Original Article

The relationship between learning styles and academic procrastination in nursing students

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Abstract

Background & Objective: The concept of academic procrastination among nursing students holds significant importance due to the sensitive nature of the field and the necessity to attain adequate educational and clinical competence. The purpose of this research therefore was to determine the correlation between nursing students' learning styles and academic procrastination.

Material & Methods: This study with the nature of a correlational descriptive method took place in 2023 and the population sample included 253 students from first to sixth semesters enrolled in Abhar School of Nursing, associated with Zanjan University of Medical Sciences, employed by the census method. Participants filled in three questionnaires, namely demographic, learning style according to Kolb, and academic procrastination.

Results: According to the survey, the most and least common learning styles were convergent (15.9%) and divergent (32.1%). The mean procrastination score in academia was 70.89 ± 8.34. The findings of the ANOVA test showed a substantial correlation between students' academic procrastination and their learning styles. Study showed that students with divergent and assimilator learning styles were more likely to procrastinate academically than those with convergent and accommodator learning styles ($p < 0.05$). Additionally, among nursing students, academic procrastination was predicted by both accommodating and divergent learning styles ($P < 0.05$).

Conclusion: The results of this study showed a connection between nursing students' academic procrastination and their learning styles. It is recommended that vulnerable students be identified, and workshops be planned and implemented to enhance their learning styles and reduce procrastination.

Keywords: learning styles, procrastination, nursing student

Introduction

Learning, a crucial component of human adaptability, is the relatively steady modification of behavior brought about by experience (1). A set of comparatively constant cognitive, emotional, and physical attributes make up learning styles, an essential component of learner characteristics (2). There are several theories concerning learning styles; Kolb's learning theory is one of the most often applied. The four different learning styles identified by Kolb's model are divergent, convergent, accommodator, and assimilator. Objective experience (feeling) is in opposition to abstract conceptualization (thinking), and active experimentation (doing) is in opposition to reflective observation (observing) (3).

Individuals with divergent learning styles learn through experimentation and observation, possessing the ability to perceive situations from various perspectives and integrate communication into a meaningful whole (4). Assimilator learners prefer thinking and close examination, proficiently organizing information and utilizing abstract concepts to comprehend situations (5). Convergent learners are excellent at applying concepts and theories to solve particular situations. They do this by thinking critically about subjects and participating in relevant activities (4). In contrast, accommodator learners benefit greatly from experiential learning, where they may demonstrate their skill with items and engage

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in activities that introduce them to new experiences (5). Remarkably, among Iranian medical and nursing students, accommodating and divergent learning styles are found to be the most prevalent (6, 7). Learning styles are especially important in nursing education because they support the main goal of preparing competent nurses with the information, attitude, and abilities needed to maintain and improve the health of society (8). Effective time management, appropriate learning environments, motivation and goal-setting, and preparation are only a few of the many aspects that influence learning (9). Procrastination is a multifaceted issue with behavioral, emotional, and cognitive components that can be mitigated in large part by practicing effective time management (11). Academic procrastination is a common problem that negatively affects learning and academic achievement in university students (12). Actually, it's believed that more than 70% of students procrastinate on their academic work (13), a problem that affects almost 50% of Iranian nursing students (14–17). Academic procrastination can result in subpar performance, negative emotional responses, and significant consequences for one's general well-being, physical health, and mental health (11, 12). In the end, it results in students who are less motivated and who perform less academically (13). Taking into account the future duties nursing students will have in overseeing human life, tackling academic procrastination is essential to guarantee the graduation of competent and skilled nurses, protecting the public's health (18).

While individual studies have examined nursing students' learning styles and academic procrastination separately, the relationship between these concepts, particularly in nursing students, has received minimal attention. Therefore, conducting research in this area can raise awareness of this issue. Understanding the learning styles that contribute to academic procrastination can guide future research toward strengthening these styles to alleviate procrastination. This prompting led to the planning and implementation of the present study, aimed at exploring the relationship between learning styles and academic procrastination in nursing students.

Material & Methods

Design and setting(s)

The study employed a descriptive-correlational design and was conducted at the Abhar School of Nursing affiliated with Zanjan University of Medical Sciences, Zanjan, Iran.

Participants and sampling

The research included all students from the first to sixth semester. A total of 253 students were selected for participation using a census method. Inclusion criteria encompassed participants' desire to engage in the research, full-time enrollment in nursing studies, absence of psychiatric illnesses and related medication, while incomplete questionnaire responses served as exclusion criteria.

