

# Learning Approaches in Relation with Demographic Factors

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Received 26 April 2015

Revised 26 May 2015; Accepted 22 June 2015

**Abstract:** The main purpose of this study is to identify the relationships between learning approach and various demographic factors. With these relationships identified, students' learning approach can be predicted, and even in some case if we can change the factors students can adapt their learning approach toward deeper-oriented. The ASSIST questionnaire and a demographic factor one developed in house were used in this study. The survey was conducted on two Vietnam universities with a sample of 882 students, who were studying maths or math-related subjects. T-tests and ANOVA were applied in the analysis process. Many relationships between learning approaches of “deep”, “surface”, “strategic” and various demographic factors were disclosed; then solutions to encourage students to use less surface approach, and more deep approach in learning were discussed.

*Keywords:* Learning approach; demographic factor; education; student; ASSIST.

## 1. Introduction

Many papers have studied students' learning approaches in higher education [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]. There are two fundamental approaches to learning, which are identified as “deep” and “surface” approaches [12, 13, 14, 15]. Deep approach leans towards to fully understanding the meaning of materials to be learned, whereas surface approach shows the intention of students to reproduce the materials during academic assessments [16]. Students with deep approach relate previous knowledge to new knowledge, knowledge from different courses, theory to daily experience;

whereas students with surface approach focus on unrelated sections of the task, information for assessment, and facts and concepts with arbitrary association [17]. Various quantitative and qualitative researches have been conducted to expand the meaning of these two categories [18, 19, 20, 21, 22]. The descriptions of students' learning approaches were expanded using students' answers on their daily study practice [23, 24]. The result is that a strategic approach to studying was identified. Students who apply strategic approach have the motive to achieve the maximum possible marks, and adapt to assessment demands to allocate their resources in studying, even they find no interest in the subjects being studied. These studies also say that each of the three approaches relate to

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different types of motivation: deep with intrinsic, surface with extrinsic and fear of failure, and strategic with need for achievement.

Various questionnaires have been developed to measure students' learning approaches, such as Study Process Questionnaire (SPQ) [20], Approaches to Studying Inventory (ASI) [14], Revised Approaches to Studying Inventory (RASI) [25], and Approaches and Study Skills Inventory for Students (ASSIST) [26]. It is different from Marton and Saljo's study where students were learning a single academic text, these inventories assess what students often do in a learning situation. Teaching methods and assessment methods can affect the choices of students' learning approach [27, 28, 29]. The learning approach is not an intrinsic characteristic of a student, but is influenced by the learning context [30, 31, 32, 33] and their prior educational and personal histories [34]. Students can apply various learning approaches in different situations [13]. However, the learning approaches are not mutually exclusive. Students can use mixed approaches in learning [13]. In other words, we cannot classify students into separate groups using only learning approaches [1]. Many researchers studied the relation between students' learning approaches and demographic factors [1, 12, 14, 15]. Genders [35, 36], cultural background [37, 38, 4], years in university [39, 4, 6, 40], employment status, intention to study higher are of interests in these studies [1] were considered in these studies.

Marton and Saljo (1976) [41] discovered a relation between learning approach and outcome. Entwistle *et al.* (1979b) [34] studied further and confirmed the nature of this relationship. Students with deep approach to learning get higher scores than those with

