

University Students' Approaches to Studying and their Academic Achievement

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Abstract: The major purpose of this study was to examine Mizan-Tepi University Students' approaches to studying. Questionnaire and interview were used to gather data from a sample of 220 (103 male and 117 female) second year students. Factor analysis, cluster analysis, discriminant analysis, ANOVA and regression analysis were used to analyze the quantitative data. Factor analysis indicated three major components (deep, surface and strategic) of the students' approaches to studying. Cluster analysis revealed four study approach profiles: very poor (very low deep and strategic, and very high surface), poor (low deep and strategic, and high surface), moderate (average deep and strategic, and high surface) and good (very high deep and strategic, and very low surface) quality study approach groups. Most female students were found to adopt very poor quality study approaches. Students in the good quality study approach profile were noted to be the most academically successful. Practical and theoretical implications of the findings were discussed.

Keywords: Surface approach to studying, strategic approach to studying, deep approach to studying, academic achievement, study approach profiles.

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Theoretical and Contextual Basis of the Study

The production of high quality, competent and skilled graduates is vital to create the vivacious socio-economic development of our country (Higher Education Relevance and Quality Agency, 2006). The Higher Education Relevance and Quality Agency (now called the Education and Training Quality Assurance Agency) was established to enhance the quality of higher education provision in both private and public higher education institutions in Ethiopia. It can be argued that the quality of learning at a university level is influenced by a number of factors including students' approach to learning or studying. Indicators of quality of learning are difficult to develop and extensive to collect. But research (e.g., Prosser and Triggwell, 1990) has shown that quality of the students' learning is related to quality of their approach to learning. That is, most students who have attained a high quality learning outcome have also adopted a high quality approach to their learning.

The issue of quality improvement requires a major adjustment on the part of the institutions, given the increasing diversity of the student population and the changing demands of students of different cultural and ethnic background (Arambewela, Mulready and Callaghan, 2007). Improving the quality of learning requires a better understanding of what happens in the learning process from the perspective of the learner.

Nonetheless, it has been assumed traditionally that there has been one correct way for any student to go about learning. This belief was reflected in the reading method SQ3R (Survey, Question, Read, Recall, Review) which was described in many study skills manuals (Watkins, 1986). However, Entwistle (1992) declared that a new area of research in Europe and Australia has been exploring student learning and has developed sets of categories used to construct descriptions of learning firmly rooted in the experiences of students. One starting point was a series of learning experiments carried out by Ference Marton and his colleagues at University of Gothenburg, Sweden (Marton and Saljo, 1976a; 1976b). Marton and Saljo

carried out qualitative analysis of a naturalistic experiment in which students were asked to read an academic text and to be ready to answer questions afterwards. In subsequent interviews, the researchers found that students differed in the level of understanding they displayed as a consequence of what was termed 'approach to learning.' The students adopted either a deep or a surface approach to the reading. The concept has since been extended to describe how students tackle many other learning tasks in lectures, essay writing, and problem solving (Marton and Saljo, 1976a; 1976b; Entwistle, 1994). According to these researchers, the term 'approach' is used to signify both the learner's intention and the way he or she processes information.

According to Marton and Saljo (1976a), the deep approach involved an active attempt by the student to understand the authors meaning, to explain the evidence in relation to the conclusion, and to relate the ideas contained in the article to the students' previous knowledge and experience. In the same manner, Beckwith (1991) points out that students who adopt the deep approach are repeatedly engaged in searching for meaning, as part of which they relate new material to old and facts to conclusions. They are seen as primarily motivated by intrinsic factors and interest in the material. The surface approach, in contrast, is characterized by a tendency to memorize discrete facts or ideas, to be anxiously aware of the need to reproduce information at a later time, and to view a particular task in isolation both from the academic subject as a whole and from real life. Students with this approach repeatedly focus on facts, emphasize reproduction of essential information, and rely on extrinsic motivators. Beckwith (1991) posits that the surface approach to learning has certain similarities with the directive, empirically based educational philosophy of behavioral teachers.