Tools/Instruments

The data collection tools comprised three demographic questionnaires, the Kolb learning styles questionnaire, and an academic procrastination assessment. The demographic questionnaire gathered information on age, gender, marital status, academic semester, grade point average (GPA), native status, and degree of interest in the field.

There are 12 questions in the Kolb's III learning styles questionnaire, and each question has four possible answers. Students must select the option that most closely matches their preferred method of learning. These choices line up with the four primary approaches to learning: active experimentation (AE), abstract conceptualization (AC), reflective observation (RO), and concrete experience (CE).

From the total of questions in the four sections, four scores are obtained, representing four ways of learning. These scores are derived by subtracting two learning methods from each other: Abstract conceptualization from concrete experience and active experimentation from reflective observation. The scores are then shown on two coordinate axes: AE - RO on the horizontal axis, and (AC - CE) on the vertical axis. The learning styles of the participants are ascertained by combining these scores with the cut points suggested by the questionnaire authors:

1. Divergent = (AC-CE) $\leq$ 7 and (AE-RO) $\leq$ 6
2. Accommodating = (AC-CE) $\leq$ 7 and (AE-RO) $\geq$ 7
3. Assimilating = (AC-CE) $\geq$ 8 and (AE-RO) $\leq$ 6
4. Converging = (AC-CE) $\geq$ 8 and (AE-RO) $\geq$ 7

Over the past three decades, this scale has been used in many investigations, and its validity and reliability have been confirmed. In Ghahremani et al.'s (2013) research, internal consistency and Cronbach's alpha were employed to assess the data's reliability. The Cronbach's alpha coefficients for concrete experience, reflective observation, abstract conceptualization, and active experimentation were 71%, 68%, 71%, and 71% respectively (19).

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The academic procrastination questionnaire was created by Solomon and Rothblum. It consists of 27 items that look at three different areas: preparing for tests (8 questions), preparing for assignments (11 questions), and preparing for papers due at the end of the semester (8 questions). Furthermore, the grades for items 2, 4, 6, 11, 13, 15, 16, 21, 23, and 25 are reversible. Likert scales from one to five are used in this questionnaire, and scores range from 27 to 135. Total procrastination is indicated by a score of 27–54, 54–81 for low and moderate procrastination, and 81–135 for high academic procrastination (20). Using the Cronbach's alpha approach, the total scale reliability in Solomon and Rothblum's study was found to be 0.79, and its validity was verified at 0.84 (21). Additionally, Jokar and Delavarpour (2007) verified the reliability of the scale using a Cronbach's alpha coefficient of 0.91 and confirmed its validity through factor analysis using the principal components method, which indicated the existence of a general factor (22).

Data collection methods

Two weeks before the end of the semester exams, the questionnaires and consent form were distributed to participants using the online Porsline system (www.porsline.ir). Researchers also provided their contact details for addressing any queries from the participants

Data analysis

Using both descriptive (frequency, precentage, mean, and standard deviation) and inferential (Pearson correlation, ANOVA, and independent t-tests) statistics, the gathered data were examined using the SPSS v16.

Results

Seven of the 253 study participants were dropped from the study because their questionnaires weren't completed in full. As a result, an analysis was done on the data from 246 individuals. The students' average age was 21.26, and 61.8% of them were female. 45.5% of participants had a GPA between 16 and 18, and 84.9% of participants were single. Furthermore, 88.6% of students said they were interested in becoming nurses.

In the next phase, the results from the questionnaires regarding learning styles and academic procrastination were analyzed. The findings indicated that divergent (31.2%) and convergent (15.9%) styles were the most and least utilized learning styles among the study participants, respectively. Additionally, the overall score for students' academic procrastination was 70.89 ± 8.34 (**Table 1**).

Table 1: frequency of learning styles and the Mean ± SD of academic procrastination in the participants

Variables			
Learning Styles	N (%)	Academic Procrastination	Mean ± SD
Diverging	79 (32.1)	Preparing for exams	27.16 ± 2.24
Accommodating	74 (30.0)	Preparing assignments	20.26 ± 1.73
Assimilating	54 (22.0)	Preparation of end-semester papers	23.47 ± 3.42
Converging	39 (15.9)	Total	70.89 ± 8.34

Abbreviations: N, number of participants; SD, standard deviation.

In ontinuation of the analysis of the findings and in line with the primary goal of the research, the relationship between learning styles and academic procrastination among the participants was examined. After the study data were first examined for normality, parametric statistical tests were deemed suitable ($p > 0.05$) based on the findings of the Kolmogorov-Smirnov test.

