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Learning strategy and its effect on academic achievement

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Abstract

This study aimed to examine the correlation between learning strategies and academic achievement of undergraduate students. A self-report questionnaire was designed to collect data from a sample of 1127 students at Nong Lam University, Ho Chi Minh City, Viet Nam, who took part in the study. Pearson' product moment correlation coefficients was used to measure how students' learning strategies affected their academic performance. The results revealed a lack of correlations between academic achievement and six subscales of learning strategies namely anxiety, concentration, information processing, selecting main ideas, self testing and test strategies. In fact, only 3 subscales: attitudes, motivation and study aid were discovered to have a close relationship with the achievement students gain at university.

Introduction

Improving student's academic performance is one of the crucial goals of higher educational institutions all over the world. Academic achievement, a significant predictor of the student's success or failure, is also closely related with initial salary of alumni Wise (1975), Blankertz & Robinson (1996). There have been a substantial number of literatures on how to achieve good results at school. Studies over the years have already pointed out numerous factors related to academic achievement, such as efficiency of human resource management (Omari Hemedi Makore & Hamidu Saleh Shukuru, 2017), socio economic status (Chandra & Azimuddin, 2013; Nisar et al., 2017), study habit (Nisar et al., 2017), self-efficacy (de Fátima Goulão, 2014; Tenaw, 2013), learning interest and attitude to school (Kpolovie et al., 2014), student engagement (Glapaththi et al., 2019). Henceforth, students' academic achievement is a multifaceted element, which depends upon various internal and external factors of an individual. According to the study conducted in Colleges of Education in Southwest, Nigeria by Olufemioladebinu et al. (2018), students' academic achievement had a close and positive relationship with educational background of their parents, home- related issues like family engagement, school facilities, teachers' effectiveness/teaching methods and habits of the students.

Students apply diversified strategies to achieve their educational objectives. Factors which affect the choice of learning strategies include, but are not limited to, individual differences, teaching approach, goal orientation, motivation, attitude, learning technologies, ways of measurement, etc. (Ames & Archer, 1988;

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Milano & Ullius, 1998). Reality shows that different learning styles lead to different academic results. Therefore, learning strategies are increasingly considered as a great tool to improve academic achievement. The question regarding the relationship between certain strategies used and academic achievement may be raised by stakeholders, and the answer to that question is vital for creating effective learning. Gerami and Baighlou (2011) in their study on learning strategy of Iranian EFL students indicated that students who utilized a broader range of learning strategies are more successful and distinguishable from unsuccessful ones.

While there have been a considerable number of international studies on this subject, the issue is not given much concern in Viet Nam. Understanding students' learning strategy could help solve related educational issues, facilitate the learning process and thus improve academic achievement (Salehi & Enayati, 2009). Since students' academic results depend on several factors, understanding each individual factor, in particular setting, could improve performance. Hence, the aim of this study was to identify learning strategies used by undergraduate students and measure the relationship between learning strategies and academic achievement. This paper is intended to contribute to the literature by presenting new empirical data on the subject.

Literature Review

Definitions of Related Terms

Learning Strategies

According to Oxford (1990), *learning strategies* are activities/actions performed by the learners, which aim to facilitate the acquisition, storage, retrieval, and use of information, and more significantly, to enhance efficient learning. This point of view is in line with that of a number of educators and learners who consider strategies as critical tools to promote learning outcomes or academic achievements. Weinstein and Mayer (1983) defined "*Learning Strategies* as behaviors and thoughts in which a learner engages and which are intended to influence the learner's encoding process" (p.3). It means that *learning strategies* manifested by actual thinking and actions can maintain lasting effort and consequently play a decisive and direct role in enhancing the academic performance. Due to their importance, the investigation for insights about measurement of these learning factors have been carried out in order that proper manipulation could be made for better learning. To this extent, Weinstein and Schulte (1987) created the questionnaire named Learning and Study Strategies Inventory to measure ten subscales of learning strategies, each of which was grouped into one of three components / scales of strategic learning. Firstly, *skill* component/scale includes three subscales of *information processing*, *selecting main ideas*, and *test strategies*. Secondly, *will* component / scale also consists of three elements*:* *anxiety*, *attitude*, and *motivation*; and the last, *self-regulation* / learning strategy component/scale, has four subscales: *concentration*, *self testing*, *time management* and *study aid*/ using academic resources. The meanings of the ten subscales can be briefly described as follows.