Later on, researchers found that assessment has a crucial effect on APTS. Foos and Clark (1984), cited in Grasha (1995), demonstrated this effect by telling two groups of students to expect an essay or a multiple choice exam. Both groups were given multiple choice exam, and those who were prepared for the essay exam earned the highest exam scores. It was suggested that

this considerable difference in scores might have been due to differences in APTS that the students adopted while preparing for the two types of exams. Also Ramsden (1981) and Biggs (1978), cited in Entwistle (1994), independently found that the pervasive influence of assessment necessitated the description of another approach to learning- 'strategic' (Ramsden) or 'achieving' (Biggs). Students who always want to be better than others and try to earn the highest grade in a class are those who adopt the strategic approach. According to Biggs (1994), strategic students are conscious of two separate foci of attention: the academic content and the teacher's reward system. In the strategic approach, depending on instructional and assessment demands, learners adopt deep and surface approaches in combination so as to achieve the highest possible marks. But Lublin (2003) suggests that when the strategic (not the surface) approach is combined with a deep approach to learning in the course; it is likely that it delivers both an intelligent engagement with the course as well as success in the course.

The above classification of components of APTS (deep, strategic and surface) depended on the qualitative research approach. However, quantitatively, while the distinction between the deep and surface approaches has been repeatedly confirmed through factor analysis, it has been less easy to identify the strategic approach across contexts (Richardson, 1993). Although difference in contexts may contribute to difference in study approaches, it could be argued that classifying students clearly to one or another category of study approach will be difficult even in similar contexts. This is because students could adopt different approaches partly depending on their personal characteristics (e.g., previous experiences, motivation, and personality) (Felder and Brent, 2005).

Research showed that there is a significant relationship between approach to studying and academic performance. For instance, previous research on direct relationships between approach to learning as measured by the Study Process Questionnaire, and performance assessment among university students indicated a negative relationship between surface scores and

performance, and positive relationships for deep and achieving scores with performance (Biggs, 1985 cited in Beckwith, 1991).

Statement of the Problem

High quality APTS (i.e., deep and strategic approaches) contribute a lot to high quality learning outcomes and success in academic performance. Despite this importance, little or no research has been conducted on the students' APTS in the Ethiopian context.

Even very capable students need to know more about high quality APTS because, according to Nist and Simpson (2002), although it is well accepted both in theory and in practice that academically successful college students know how to study, research suggests that many students enter postsecondary institutions unprepared to meet the studying demands placed on them. This lack of preparation can be traced to the fact that study strategies are hidden because teachers at all levels assume that their students already have a repertoire of studying behaviors. This led many colleges and universities abroad to offer study skills courses or programs that teach students to be efficient and effective learners.

Nevertheless, the situation in our country is different. Despite the importance of high quality APTS as determinants of high quality learning and academic progress in higher education and students' lack of the necessary study skills, there is little or no attempt made to improve these skills in the Ethiopian higher education institutions. The researchers' observation of the students' study strategies, their interest in tertiary education and their working background as staff members in the universities has led them to the present research. Besides, in Mizan-Tepi University, one of the researchers has observed that many students have difficulties of how and when to study and that they wait for announcement of tests or exam schedules to start their actual studying. This may lead to cramming only for exams in a short period of time which puts deep and high quality learning in jeopardy. If this trend is

allowed to continue unchecked, the students will not be successful not only in their academic activities but also in their work places. The reason is that they are adopting surface approach to studying which generally leads to low retention and an inability to use the learned information in new contexts (Felder and Brent, 2005; Marsh, 2006). The starting point for making appropriate interventions in this area should be exploring the study approaches used by students in our context through research. This is because if we identify the students' APTS, we may suggest ways of helping those who use low quality approaches. This in turn may help to enhance quality of learning and academic performance. This study, therefore, sought to answer the following questions:

1. What are the study approach profiles of Mizan-Tapi University students?
2. What proportion of the variance in academic achievement does approach to studying explain?

Definition of Key Terms and Conceptual Framework of the Study

In this study, APTS or study approaches are defined as the strategies that the students use when they study which are measured by the Approaches and Study Skills Inventory for Students (ASSIST) (Centre for Research on Learning and Instruction, CRLI, 1997). Approaches to studying have been investigated using four models derived from personal style, information processing, phenomenographic theories and systems theories (Biggs, 1994). The systems model assumes that students enter courses with overall goals (e.g., to aspire to score top grades and pass with minimum effort), and with stable characteristics such as abilities, cognitive styles, and preferred ways of learning. An approach, in the systems view, differs from information processing view by including motivational and contextual components and from phenomenography by recognizing the role of personality factors in learning. ASSIST was developed depending mainly on the systems theories. The theoretical framework for conceptualizing students' approach to studying

that is used in the present study is an adoption of the systems model. ASSIST has the following three major components:

- *Surface Approach to Studying* – is an approach that is characterized by students' attempt to meet academic requirements minimally and limit target to reproduce them through rote learning.
- *Strategic Approach to Studying* – is an approach in which students strive to be competent in dealing with their academic tasks (e.g., by ensuring that the conditions and materials for studying are appropriate and obtaining highest grades, whether the materials are interesting or not).
- *Deep Approach to Studying* - is students' approach to studying that is characterized by discovering meaning through reading widely, interrelating relevant previous knowledge, and inherent interest to develop competence in particular academic areas.