The relationship between academic procrastination and learning styles was then examined using an ANOVA test (**Table 2**), which showed a significant correlation ($p < 0.001$) between academic procrastination and all four learning styles.

Furthermore, a multiple regression (simultaneous model) was employed to predict academic procrastination based on learning styles. The analysis showed that 8.2% of the variance in academic procrastination could be explained by the students' learning styles ($F = 2.92$, $R = 0.263$, $R^2 = 0.102$, adjusted $R^2 = 0.082$, $p < 0.05$). However, only the divergent and accommodator learning styles emerged as significant predictors based on the regression coefficients (**Table 3**).

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Table 2: ANOVA test to investigate the relationship between learning styles and academic procrastination of the participants

Variables	Learning Styles				Test	P- value
	Diverging	Accommodating	Assimilating	Converging		
Academic Procrastination	79.11 ± 9.01	59.27 ± 6.62	77.90 ± 8.28	63.88 ± 9.51	ANOVA	<0.001

Abbreviations: ANOVA, analysis of variance; SD, standard deviation; P-value, probability-value.

Table 3. The results of the multiple regression analysis to predict academic procrastination based on the student`s learning styles

Criterion variable	Predictor variables	Not standardized coefficients		Standardized coefficients	T	P
		β	Std. Error	β		
Academic Procrastination	Constant	84.53	11.22	-	6.23	0.001
	Diverging	0.41	0.21	0.24	3.61	**0.011**
	Accommodating	- 0.33	0.15	- 0.18	- 2.11	**0.034**
	Assimilating	0.11	0.12	0.01	0.13	0.86
	Converging	0.13	0.17	-0.05	0.15	0.83

Note: A significance level of $p < 0.05$ was considered statistically significant.
Abbreviations: β, unstandardized coefficient; Std. Error, standard error of the coefficient; β, standardized coefficient; T, t-value; P, probability-value.

The association between the participants' learning styles, demographic characteristics, and academic procrastination was examined in the last phase of the analysis. For this, ANOVA, Pearson's correlation coefficient, and parametric independent t-tests were employed. The findings revealed that there was no statistically significant correlation ($p < 0.05$) between the participants' demographic features and any of the learning styles. Nonetheless, a significant correlation was observed between the academic procrastination of the participants and their demographic characteristics, including age, gender, semester, GPA, and interest in nursing ($p < 0.05$) (**Table 4**).

Table 4: Relationship between demographic variables with learning styles and academic procrastination of the participants

Demographic characteristics	Academic Procrastination	Diverging	Accommodating	Assimilating	Converging
Age	**0.023*** (r= +0.027**)**	0.640** (F = 0.056)	0.424** (F : 0.078)	0.133** (F : 1.34)	0.346** (F : 0.093)
Gender	**< 0.001*** (t : 4.32)**	0.224** (F : 0.126)	0.092** (F : 2.12)	0.101** (1.72)	0.089** (F : 2.13)
Marital status	0.644*** (t : 0.243)	0.122** (F : 0.342)	0.343** (F : 0.097)	0.128** (F : 1.57)	0.692** (F : 0.045)
Semester	**< 0.001**** (F: 3.32)	0.260** (F: 0.133)	0.114** (F: 1.06)	0.072** (F: 2.95)	0.134** (F : 1.32)
GPA	**0.024*** (r = -0.019**)**	0/061** (F : 2.44)	0.234** (F : 0.169)	0.671** (F : 0.063)	0.094** (F : 2.08)
Interest to nursing	**< 0.001*** (t : 5.44)**	0.234** (F : 0.169)	0.856** (F : 0.015)	0.605** (F : 0.071)	0.219** (F : 0.244)

Notes: *Pearson correlation, ** ANOVA, *** Independent t-test.
Abbreviations: GPA, grade point average; r, correlation coefficient; F, F-value from ANOVA; t, t-value from t-test; P-value, probability-value.

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Discussion

This study investigated the relationship between nursing students' learning styles and academic procrastination.

Firstly, the research variables are examined, and then the relationship between these two variables will be explored. The most frequently used learning style among nursing students was found to be divergent. This discovery aligns with the results of several domestic (23, 24) and international (25-28) studies. It can be inferred that individuals with a divergent learning style possess dominant abilities in objective experience and reflective observation. They tend to perceive situations from multiple perspectives, emphasize brainstorming and idea generation, demonstrate a strong imagination, exhibit sensitivity to values, show respect for the feelings of others, and engage in open-minded and impartial listening (23). Given that more than half of nursing students' courses are held in practical and clinical settings, it has been observed that this learning approach is well-suited for these settings (23, 25). Additionally, in line with previous research in this area, the results showed no discernible correlation between the individuals' learning styles and demographic traits (29–31). It can be inferred that learning styles are a reflection of individual characteristics and are less influenced by demographic variables (31).