The *Information processing* in *Skill* component/ scale measures the level to which student use skills as learning strategies to help learn new information; *Selecting main ideas* assesses students' thinking skill to distinguish information that is essential for further analysis from not-so-relevant details; and *Test strategies* evaluates the students' effective use of test preparation and test taking strategies (Weinstein et al., 2002).

As for the *Will* group, *anxiety* subscale refers to the degree to which students worry about their academic performance and school- related issues. Another element of *Will* group is *attitude* that evaluates students' feeling and interest related to their goals in university; and *motivatio*n subscale examines students' diligence and willingness to work hard to successfully complete all school requirements.

In terms of *Self-regulation*, this category is quantified by a combination of 4 measurement subscales: i.e. (1) *Time Management* refers to students' ability to manage their time in learning; (2) *Concentration* involves the ability of students to keep their attention/ focus on learning activities; (3) *Self- Testing* is students' usage of reviewing techniques to assess their understanding of the learning materials; and (4) *Study aids* involves how students' usage of assets to help their learning.

Academic achievement

As defined by Biswas and Aggarwal (1971) in the Encyclopedic Dictionary and Dictionary of Education, *academic achievement* or academic performance is considered as knowledge achieved or skill created in academic subjects, and it's usually derived from test scores. This explanation was consistent with that of Good (1959), who also regarded *academic achievement* as the knowledge attained and skill developed in school subjects which were usually weighed from test scores or marks. In other words, an *academic achievement*

involves a quantitative outcome of a learning process during an academic year when the major evaluation depends on the exam results of a student which demonstrate his/her comprehensive understanding of a subject. There are a variety of methods to assess the achievement, among which, Grade Point Average (GPA) is mostly used. Its variation, the Cumulative Grade Point Average (CGPA) from the course exams, in the current study, is the numerical reflection of a student's academic achievement.

Learning Strategies and Academic Achievement

Many researchers have used the Learning and Study Strategies Inventory (LASSI) to investigate the relationship between student's *learning strategy* and *academic achievement*. When compared, it can be seen that most of them share similar ideas. Harrison et al. (2003) reasoned that students who adopt effective learning strategies would obtain high academic results. In the same vein, Cano (2006), after analyzing the relationship between the latent structure of learning and study strategies and students' academic performance, stated that affective strategies (including subscales: time management, motivation, concentration, and attitude), goal strategies (consisting of subscales: test strategies, anxiety, and selecting main ideas) and academic achievement of undergraduate students were definitely interrelated.

With similar perspectives, Martín et al. (2008) indicated that students who have high scores on learning strategy obtained higher academic outcomes. Additionally, Gerami and Baighlou (2011) surveyed English language students and came to the conclusion that successful students used a broader range of learning and studying strategies than their failed classmates. Simsek and Balaban (2020) also reported students who used diverse, and better learning strategies are likely to success in school than-others.

This point of view is restated by Salehi and Enayati (2009) in their survey of 386 students at Mazandaran Islamic Azad University, where they found out that skill, will and self-regulation, were statistically closely associated to students' academic achievement. Likewise, Mohammadi et al. (2017) discovered that skill, will and self-regulation is correlated with academic outcomes. The findings were consistent with Loomis' results (2000) which suggested that *Attitude*, *Time Management*, *Concentration*, *Selecting Main Ideas*, and *Study Aids* bear a significant correlation with no less than one component of the course assessment (including final grade, and scores on exams, projects, and assignments). With the same view, Flowers et al. (2012) indicated that anxiety and test strategies were related to academic achievement. Schutz et al. (2013) provided further evidence that the anxiety, concentration, selecting main ideas, and test strategies are the best predictors of academic success.