Deep and strategic approaches are the good quality components of APTS while the surface approach is the poor quality component. In the context of this study, therefore, a good quality approach to studying is one in which students indicate that they adopt more deep and strategic approaches than the surface approach.

- *Study Approach Profiles* - are similar patterns in approaches to studying adopted by subgroups of the students.
- *Academic Achievement* - is Cumulative Grade Point Average (CGPA) of two semesters.
 - Self- rated Academic Performance – is evaluation of the students' academic performance compared to other students in a class or department as rated by themselves when asked in a questionnaire.

Methods

Sample

The participants of this study were second year Mizan-Tepi University main campus students in 2002 E.C. academic year. There were two faculties and ten departments in which 1049 (558 female and 491 male) second year students were enrolled. The sampling frame was the list of all second year students in each faculty and department. To select participants sampling frame based on faculties, departments, gender and achievement categories; stratified, simple and systematic random sampling techniques were used. These procedures were followed in both pilot and main studies.

Instruments

In this study, questionnaire and semi-structured interview were used to gather data. The interview items were developed by the researchers from the literature. The items focused on the students' APTS. The questionnaire consisted of Approaches and Study Skills Inventory for Students (ASSIST), one item for self-rated academic performance and demographic questions. The item on self-rated academic performance were developed by the researchers to ask the students to rate their levels of academic performance on a five point scale: Very Well (5), Well (4), About Average (3), Not So Well (2) and Unsatisfactory (1). ASSIST was developed at the Center for Research on Learning and Instruction (CRLI), University of Edinburgh, Scotland. This tool has three major subscales - deep, strategic and surface; and 17 minor subscales with a total of 66 items. For the purpose of the present study, only 56 items within 14 minor subscales were adapted. The scale was chosen for different reasons. First, most of the items in the scale seemed not to be ambiguous and culture bound, and therefore, appropriate for Ethiopian higher education students. Second, the scale had well-established psychometric qualities in its original form and it was constructed in order to improve the limitations that its preceding instruments had. The internal consistency reliability of the original major subscales - deep,

strategic and surface as estimated by Cronbach alpha were respectively .84, .80 and .87. Third, the original form of the scale was designed for higher education students.

Items were not translated into the Amharic language since the students came from different regions of Ethiopia and there were students who could not understand Amharic well. English Language was considered to be common for all since it is the medium of instruction for Ethiopian students starting from at least grade nine. Despite this fact, since most students had poor command of English, a considerable care was taken while adapting items to make the language as simple as possible without losing their original meaning. Also, two TEFL (Teaching English as a Foreign Language) Master's Degree students, who had teaching experience in higher education, were asked to comment on whether the items match the English Language understanding levels of the students. Following the suggestions of these students, long statements were shortened and some seemingly difficult words were replaced by similar, relevant and simple words. After taking all these steps and putting the items in a random order to reduce response bias, a total of 56 items were used in the pilot study. Conducting the pilot study was necessary because the scale had well-established psychometric properties (i.e., reliability and validity) in its original form and these properties may change in the process of adaptation. Richardson (1994), cited in Byrne et al. (1999), asserts that when employing a questionnaire in a situation different from that in which it was originally developed, factor analysis should always be carried out to check that its intended constituent structure can be reconstructed in the new context. In both pilot and main studies of the present research, therefore, factor analysis was employed.

The pilot study was conducted on 100 (53 female and 47 male) students who were randomly drawn from the population (1049 students) by considering faculty, department, gender and achievement category as strata. It was decided to conduct the pilot study on 100 students since the aim was

to factor analyze the instrument and 100 is the minimum sample size for this purpose (Brace, Kemp and Snelgar, 2006).

