Good, < Excellent
Average (3.29; 0.43)		
Good (3.45; 0.44)		
Excellent (3.57; 0.40)		
Avoidant	13.119*	
Low (3.13; 0.58)		
Average (3.07; 0.48)		Average: > Good, > Excellent
Good (2.87; 0.54)		
Excellent (2.56; 0.43)		
Competitive	1.530	Non-significant
Low (2.95; 0.63)		
Average (2.91; 0.64)		
Good (2.81; 0.70)		
Excellent (2.70; 0.51)		

* P-value < 0.01 based on ANOVA.
§ P-value < 0.05 based on Sheffe's method for pairwise comparisons.
† Academic achievements based on cumulative GPA:
 Low: GPA ≤ 2.49; Average: GPA = 2.50 - 2.99; Good: GPA = 3.00-3.49; Excellent: GPA ≥ 3.50.

Scores of perceived academic self-efficacy of participants with different years of study were statistically different (P-value < 0.01). Pairwise comparisons showed that participants with higher years of study reported significantly higher perceived

academic self-efficacy (P-value < 0.05). However, no statistically significant difference for perceived academic self-efficacy scores in those with different academic achievements (Table 4).

Table 4 Comparisons of perceived academic self-efficacy scores by year of study and academic achievement (N = 385).

Perceived academic self-efficacy (mean; SD) by year of study and academic achievement[†]	ANOVA F	Pairs with significant difference[§]
Perceived academic self-efficacy	11.421*	
Year 1 (32.02; 3.55)		Year 1: < Year 3, < Year 4
Year 2 (32.70; 4.24)		Year 2: < Year 4
Year 3 (33.28; 3.04)		Year 3: < Year 4
Year 4 (34.84; 3.08)		
Perceived academic self-efficacy	2.280	Non-significant
Low (32.28; 4.08)	(P-value = 0.79)	
Average (32.92; 3.50)		
Good (33.60; 3.78)		
Excellent (34.00; 3.22)		

* P-value < 0.01 based on ANOVA.
§ P-value < 0.05 based on Sheffe's method for pairwise comparisons.
† Academic achievements based on cumulative GPA:
 Low: GPA ≤ 2.49; Average: GPA = 2.50 - 2.99; Good: GPA = 3.00-3.49; Excellent: GPA ≥ 3.50.

The learning styles which were significantly associated with perceived academic self-efficacy included participative (r = 0.485), collaborative (r = 0.382), independent (r = 0.468), and avoidant (r = -0.243) (P-value < 0.01); while dependent and competitive styles were not (Table 5).

Table 5 Correlations between perceived academic self-efficacy with each of learning styles (N = 385).

Learning style	Coefficient coefficient (r)
Participative	0.485*
Collaborative	0.382*
Dependent	-0.053
Independent	0.468*
Avoidant	-0.243*
Competitive	0.088

* P-value < 0.01 based on Pearson's product moment correlation analysis.

Discussions and Conclusion

Most used learning styles among nursing students of Burapha University were participative style followed collaborative, dependent, independent, avoidant, and competitive styles. The highest two styles i.e., participative and collaborative styles, were styles that need working with other people. In addition, these nursing participants reported the lowest scores towards competitive learning style. The results are consistent with the study conducted by Wongrattanarak and Chittayanunt.[2] Apart from students'

individual work, nursing students are also required to work in a group both in classes and clinical settings. Thus, the nursing students have to cooperate in working with others, these resulted in higher scores in the styles that dealing with others including participative, and collaborative learning styles. In addition, the majority of participants were women (95.10%). With their psychological characteristics, female students tend to collaborate and participate with other students of the same sex. In addition, health science students, nursing in particular, in comparison to humanity students, are more participative and collaborative because they have more collaboration in their course works and practicum. Although it seems there is more interaction among humanities students, group work and collaborative projects are more common among nursing students. This could be a possible reason for the higher scores in these two styles. Students who have strong friendship networks and communication styles tended to use more cooperative learning and be more successful in their learning.[17] It was found that scores of participative, collaborative, dependent, independent, and avoidant styles were significantly different regarding difference in years of study and academic achievement (cumulative GPA); scores of competitive style, on the other hand, were not. This study results are consistent with previous studies [2,3.]

Nursing students in this study had perceived academic self-efficacy at a high level. Nursing students with different years of study had different levels of perceived academic self-efficacy. First-year nursing students had the lowest level of academic self-efficacy whereas those in fourth year reported the highest level of this efficacy. The findings could be attributable to less knowledge and experience among first year students. First year students also had to adjust themselves for their transition from high school to university education. There are different teaching and learning conditions in each year of study. First year students study general education subjects and basic professional courses. Second year students study subjects relevant to nursing profession. For 3rd and 4th year students, most of the subjects taught are both didactic and practical focus. With higher years of study, students gain more knowledge and skills which made them report more confidence in academic learning. This study results corresponds to the study conducted by Suwannit which found that factors directly related to academic self-efficacy were learning skills and experiences.[20] Regarding perceived academic self-efficacy, it was found that the higher year of study as well as a better academic achievement, the more perceived academic self-efficacy were reported. The fourth-year nursing students reported a high level of academic self-efficacy, which could be linked to the quality of their educational experience.

Significant, positive relationships were found between perceived academic self-efficacy and participative, collaborative and independent learning styles. Significant, negative relationships were found between perceived academic self-efficacy and avoidant learning style. No significant relationships between dependent and competitive learning style with perceived academic self-efficacy. The students with high academic self-efficacy pay attention to achieving goals requiring learning by trying harder [21] and have higher willpower regarding success by struggling with the difficulties that they face in learning environments. At this point, the students with high academic self-efficacy in educational environments are thought to get motivated to use their learning styles and cognitive abilities in the foreground by trying harder.[22] As previously stated, students are more likely to report higher scores in the learning styles that deals with others such as participative, and collaborative, and these learning styles were also correlated with academic self-efficacy.

This study has certain limitations. First, the learning styles and perceived academic self-efficacy could be affected by personality traits. Since personality traits were not controlled in this study, confounded results could be expected. In addition, the participants were recruited from only one setting. Audience should be cautious to generalize to other settings such as private university nursing schools. Studies in nursing students in other universities and colleges need to be explored as well. This was a cross-sectional study, a dynamic nature of learning styles and perceived academic self-efficacy could not be fully captured. Longitudinal study to monitor changing patterns of and relationships between learning styles and perceived academic self-efficacy among the nursing students should be conducted. In addition, other factors contributing to different learning styles and perceived academic self-efficacy should also be examined in order to gain insight of the issues which can be useful for future nursing education management.

In conclusion, a variety of learning styles and the perception towards academic self-efficacy are significant to the management of teaching and learning which are suitable for nursing students. Therefore, nursing schools should

emphasize the development of teachers' awareness towards the importance of learners' learning styles as well as the enhancement of perceived academic self-efficacy, especially in their early year of study. In addition, developing a variety of teaching and learning management which respond to learners' preferred learning styles as well as strategies to enhance their academic self-efficacy in cooperation with the use of technology should be a priority.

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