surface approach [42]. Nelson *et al.* (2008) [43] stated that students who often apply deep learning approach achieve higher educational gains, higher results, and more satisfaction with their institutions. Trigwell *et al.* (2012) [44] also affirmed that "deeper" approach to learning is related to higher achievement results while surface approach to learning is correlated with lower achievement. With the association between deep approach and higher outcome, most academic staff expect students to become deeper-oriented in their learning [45, 46]. Bearing in mind that both students and faculty bear the responsibility in learning, therefore faculty members should stress the importance of deep approach and evaluate how far students apply these approaches in learning [43]. However, there may be tendency for students to be more surface-oriented over their courses in university [47]. Yonker (2011) [48] in a study with students of age between 18 and 52 stated that there is a relationship between age and learning approach. The younger students are the greater tendency to apply surface approach is. Walker *et al.* (2010) [49] examined the change of learning approaches over time. It is confirmed that freshmen tend to apply strategic and deep approach going toward the end of the year. In addition, it verified the positive effect of curriculum change on students' learning approach. Case and Marshal (2004) [50] identified the dependence between the learning approaches applied and the course contexts. Wilding *et al.* (2006) [51] the association between life goal factors and learning approaches, where students with deep approach generally target kind-hearted life goals and those with surface approach aims to affluence and status life goals. The strategic approach was associated with both type of life goals but more emphasis on affluence and status. Kyndt

*et al.* (2012) [52] suggested a negative association between attention factor and deep approach. Students with higher level of attention often apply surface approach, and who with lower attention level gravitate toward deep approach. The study also showed the dependence of working memory capacity with approaches to learning. Chiou *et al.* (2012) [53] studied the relationship between conceptions of learning and learning approach. The result says that students with higher level conceptions have tendency to apply deep approach, whereas who with lower level conception tend to choose surface approach. The research also showed that there is a significant gender difference in selection of learning approach. Bliuc *et al.* (2011) [54] studied the effect of socio-psychological dimensions on learning approach in higher education. The result proposed a positive student social identity link with deep approach, which results in higher academic achievement; whereas surface approach is not related to student social identity.

## 2. Aims

The main purpose of this current study is to identify the relationships between demographic factors and learning approaches. With that understanding, we can predict the tendency of students in learning approaches and figure out whether we can change students' learning approaches toward deeper-oriented.

## 3. Methodology

Students in this current study are studying maths or math-related subjects. Math-related subjects here are statistics, operation research, quantitative analysis, which require much

knowledge of maths in problem solving. There are several reasons behind choosing maths or math-related subjects for this current study. One is that they are foundation subjects in various majors. Hence, it is advantageous to acquire a large sample size of students to survey. In addition, students in various majors sit in the same classes can be a good representation sample for the whole universities. Another reason is that students enrol in these subjects in their first or second year in university. Therefore, we can study the effect of time factor on their selection of learning approach. Further reason for this selection is that teachers in these subjects use similar teaching approaches. Hence, students' learning approach is attributed to other factors rather than the variation of subjects being taught.

The instrumentation used in this current study is the Approaches and Study Skills Inventory for Students (ASSIST) questionnaire and a demographic survey developed by Ayse Bilgin from Macquaire University. The demographic factors were classified into three sub-categories: (a) social-demographic factors (gender, parental education), (b) education related background factors (major, admission mark, years in study, workload, compulsory/elective subject, language used as medium of instruction), and (c) psycho-educational factors (interest in studying, math preference in high school, instrumentality of the subject being studied for the future or life goals, conception of learning, preference for different types of teaching). This current study also looks for the relationship between students' perception in learning approaches and what approach they undertake. In other words, do students have "preferred" strategies compared to strategies they actually undertake? [55]. The students were asked about the learning

approach they were applying, and forced to select the most appropriate among deep, surface and strategic approach. The actual approach was calculated based on deep, surface, or strategic scores from questionnaires. The approach with the highest score prevailed (e.g. if the deep score is the highest then the learning approach is deep). Then we count the “hit ratio”, i.e. the percentage of students whose perception of approach is the same as the approach is being applied. The smaller hit ratio indicates that there are more students who do not undertake the appropriate learning approach as they may wish.

The original version of the questionnaire was in English and then translated into Vietnamese to facilitate the data collection process. Two students were asked to read through the translated version and correct mistakes if any to ensure there is no possible misunderstanding with wording. Finally, the corrected version was formally used to collect data.