On the other hand, Taheri et al. (2017) surveyed 447 students of Guilan University and concluded that there was no significant correlation between *skill*, *will*, *self-regulation* and student's *academic achievement*. These results were somehow different from those by Alkhateeb and Nasser (2014), who suggested that all ten subscales and academic achievement were really interrelated.

In Vietnam, most of the studies on learning strategy focus on second language learning. A study conducted by Nguyen Huu Binh (2014) in Danang University on French learning strategies found low-medium frequency in the students' using language learning strategies. The most preferable strategies were information reception, treatment and focalized reviewing strategies while the least used ones were language practicing and memory. With a similar context of university education, Nguyen et al. (2021) investigated the language learning strategies employed by English juniors at Dalat University. The results revealed that students' academic achievements have been positively affected by learning strategies (compensation strategy). This finding was significantly comparable with that of the experimental design by Le et al. (2016) when the authors, upon examining the effectiveness of application of intensive reading strategies, concluded that the experimental group had higher scores compared with the control one. As a result, it was evident that the application of these strategies partly improved the reading skills.

Other studies focus on particular subscales of learning strategies (i.e. motivation, attitude, skills, etc.) and their relationship with academic achievement. Especially, Ngo and Vo (2021), with a recent study carried out in Can Tho University, confirmed the significance of learning strategies towards the outcomes when critical thinking and solving skills were proved to have positive effects on student's academic achievement. The corresponding correlation between students' self-learning skill and learning outcomes was reported in the research by Do and Do (2016) at Ho Chi Minh City University of Technology and Education.

Methodology

This research applied the quantitative approach, particularly, with the survey- descriptive-correlative method employed. Data were collected through a questionnaire and analyzed using descriptive and inferential statistical methods. SPSS Version 22 was used as a tool for analyzing the quantitative data in the study.

Instrument

A number of tools can be used to measure learning strategies, such as The Motivated Strategies for Learning Questionnaire (MSLQ) written by Pintrich et al. (1991), The Components of Self-Regulated Learning (CSRL) created by Niemivirta (1998), Self-Regulated Academic Motivation (SRAM) developed by Wolters (1999), The Learning and Study Strategies Inventory (LASSI) writen by Weinstein et al. (1987), etc. The results of the available literatures indicated that LASSI has been applied extensively in higher education, and it has been said to have an appropriate degree of reliability (Cano, 2006; Flowers et al., 2012; Iqbal et al., 2010; Loomis, 2000; Schutz et al., 2013; Taheri, et al, 2017; Zhou et al., 2016). Therefore, this study used the Learning and Study Strategies Inventory second version for collecting data about learning and study strategies used by students. The LASSI consists of 10 subscales: attitude, motivation, time management, anxiety, concentration, information processing, selecting main ideas, study aids, self-testing, and test strategies. Each subscale was measured by 8 items. These ten subscales cover three main components/ scales called *skills* (includes three subscales: information processing; selecting main ideas; and test strategies), *will* (includes three subscales anxiety, attitude, and motivation) and *self-regulation* (or study strategies, including four subscales: concentration, self-testing, study aids; and time management). The reliability of the subscales was tested by the author and the Cronbach's alphas ranged from .73 to .89 (Weinstein & Palmer, 2002). The accumulative grade point average (CGPA) was used to assess student academic achievement.

Translation of the Tool

Participants were administered a Vietnamese version of the LASSI which was translated from the English scales developed and revised by Weinstein and Palmer (2002). Cronbach's alpha was used to test the reliability of the Vietnamese LASSI. The results showed that the Cronbach's Alpha value of time management scale was lower than .60, thus, it was removed. Nine other scales had Cronbach's Alpha values range from .666 to .762, indicating a relatively strong internal reliability of the scale, as shown in Table 1.