Based on the results of the study, the level of academic procrastination among nursing students was reported to be at an average level, consistent with the findings of numerous studies conducted in Iran (14-17) and other countries (32,33). It's crucial to remember that many studies have produced contradictory results. For example, Moya-Salazar et al. found that nursing students procrastinate a lot in their academic work (34). Their study concentrated on nursing students enrolled in advanced semesters, which is consistent with the general conclusion drawn from related research, such as this one, that students enrolled in advanced semesters are more likely to procrastinate when it comes to their academic work. On the other hand, Budury et al. found that academic procrastination was low in their study (35), where most of the participants were female and the average age of the group was lower. Curiously, the results of this study are somewhat supported by other studies that have found higher rates of academic procrastination among male and older students. Moreover, among other demographic variables, GPA and interest in nursing were found to be directly related to academic procrastination in students. Ghaffari et al., in a qualitative study involving interviews with nursing students and instructors, identified a lack of interest in the field and inadequate knowledge and skills as the most significant factors contributing to academic procrastination among nursing students (36). These findings are consistent with the results of the present research.

ased on the most significant finding of this research, there was a discernible relationship between learning styles and academic procrastination in nursing students. Specifically, two learning styles, divergent and assimilator, exhibited significant correlations with academic procrastination, indicating that students who favored these two learning styles reported higher levels of academic procrastination. This is consistent with the results of Tabassum et al. (37) studies. Reflective observation is a common characteristic of both divergent and assimilator learning styles. In this learning process, individuals rely on objectivity, patience, and precise judgment and show less propensity to take quick practical action. As a result, students could complete their assignments with inadequate planning, which frequently leads to task delays and increased levels of academic procrastination (37,38). On the other hand, academic procrastination was less common among students with convergent and accommodator learning styles, which is consistent with the findings of two other pertinent studies in this area (39, 40). Tabassum et al. noted in their study that learners with accommodator and convergent learning styles tend to have a positive attitude toward tackling challenging tasks and prefer to confront and complete such tasks. These individuals engage in purposeful planning and perceive themselves compelled to complete tasks as promptly as possible, factors that are associated with reduced academic procrastination (37). Therefore, the negative relationship between adaptive learning styles and academic procrastination can be elucidated based on these characteristics.

Based on the latest study findings, divergent and accommodative learning styles were identified as significant predictors of academic procrastination in nursing students. This observation aligns with prior research indicating that learners' communication skills (41) and their levels of self-discrepancy, involving a tendency to prioritize others' opinions over their own (42), were predictive of academic procrastination. Given that individuals with divergent and accommodator styles typically exhibit strong communication skills and are more receptive to the opinions of others rather than relying solely on their own analysis, these findings

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indirectly corroborate the results of the present study (4,5). Therefore, it seems sense to draw the conclusion that these two learning styles can be used to predict how much nursing students procrastinate in their academic work.

Due to the electronic data collection technology and the large number of questions, one limitation of this study was the possibility of incomplete and erroneous questionnaire completion. In order to overcome this constraint, participants were called at the time of data collection and given the required direction and counseling. The use of self-reporting tools, which the researcher had no control over, was another drawback.

Conclusion

The study's findings revealed a correlation between learning styles and academic procrastination in nursing students. As a result, it is recommended that students exhibiting a propensity for academic procrastination based on their learning styles be identified. Workshops aimed at enhancing learning styles with minimal procrastination and effective time management should be scheduled and executed for these students. Furthermore, given the complexity of the concepts of learning styles and academic procrastination, it is advisable to incorporate other theories, tools, and qualitative or mixed studies in future research endeavors.

Ethical considerations

Permission to conduct the current study was secured from the Research Department and Ethics Committee of Zanjan University of Medical Sciences (IR.ZUMS.REC.1402.095, available at: https://ethics.research.ac.ir/). All participants were briefed on the study's objectives, the confidentiality of their information, and the voluntary nature of their participation. Moreover, all students completed the informed consent form.

Artificial intelligence utilization for article writing

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Conflict of interest statement

The researchers declare that they have no conflict of interest in any of the research stages

Author contributions

The study was designed with contributions from all the authors. AJ and HH were responsible for data collection, while SKM and AJ conducted the data analysis and interpretation. All authors participated in writing the manuscript and have reviewed and approved the final version.

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Data availability statement

The data for this study is fully available within the article.

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