The author asked lecturers in charge of classes in advance to receive their permission on survey. The questionnaire was delivered to students during class break with the help of the author's teaching assistant. This can ensure the maximum participation percentage in the survey. The students were given a brief introduction on the purpose of this research and reminded to give their opinions on the subjects being studied. The author did not survey any of his classes to prevent any bias in students' response.

Each item in the questionnaire is set as a variable. Then a new variable is created by summing all sub-scale items. Further explanation of how to use the questionnaire can be found in Entwistle (2000) [26].

Some students did not answer all questions in the questionnaire. All answers with more than 14 questions missing were eliminated. To maximise the eligible students in our study, a method of adjusting scores was developed. Learning as Reproducing (Lar) scores for each student were calculated by summing scores under each of those headings (Aa + Ac + Ad) if no missing. If there was one missing, then Lar score was  $(\text{mean}(Aa + Ac + Ad)) * 3$ . If there were two missing, then 6 was added to the available value. If all three were missing, then 9 was assigned to Lar. A similar procedure was applied to Learning as Transforming (Lat) with Aa, Ac, Ad were replaced by Ab, Ae and Af. For items in Approaches to Studying part, any missing score was replaced by the average of that subscale rounded to the nearest integer. Average scores for learning approaches were compared across various demographic groups to test the null hypotheses that students' learning approaches are the same between groups against the hypotheses that students' learning approaches are different between groups. T-test was applied. However, if the demographic variables are metric then the correlation coefficients between learning approach and these variables are used to detect the relationship.

This current study was conducted in two Vietnam universities - International University (IU - a member of Vietnam National University of Ho Chi Minh City) and Open University (OU); both are public and locate in Ho Chi Minh City. The main difference between these two universities is that IU offers all courses with English as the means of teaching, but Vietnamese is used as the means of teaching in OU. The sample taken from two universities helps to identify any relationship between learning approach and language as the means of teaching.

In addition, the correlation coefficients between learning approaches were calculated to discover the relationship between them.

Finally, students' academic outcomes of the subjects were collected at the end of semester to study the relationship between the academic outcomes and learning approach by using correlation coefficients.

#### 4. Findings and discussion

There were 890 questionnaires collected in which eight (8) students with 14 or more answers missing in Approaches to Study part were deleted (0.9 %). The remaining 882 were analyzed further (99.1 %). It consisted of 296 male (33.6 %) and 586 female students (66.4 %). With the female proportion was about twice as more than male proportion, a big difference was detected here. The possible explanation is the more regular attendance of female students, and absent students do not have the chance to participate in this current study. The average age of students was 19.5 with the maximum of 31 and the minimum of 17. The average of female students was 19.43 and that of male students was 19.73. The difference here was 0.3 year and significant (sig. = 0.001). The possible explanation is that because the two universities being studied are public ones. In Vietnam, having graduation from high school, students must pass a national entrance exam to enter public universities. The national entrance exams have been the same for all high school students in any academic year. Many male students who fail the entrance exam go to serve three years in army. After demobilization from the army, many may return to sit another entrance exam to seek a second chance. Hence, they now are three (3) years older than they were in the

previous entrance exam. There were 661 business students (74.9 %) and 221 non-business students (25.1 %). 70 students did not know or want to tell about their parents' education level. Hence, we did not count these students when using their parents' education background as a factor to assess. There were 356 students (43.8%) whose both parents did not have university degree and 456 students (56.2%) reported having at least one parent with university degree. There were 253 first-year students (28.7 %) and 629 students (71.3 %) who have been in campus more than one year. Four (4) students did not provide answers when asked about interest in study. The remaining 878 consisted of 743 students (84.6 %) showing interest in study, while 135 students (15.4 %) having no interest. Three (3) students did not feedback when asked about their preference in maths in high school, and they were not counted. The remaining consisted of 677 students (77.0 %) who did like maths in high school, and 202 students (23.0 %) who did not. 880 students provided feedback about the usefulness of subject being studied, in which 700 students (79.5 %) said "yes" and 180 students (21.5 %) said "no". 857 students gave their opinions about further study, in which 714 students (83.3 %) expressed their intention on further study and 143 students (16.7 %) revealed no intention. 501 students (56.8 %) chose the subjects because they were compulsory, and 381 students (43.2 %) chose the subjects because of other reasons.