Depending on the results of the pilot study 17 items were discarded. Even though 14 minor subscales of ASSIST were adapted for the present study, one minor subscale (lack of purpose) was removed with its four items. The removal of the subscale was necessitated by the fact that: (1) all of its four items did not have loading of the required factor (i.e., surface approach), (2) item analysis showed that if three of its items were rejected, reliability would improve and (3) staff members who were given ASSIST prior to pilot study to comment on its face validity and appropriateness for Ethiopian students suggested that the subscale be removed. Reasons for discarding the other items were that while some of the items had loadings of less than .30, the elimination of some others increased reliability. The remaining items were either improved or taken as they were and finally a total of 39 items were used in the main study¹.

The main study was conducted on a random sample of 220 (23% of the population, that is, 949 students excluding pilot study participants) of which 117 were female and 103 were male students. Out of the total sample, 198 (101 male and 97 female) students responded to the questionnaire appropriately. However, 22 (2 male and 20 female) students failed to provide complete data. The age of the participants ranged from 18 to 29 with a mean age of 21 years and a standard deviation of 1.32. Fathers or male guardians of majority of the respondents were uneducated (81, 36.80%) and farmers (135, 61.40%). Also mothers or female guardians of majority of the respondents were uneducated (101, 45.90%) and farmers (129, 58.60%). Only 16 (7.30%) of the fathers or male guardians of the participants were involved in other occupations (e.g., police, guard ...etc) while 28 (12.70%) of the mothers or female guardians of the participants were engaged in household tasks. Nonetheless, 3 (1.40%) of the participants did not provide data about their parents or guardians.

In the present study, internal consistency reliability of the scale and its subscales was estimated with Cronbach Alpha (α). In the main study, reliability coefficients for the deep, strategic and surface subscales were respectively .75, .63 and .69. For the full scale of ASSIST the reliability coefficient was .79.

Procedures

Data gathering procedures for both pilot and main studies started by collecting CGPA of the students from the university's registrar office. Then, achievement category (Low, Medium and High) was formed for each department using students' CGPA. Accordingly, students with CGPA of less than 2.20 were grouped in the low achievement category. This was because these students were under (or closer to) the academic status of warning or probation. Similarly, students with CGPA of 3.00 and above were classified in the high achievement category considering the fact that they were at (or closer to) the academic status of distinction, great distinction and very great distinction. Students whose CGPA fall between these points (i.e., greater than or equal to 2.20 and less than 3.00) were placed in the medium achievement category. The purpose of this categorization was to minimize the likelihood of over or underselection of students from one achievement level during sampling. Besides, in order to supplement CGPA that was gathered from the registrar, data on self-rated academic performance were collected from the students.

In both the pilot and main studies, the questionnaire was administered to students of the same faculty in a lecture hall by arranging time during which all of them were free. The questionnaire was administered and collected by the researchers and one of his friends who was an instructor at the University. During the administration, the students were given orientations regarding the purpose of the study, how to respond to the items, the freedom they have to ask any question and the right to decide not to participate in the study if they wanted to. Students who needed explanations concerning the

items, instructions or the way they should respond to the items were given clarifications.

After collecting data through the questionnaire, six students (five males and one female) were interviewed by the researcher. The purpose of the interview was to collect information so as to supplement the data gathered through the questionnaire. Although it was planned to interview two students (one male and one female) from each achievement category (Low, Medium and High), mostly male students from high achievement category were willing to participate in interview. The interview was conducted in the language that the interviewees preferred (either Amharic or English) in a classroom. Later the Amharic version of the interview data was translated to the English language.

Methods of Data Analysis

Before conducting the analysis, response options of the items of the ASSIST were given values ranging from Strongly Disagree (1) to Strongly Agree (5). To get a respondent's total scale or subscale scores, rating scores of the respondent to items under the scale or the subscale were summed up. Items that measured the scale or subscales negatively were reversed during scoring. Likewise, data were screened for data entry errors, missing data and outliers. Minimum and maximum values, means and standard deviations of items of the questionnaire, and variables of the study were examined using various SPSS procedures. Responses obtained from 22 respondents (20 females and 2 males) were found to be incomplete. Responses of the students to the item on self-rated academic performance were directly fed into the SPSS and analyzed accordingly.