Population, Sample and Sampling Technique

The sample of the study consisted of 1127 full-time undergraduates studying in different majors at Nong Lam University, Ho Chi Minh City, Viet Nam: 257 students from Food Technology Department (22.8%), 125 students studying Business Administration (11.1%), 104 students majoring in Veterinary Medicine (9.2%), 87 students from Economics (7.7%) Department, 53 students studying Animal Science (4.7%), 48 students learning Agronomy (4.3%), 46 students majoring in Rural Development (4.1%), 43 students learning Agricultural Technology Education (3.8%), 39 students of Biotechnology (3.5%), 38 students majoring in Information Technology (3.4%), 37 students from Accounting Department (3.3%), 29 students of Chemical Engineering and Processing (2.6%), 26 students studying Aquatic Products Processing

Table 1 Reliability analysis

Scales	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N* of Items
Anxiety	.742	.749	8 (29,35,43,46,61,69,72,78)
Attitude	.660	.666	6 (17, 41, 48, 51, 70, 76)
Concentration	.736	.736	5 (16, 32, 49 55, 79)
Information processing	.762	.765	8 (3, 11, 15, 23, 27, 44, 50, 58)
Motivation	.678	.678	7 (14, 30, 39, 42, 56, 65, 80)
Select main ideas	.729	.728	5 (21, 24, 53, 57, 73)
Self-testing	.750	.750	8 (9, 18, 25, 33, 37, 47, 60, 74)
Study aids	.669	.670	5 (12, 40, 54, 71, 77)
Test strategies	.731	.733	7 (2, 5,19, 26, 38, 45, 63)
Time management	.479	.476	8

Technology (2.3%), 26 students majoring in English Language Studies (2.3%), and the rest come from Aquaculture, Horticulture and Landscaping, Natural Resources and Environmental Management, Environmental Management, Automotive Engineering Technology, Land Management, Mechatronics Engineering Technology, Plant Protection, Forestry, Mechanical Engineering Technology, Environmental Science, Control Engineering and Automation, Environmental Engineering, Heat and Refrigeration Engineering Technology, Food Processing Engineering, Wood Technology, and Forest Resources Management.

The convenient sampling method was applied. The Google form questionnaire was sent to the participants, and they were asked for their voluntary participation in the survey. Issues related to securing of personal data, using of responses were also specified to comply with ethical requirements

Data collection

The self-report questionnaire using Google Forms was administered by the researcher in this study. The Google Forms link was sent to students' email to ask for their voluntary participation. Participants were sufficiently informed that they were involved in a study on the learning strategies and that the recorded answers were not classified as right or wrong. In addition, they were also notified to reserve the right to withdraw from the study at any time without penalty as well as the potential uses of the research data and the procedures for maintaining confidentiality.

Data were collected during the second semester of the 2019–2020 school year. The duration of accepted responses was one month, starting from 1st February, ending on 29th February.

Data Analysis

Scores were calculated for nine subscales: information processing; selecting main ideas; test strategies anxiety, attitude, motivation, concentration, self-testing, and study aids. Total scores were also calculated for *skill*, *will* and *self-regulation* components/scales.

In order to achieve the stated objectives, this study utilized descriptive and inferential statistics. Descriptive statistics were used to describe respondents' demographic characteristics. Data were analyzed by using the Pearson product moment to assess the correlation between learning strategy components/subscales with academic achievement.

Result

Demographic Characteristics of Respondents

Of the 1127 respondents who were full-time undergraduate students at Nong Lam University, 357 (31.76%) were males, and 770 females accounted for 68.3% of the sample.

In term of *academic status*, Table 2 indicates that the majority of respondents obtained "good" status (689 students, 61.1% of the sample); 291 respondents (25.8% of the sample) had "average" status; 48 respondents (4.3% of the sample) had "below average" status; 98 respondents (8.7% of the sample) had "very good" status, and 1 respondent had "Excellent" status. The majority of respondents were freshmen (n = 427, 37.9% of the sample), followed by juniors (n = 272, 24.1% of the sample), sophomores (n = 262, 23.3% of the sample), and seniors (n = 166, 14.8% of the sample). The mean of the CGPA score of the sample was 6.86 on a scale from 0 to 10 (SD = .99, minimum = 1. 6, maximum = 9.09).