The hit ratio is 42.38 per cent (359/847). The hit ratio for deep approach is 31.65 per cent, and for strategic is 46.21 per cent. It indicates that the majority of students who have "preferred" learning approaches different from what they undertake.

With reference to tables 1, 2 and 3 the following relationships between learning approach and demographic factors are detected.

*Relationship between learning approach and social-demographic factors*

There is no relationship between deep approach or surface approach and gender. However, female students have tendency to apply strategic approach by comparison with male students. This contradicts to the study result of Chiou *et al.* (2012) [53].

In addition, there is no relationship between learning approach and parental education background.

*Relationship between learning approach and education related background factors*

Business students and non-business students have similar tendency in choosing deep and surface approach. However, non-business students tend to be more strategic-oriented.

There is neither relationship between deep approach nor strategic approach to learning and admission mark, but students with higher admission marks are less likely to apply surface approach to study. This again implies that many indifferent students have been trained by tutors to pass the admission exams. They have been taught to apply surface approach and it “works”. Hence, they do not want to face the risk using other learning approaches.

The learning of students has not got deeper by their university time, but become shallower and more strategic-oriented when they go through their course of study. This is similar the study result of Biggs *et al.* (2001) [47]. One possible explanation is that students have become overloaded with curriculum by time, and they need to apply surface approach in subjects which they did not have much interest

in. Furthermore, when students get more acquainted to study in university, they can better deploy their limited resources in order to achieve the best possible outcomes.

Deeper or strategic approach to learning does not depend on the study workload, but students tend to be more surface-oriented when their workload becomes heavier. This implies that academic advisors should be careful to counsel students on their enrolment. Only students with good academic records should be given a go-ahead to enrol in high workload. Normal students who want to keep pace with their friends due to certain circumstances should enrol additional subjects in summer semester. Lecturers also should be aware of that their teaching can affect students’ learning approach. Too many assignments and exams can increase the workload, and advocate students to apply surface approach. Therefore, lecturer should choose an appropriate number of assessment tasks for subjects in charge. The curriculum should often be revised to ensure appropriate workload bearing in mind that heavy workload may encourage students to become surface-oriented.

There is no relationship between deep approach, strategic approach and whether subjects are compulsory. However, there is relationship between surface approach and whether subjects are compulsory. A possible explanation is that many students who do not have interest in the subjects may adopt surface approach because it involves less effort and energy.

There is no relationship between IU and OU students in choosing deep approach to learning. However, OU students tend to be more surface-oriented and strategic-oriented. Nowadays, fluency at English is a *passport* for any students

who want to go into the world, but it also poses a barrier for IU students to learning. It takes more time and effort for IU students to learn the same tasks by comparison with those in OU. The intuition here is IU students have inclination to apply surface approach to meet assessment demand, whereas OU students lean toward deep or strategic approach. Hence, the result contradicts to our intuition. In order to identify the cause, we cannot conclude the means of teaching language as the determinant factor, but an additional qualitative research may be helpful. For example, many OU students are not good at English, so it is more difficult for them to acquire knowledge through English textbooks (more updated) and digital repository (mainly in English). Another possible reason is that because the tuition fee of IU is about five or six times higher than that of OU. The majority of IU students are from middle or upper-income class, whereas many OU students are from low income class. In this case, the question turns into whether income level plays a big role here.

*Relationship between learning approach and psycho-educational factors*

Students with interest in study tend to go “deeper” in study, become more strategic-oriented in learning, and students who do not like study tend to apply surface approach to learning. This again confirms that students with intrinsic interest in the subject are willing to work hard [56].