On the other hand, using various methods of detecting outliers (e.g. graphical methods- histograms, box plots ...etc), the data from 3 (2 female and 1 male) participants were found to be outliers. Tabachnick and Fidell (2001) suggest deleting cases with outliers and missing data if they seem to be a random subsample of the entire sample. Otherwise, deletion of cases

could mean substantial loss of participants and therefore erroneous generalization. In the present study, dropping 25 respondents (22 cases with missing data and 3 cases with outliers) was found to seriously affect the generalizability of the results. This was so because the cases could not approximate random or nearly random subsample when the original sample size, 220, was considered as a population. Thus, excluding cases analysis by analysis using SPSS was preferred. This technique was preferred because, when the cases were excluded analysis by analysis, the number of excluded participants was reduced and found to be relatively nearly random subsample of the original sample.

After preparing the raw scores in this manner, different data analysis techniques were employed. These were factor analysis, cluster analysis, discriminant analysis, ANOVA and regression analysis. For the methods which require one or more of the assumptions of normality, linearity and homoscedasticity, graphical and scatterplot methods (Tabachnick and Fidell, 2001) were employed. After removal of the outliers, these assumptions were tenable justifying the use of the methods. Using Levene's Test for Homogeneity of Variance (Brace, Kemp and Snelgar, 2006), the assumption of homogeneity of variance was tenable and the use of ANOVA and t- test was justified. All of the analyses were carried out using the Statistical Package for the Social Sciences (SPSS) version 17.0. Test of significance was set at .05 level and all tests were two-tailed.

There seem to be two approaches to analyzing scores from the ASSIST. These are person and variable-oriented analyses. The person-oriented approach to analysis, compared to the traditional variable-oriented analysis has been used recently in the educational literature (Ratelle et al., 2007). The person-oriented analysis examines how different components of variables combine to produce distinct profiles. But the variable-oriented approach compares individuals by mean and standard deviation of their scores without emphasizing profiles of individuals. That is to say, the variable-oriented analysis focuses on whether an individual's score on one

component of a variable is greater or less than an average score, without considering whether the individual gets higher or lower scores on other components or subscales. Thus, the main limitation of a variable-oriented analysis that is offset by the person-oriented analysis is that it reduces the simultaneous endorsement of multiple profiles to one dimension. It is the person-oriented analysis of the components of APTS that was used in this study to identify profiles of the students in the study approach components. Cluster analysis is one of the techniques of carrying out the person-oriented analysis (Bergman and Magnusson, 2001). While a cluster is a group of relatively homogeneous cases or observations, cluster analysis is the statistical method of partitioning a sample into homogeneous classes to produce an operational classification. Of the three major techniques of clustering (Hierarchical, K-means and Two-Step) the Two-Step Clustering method was employed in this research. This method is appropriate for handling categorical and continuous data simultaneously and for determining the maximum number of clusters automatically. In order to assess adequacy of the cluster solutions to predict the membership of the students, discriminant analysis was employed. Then, whether there was significant difference in academic performance with respect to cluster membership was tested by One - Way ANOVA.

Results

In order to examine dimensionality of ASSIST, exploratory factor analysis was employed. Factor analysis is a family of analytic techniques that is designed to identify factors that underlie the relations among a set of observed variables (Pedhazur and Sckmelkin, 1991). In the present context, the observed variables are the indicators (or items) presumed to reflect the factor. In most factor analysis of real data, all items tend to have high loadings (loading is the correlation between an item and a factor) on the first unrotated factor (Pedhazur and Sckmelkin, 1991). Because of this it was necessary to rotate factors. Thus, the factors were extracted by means of maximum likelihood, and rotated with varimax method of rotation (Kline, 1994). Factorability of the scale was checked using KMO (Kaiser-Meyer-Olkin measure of sampling Adequacy) and Bartlett's Test (Brace, Kemp and

Snelgar, 2006). As presented in Table 1, for three major factor solutions (KMO = .83) and 13 minor factor solutions (KMO = .75) of ASSIST, both tests were good. KMO was good since it was close to one and Bartlett's Test was significant ($p < .001$). However, relative to the other two major factors, factor 3, the strategic approach, is less clear because most of its minor subscales loaded on factor 1.