Table 2 Respondent Demographic

Characteristics of respondents		Frequency	Percent
Sex	Male	357	31.7
	Female	770	68.3
Academic status	Below average	48	4.3
	Average	291	25.8
	Good	689	61.1
	Very good	98	8.7
	Excellent	1	0.1
Year of study	Sophomore	262	23.2
	Freshmen	427	37.9
	Junior	272	24.1
	Senior	166	14.8
	Total	1127	100.0

Student's Learning Strategies

The results in Table 3 show the mean and standard deviation of three components/scales and nine subscales of learning strategies. It should be noted that the *skill* component got a score range of 20–100 while that of the *will* component was 21–105, and that of the *self-regulation* component was between 18 and 90. The three subscales, namely, *information processing*, *anxiety*, and *self-testing,* got the score range from 8 to 40 whereas *select main ideas*, *concentration*, and *study aids* got the score range from 5 to 25, and the score range from 7 to 35 could be applied to the other two, *test strategies* and *motivation*. The subscale *attitude* ranged from 6 to 30. The higher the

subscale scores, the more it indicates good learning strategies. Considering the number of items in each subscale, the data show that students in the study have higher scores on *study aids*, followed by *motivation, information processing*, and *self-testing*. Lower scores were found in subscales: *concentration*, *select main ideas*, *anxiety*.

To assess strength and weakness of students in each subscale of learning strategies, percentiles scores were used. As proposed by Weinstein and Palmer (2002), students whose score is equal or above the 75th percentile of a particular subscale show their strength in that subscale and as a result, they can fulfill their academic programs without any related academic difficulties. Students with score from 50th percentile to 75th percentile should improve strategies in that subscale. And students who get scores below 50th percentile need to enhance strategies in that subscale to avoid serious problems in learning process or risk of not succeeding in college (Weinstein et al., 1987).

As revealed in Table 3, 37.4 percent to 46.9 percent students in the sample scored below the 50th percentile in nine subscales. This means that nearly half of the students should develop their own skills and strategies; otherwise, serious complexities and low academic performance are likely to result. The results also provide an overall perspective on the students' comprehensive skills that are essential for effective learning. Appropriate learning habits ought to be continually built and reinforced for long term in all subjects as they are not only meaningful to the academic achievements reported in this study but also to life-long learning.

As for *skill*, Table 3 shows that the number of the students with the ability of *processing information*, *selecting main ideas* and *identifying test strategies* is low (respectively 15.2%, 2.1%, and 19.3% of the participants got above the 75th percentile). Moreover, nearly half of the respondents in the sample have low skills in test preparation and test taking strategies. (44.8% of students in the sample scored below the 50th percentile score on the test strategies subscale). This percentage is nearly the same as the ones of the participants who fail to process information (44.3% of them had sub-50th percentile score on information processing) and who are unable to select main ideas (40.5%). Obviously, this implies that students need to take these subskills into consideration in order to have better academic results.

In terms of *will*, the outcome is the same. As can be seen in Table 3, the percentage of the students who got below 50th percentile for *anxiety, attitude* and *motivation* is respectively 46.9 percent, 41.8 percent, and 41.3 percent. This reveals that most of the students are worried about their academic issues and need to learn how to reduce anxiety or cope with it. The finding also shows that the participants have negative attitudes toward school and academic-related tasks. As a consequence, they have difficulties in establishing their educational as well as future goals. Besides anxiety and attitude, the respondents lack motivation to work hard. It means that they have low incentive to successfully complete all school requirements.