Students who have preference in maths tend to go deeper and more strategic-oriented, whereas who have no or little preference in maths tend to use surface approach. Because we conducted this current study in maths or math-related subject, there may be a possible link here. This also suggests further study on other

subjects to test the association between preference in maths in high school and tendency to go deeper and more strategic-oriented in higher education.

Students have tendency to go deeper, more strategic-oriented approach if they think about subjects being studied as of future benefit, and they will go “shallower” if they consider subjects being studied as non-beneficial in future. This result also confirms that students can change their learning approach through different subjects [15]. Hence, lecturers should thoroughly introduce subjects in charge to students at the very beginning of semester. Subjects’ contents should be frequently revised and updated with input from industry. In addition, guest speakers from industry and field trips should be indispensable elements of university curriculum.

Students have the conception of learning as transforming gravitate toward deep approach and strategic approach to learning. This also confirms the study result of Chiou *et al.* (2012) [53].

There are positive relationships between deep approach, strategic approach and preference in teaching style of supporting understanding. This suggests that the instructors play a very important role to influence students toward deep and strategic approach. There are also positive relationships between learning approach and preference in style of transmitting information. However, the correlation coefficient between deep approach and preference in style of transmitting information is quite weak (0.085\*) by comparison with surface (0.245\*\*) and strategic approach (0.197\*\*). This implies a stronger tendency that whoever prefers style of transmitting information will go for surface or strategic approach.

In addition, correlation coefficients in table 2 show that the three learning approaches are related and a student can have a “mixed” approach. This corresponds to other study results of Bilgin and Crowe (2008) [2] and Marton and Saljo (1984) [41]. However, our study only focuses on maths and maths-related subjects. Further study can reveal their “mixed” approach under various contexts.

Table 2 also shows that whoever uses surface or strategic approach tends to get worse academic outcome. However, the correlation coefficient between strategic approach and academic outcome is quite weak (-0.093\*) by comparison with surface approach (-.209\*\*). It indicates that surface-oriented students tend to get lower academic outcome.

Furthermore, there is no relationship between deep approach and academic outcome. In other words, it also indicates that other factors e.g. class hours or independent study hours play a very important role here. However, the result contradicts to the study result of Trigwell *et al.* (2012) [44] which affirms that “deeper” approach can lead to higher academic outcome. The question arises here is whether there is a trade-off for students with the need of better knowledge and having higher academic results.

#### *Limitation of this current study and implications*

There are many other ways to identify demographic groups rather than ones in this current study. Different classification can help us to discover more relationships between learning approach and demographic factors.

Students can change their learning approach through different subjects [1]. The results in

this current study are limited to maths or maths-related subjects. These subjects can be viewed as more “quantitative” in nature. Hence, further study can uncover more about students’ learning approach on “qualitative” subjects.

Instructors also play important role. Teaching style of supporting understanding should be encouraged because it has the strongest influence on students toward learning approach.

Methods of assessment for these subjects also should be reconsidered to reflect students’ understanding and how they can apply the knowledge into real life with the aim that deep approach should have positive relationship with outcomes.

In general, instructors encourage their students to be deeper oriented in their subjects, but the low hit ratio for deep approach of 31.65 per cent means that many students who want to apply deep approach actually use other approach. Therefore, we need to teach students how to be deeper oriented before encouraging them to apply.

Finally, students’ appropriate workload should be considered if we want to promote deep approach. This requires the involvement of faculties (curriculum), instructors (assignments), and students (number of subjects enrolled).

#### *Acknowledgments*

The author would like to thank Dr. Ayse Bilgin and Dr. Margaret Hopkins for contributing ideas, Nguyen Vo Hien Chau, Nguyen Dai Trang, Ho Nguyen Kim Ngan for data collection, and especially thank Nguyen Tuong Vi for her hard work in data input and analysis.



**Learning Approaches in Demographic Survey**

Student ID: \_\_\_\_\_

- Q1. What gender are you?  Female  Male
- Q2. In which school/department are you enrolled? (e.g. Business, Biotechnology, etc)  
\_\_\_\_\_
- Q3. What was your university admission mark? \_\_\_\_\_
- Q4. Do either of your parents have a university degree?  
 Yes, both  Yes, only my mother  Yes, only my father  No  Don't know
- Q5. Is this your first, second, third, fourth or more year in the university?  
 (1)  (2)  (3)  (4)  More \_\_\_\_\_
- Q6. How many units of study are you taking this semester?  
 (1)  (2)  (3)  (4)  (5)  
 (6)  (7)  (8)
- Q7. Do you like studying?  Yes  No
- Q8. Did you like studying mathematics in high school?  Yes  No
- Q9. Do you consider this subject useful for your future work?  Yes  No
- Q10. Do you consider enrolling in a higher degree after completing your Bachelor degree?  
 Yes  No
- Q11. Why have you chosen to study this unit?
- Q12. Is there anything else that you would like to add? \_\_\_\_\_

Table 1. T-tests

	Deep	Surface	Strategic
Gender	(Male – Female)		
	.03685	.04217	-.10169*
Major	(Business – Non-business)		
	.01259	-.03429	-.10177*
Year	(1st year – non 1st year)		
	.01606	-.13915**	-.12513*
Course	(Compulsory – Elective)		
	-.02252	.08985*	-.06924
Means of teaching	(English – Vietnamese)		
	.07415	-.09157*	-.14979**
Study	(Interested – Not interested)		
	.32535**	-.19032**	.38258**
Math	(Preferred – Not preferred)		
	.17257**	-.13696**	.15058**
Subject	(Beneficial – Not beneficial)		
	.26587**	-.12670**	.25763**
Parent education background	(University – Non-university)		
	.02780	-.07546	-.04106

Table 2. Pearson's coefficients

	Deep	Surface	Strategic
Workload	0.061	0.076*	0.039
Admission mark	0.022	-0.213**	0.005
Preference for transmitting info teaching style	0.085*	0.245**	0.197**
Preference for support understanding teaching style	0.457**	0.019	0.324**
Learning as reproducing	0.278**	0.075*	0.257**
Learning as transforming	0.355**	-0.002	0.289*
Deep	1	0.176**	0.530**
Surface		1	0.157**
Strategic			1
Academic outcome	-0.018	-0.209**	-0.093

\*: Significant at 0.05

\*\*: Significant at 0.01

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## Quan hệ giữa các phương pháp học và các yếu tố nhân khẩu học

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**Tóm tắt:** Mục đích chính của nghiên cứu này là xác định các mối quan hệ giữa các phương pháp học và các yếu tố nhân khẩu học khác nhau. Với những mối quan hệ xác định, phương pháp học của học sinh có thể được dự đoán trước và thậm chí trong một số trường hợp nếu chúng ta có thể thay đổi các yếu tố, sinh viên có thể điều chỉnh phương pháp học của họ theo hướng hiểu sâu hơn. Nghiên cứu

này sử dụng bộ câu hỏi ASSIST và một bộ câu hỏi tự xây dựng về nhân khẩu học. Cuộc khảo sát được tiến hành ở hai trường đại học Việt Nam với một mẫu gồm 882 sinh viên đang nghiên cứu toán học hoặc các chuyên ngành liên quan đến toán học. Kiểm định T và ANOVA được sử dụng trong quá trình phân tích. Nhiều mối quan hệ giữa các phương pháp học "sâu sắc", "bề mặt", "chiến lược" và các yếu tố nhân khẩu học khác nhau đã được phát hiện; sau đó nghiên cứu này đã thảo luận về các giải pháp để hạn chế sinh viên sử dụng phương pháp bề mặt và khuyến khích cách tiếp cận sâu hơn trong học tập.

*Từ khóa:* Phương pháp học; yếu tố nhân khẩu học; giáo dục; sinh viên; ASSIST.