For the last one, *self-regulation*, Table 3 reveals that the students have trouble in focusing on academic tasks, in understanding learning materials and in utilizing sources to support their learning (the proportions of them below the 50th percentile score on the *concentration* subscale, *self- testing* and *study aids* were at 42.4 percent, 37.4 percent, 40.0 percent correspondingly)

Table 3 Descriptive of students' learning strategies

Scales /Subscales	Min	Max	Mean	*SD*	Percentiles			% below 50th Percentile	% above 75th Percentile
					25th	50th	75th		
Skill	39.00	93.00	59.5278	6.1967					
Information processing	8.00	40.00	29.4206	3.7574	28	30	32	44.3	15.2
Select main ideas	5.00	25.00	12.3094	2.6921	10	12	13	40.5	24.1
Test strategies	9.00	35.00	17.7977	3.8846	15	17	19	44.8	19.3
Will	40.00	99.00	61.5415	7.6204					
Anxiety	8.00	40.00	18.4601	4.5113	14	16	18	46.9	21.6
Attitude	8.00	30.00	17.3159	4.3455	14	16	20	41.8	22.0
Motivation	7.00	35.00	25.7655	3.1516	24	26	28	41.3	15.1
Self-regulation	25.00	86.00	60.8525	5.8197					
Concentration	5.00	25.00	12.3908	2.8502	10	12	13	42.4	24.7
Self-testing	8.00	40.00	28.7873	3.8000	27	29	31	37.4	21.0
Study aids	5.00	25.00	19.6745	2.6698	18	20	21	44.0	21.9

Correlation between Learning Strategies and Academic Achievement

The correlations between academic achievement and learning strategy subscales were calculated by using Pearson' product moment correlation coefficients. Results from Table 4 show that weak significant positive correlations were found between *attitude* and *academic achievement* ($p < .05$), between *motivation* and *academic achievement* ($p < .00$), between *study aids* and *academic achievement* ($p < .00$).

The findings highlight the importance of proper attitude to boost the learning process and the outcomes afterwards. This factor could create positive awareness and eagerness that serve as mental guidance for all learning activities, whose effects require more time and effort in the learning process. As a consequence, the acquisition of knowledge and skills should be remarkably more efficient and exhilarating with higher results.

In terms of motivation, the findings proved that high levels of motivation can be said to correspond with high academic achievements. Obviously, motivation involves clear and reachable targets, from which a detailed plan or pathway including strategies needed to obtain these goals is prepared. The results above indicate that in order to improve the academic performance, both *attitude* and *motivation* of the students should be properly adjusted, maybe by a right orientation of thinking and learning objectives that meet their expectations and interests.

Along with *attitude* and *motivation*, *study aids* are basically important for the learning achievements. In such a blended learning environment at present with a variety of teaching approaches powered by internet or computers, adequate aids offer a student more opportunities and access to the discovery of new knowledge and to self-learning. It could be said that together with course materials, different tools or aids for further study are provided to students, which definitely assist them in achieving more rewarding accomplishments.

In brief, the three subscales involved in the improvement of academic achievement of students are *attitude*, *study-aids* and *motivation*.

In contrast to the reported correlations, Table 4 shows no significant correlations between *academic achievement* and other subscales, includes *anxiety*, *concentration*, *information processing*, *select main ideas*, *self-testing*, and *test strategies*. These subscales may be applicable to increase the test results of some particular subjects, but the overall accomplishments are not affected by them.

Pearson' product moment correlation coefficients were used to test the correlation of three components of LASSI, namely, skill, will and self-regulation with academic achievement. Table 5 indicates that there was a significantly positive correlation between academic achievement and will component, and between academic achievement and self-regulation component ($p < .00$). However, these correlations were weak. No evidence of significant correlation between academic achievement and skill component was found. In other words, skills including learning and testing are not as influential to the final achievements as the strong will and self-discipline, which serve as initiative drive to improve the outcomes. No matter how skillful a student may be in learning, this is not the decisive component. Consequently, developing the students' determination and sense of self-control is somehow more essential than focusing on just skills, which will be reflected in the grades they receive.

Discussion

Understanding learning strategies as factors affecting academic achievement helps student be aware of and motivated to have better skills and strategies for the fulfillment of their learnings. The findings of this study are consistent with as well as contradictory to other

Table 4 Correlation of learning strategy subscales with academic achievement

Variables		Pearson Correlation
Anxiety		.053
Attitude		.061*
Concentration		.041
Information processing		.017
Motivation	Academic achievement	.192**
Select main ideas		.028
Self-testing		.026
Study aids		.130**
Test strategies		.030

Note: ** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 5 Correlation of three components of LASSI, named skill, will and self-regulation with academic achievement.

Variables		Pearson Correlation
Skill		.041
Will	Academic achievement	.149**
Self-regulation		.095**

Note: ** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

researches in literature. The results of this study do not support studies by Flowers et al. (2012) and Schutz et al. (2013), who found *anxiety*, *concentration*, *selecting main ideas*, and *test strategies* are the best predictors of academic achievement. Moreover, this result was also different from the finding of Alkhateeb & Nasser (2014), who proposed that all ten subscales of LASSI were substantially correlated with academic achievement. However, the findings of this study are consistent with previous works by (Loomis, 2000), Kpolovie et al. (2014), which indicated that attitude and interest toward school, partly influences academic achievement.

In this study, the relationship between the three main components/scales of learning strategies and academic achievement was also examined. Such indicated that only two components/scales (will and self-regulation) were closely correlated with academic achievement. However, these results were not fully consistent with those of Salehi and Enayati (2009) and Mohammadi et al. (2017), who found three significant correlations existed.

Compared to some other studies based on Vietnam regarding this issue, this study contributes to the overall picture. In line with the works by Nguyen et al. (2021). (2021) and Le Mai Van et al. (2016), which highlighted strategies as the influential factor to improve achievements in language learning, the data collected in this study proved this correlation in a broader context when the respondents were not restricted in language learning but in different fields of study. Therefore, the results could be reliable and applicable to other majors in a university. With appropriate strategies of raising *attitude*, *motivation* and *self-regulation*, the academic performance of a student is much more likely to improve.

Seen from different perspectives, the findings of this study, to some extent, conflict with the recent study of Ngo and Vo (2021) in which critical thinking and solving skills were reported to significantly help to enhance students' academic achievements; however, that correlation in this study is not clear. Such difference may derive from the divergent skills of *information processing* and *selecting main ideas* compared to the previous study. They tend to suit subjects that require more theoretical reading than the ones focusing on experiments or creativity. The contradiction implies flexibilities in using proper skills and strategies to obtain the highest achievements among various subjects.

The overall results of this study show a strong support to the notion that the academic achievement of students is complex and dependent on many factors. The motivation to learn and the self-regulation or study strategies applied are two key components that help increase academic achievement. Students who are motivated to learn can achieve better study result.

Conclusion

This study contributes to the literature by examining the influence of learning strategy on the academic achievement of undergraduate students. The findings revealed that the academic achievement of students was closely correlated with three out of ten LASSI subscales (*attitude*, *study-aids*, and *motivation*). Other subscales (*anxiety*, *concentration*, *information processing*, *select main ideas*, *self-testing*, and *test strategies*) have no significant correlations with *academic achievement*. As far as the results of descriptive statistics of the nine subscales of LASSI are concerned, students in the sample showed weakness in all nine subscales. Therefore, special trainings or workshops need to be organized to raise students' awareness of and enhance their learning and studying strategies.

Like any other studies using only quantitative method, this study has its own limitations. Particularly, in relying on data collected through a self – evaluation questionnaire, such may be subject to bias of individual respondents. Increasing sample size, using random sampling techniques, adding in-depth interviews may be considered to increase the validity and reliability of the study. A yearly survey could be conducted to understand progress in strategies used by students.

Conflicts of Interest

The author has no conflicts of interest to declare.

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