Table 1: Factor Loadings of Minor Subscales of ASSIST (N = 198)

	Factor 1	Factor 2	Factor 3
<i>Deep Approach to Studying</i>			
Seeking meaning	.57		
Relating ideas	.57		
Use of evidence	.55		
Interest in ideas	.63		
Preference for teaching which encourages understanding	.63		
<i>Strategic Approach to Studying</i>			
Organized studying	.53		
Alertness to assessment demands	.57		
Monitoring effectiveness			.95
Achieving	.58		
<i>Surface Approach to Studying</i>			
Lack of understanding		.63	
Syllabus boundness		.68	
Fear of failure		.64	
Preference for teaching which transmits information	.39		
<i>% of the explained Variance</i>	<i>23.07</i>	<i>10.66</i>	<i>8.64</i>
<i>Eigenvalue</i>	<i>3.94</i>	<i>1.96</i>	<i>.97</i>

Notes: - Loadings less than .30 were omitted

- Factor 1 = Deep Approach to Studying

- Factor 2 = Surface Approach to Studying

- Factor 3 = Strategic Approach to Studying

- Bolded loadings were used to name the factors

- Total variance explained by the three factors = 42.36%

To group students with similar learning approaches, Two-Step Cluster analysis was used. The total sample was clustered by using categorical variables (sex and achievement category) and continuous variables (deep, strategic and surface approaches to studying). This clustering technique produced four clusters and the profile of these clusters is presented in Table 2.

Clusters 1 and 4 had the greatest dissimilarity. This is because, while cluster 1 contains the lowest average scores of the students on the deep and strategic approaches and the highest average score on the surface approach, the reverse is true for cluster 4.

Table 2: Cluster Membership and Cluster Means (Centroids) of the three Components of Approach to Studying (N = 198)

Clusters	Clustering Variables		
	Deep Approach to Studying*	Strategic Approach to Studying**	Surface Approach to Studying***
Cluster 1 (n = 58, 18 Males, 40 Females)	57.47	48.03	40.98
Cluster 2 (n = 39 Males)	59.36	48.97	38.51
Cluster 3 (n = 57 Females)	60.74	49.82	38.60
Cluster 4 (n = 44 Males)	63.41	52.89	30.64
<i>Total</i>	<i>60.10</i>	<i>49.81</i>	<i>37.51</i>

*. **. ***Minimum and maximum total scores were respectively 26 and 75, 29 and 59, and 19 and 59.

Cluster 1 represents students whose learning approach was very much dominated by a surface approach. This is labeled as very poor quality study approach group. It seems that deep and strategic approaches dominate cluster 4. Students in this group did not make much use of the surface approach; and the cluster is named good quality approach group. Cluster 2

is composed of students who adopt low levels of deep and strategic approaches and more than average level of the surface approach. They are, therefore, named as poor quality study approach group. The students who adopt deep and strategic approaches on approximately average level and use the surface approach at somewhat more than average level are found in cluster 3. These were labeled as moderate quality study approach group. These students tended to use the surface approach relatively highly. They also used the deep and strategic approaches at average level.

The adequacy of the four cluster solutions was assessed by discriminant analysis. Discriminant analysis produces canonical discriminant functions which are mathematical formulas that combine a set of predictor variables to discriminate between different categories (Brace, Kemp and Snelgar, 2006). Thus, in this study discriminant analysis revealed three discriminant functions with eigenvalues of 10.80, 2.27 and .06. Also Wilks' Lambda values for the three functions were significant ($p < .05$) indicating that the functions adequately discriminate among the four clusters. The analysis showed that from the total sample, 99.50% of the cases were correctly classified. Nevertheless, Brace, Kemp and Snelgar (2006) suggest that because discriminant analysis tends to overestimate the success of the discriminant functions, it is advisable to cross validate the results on subsample of the total sample. Thus, the same analysis was run on approximately 50% (114, 58 females and 56 males) of a random subsample of the entire sample. This additional analysis showed that 97.10% of the students were correctly classified.

In terms of cluster composition, cluster 1 is composed of low achievers, the majority (40, 68.97%) of which were females. In contrast, cluster 4 contains only male students, the majority (44, 77.20%) of which were high achievers. Cluster 2 is composed of entirely male and medium achieving students (39, 46.40%), while cluster 3 is composed of only female students, the majority (44, 52.40%) of which were medium achievers.

As could be observed from Table 3, students in the fourth cluster (good quality study approach profile) exhibited the best performance (mean CGPA = 3.48). Academic performance of the students in the first cluster (very poor quality study approach profile) was the lowest (mean CGPA = 2.00).

Table 3: Mean CGPAs (M) and Standard Deviations (SD) for Students in the Four Clusters

Cluster	N	M	SD
1	58	2.00	.13
2	39	2.53	.22
3	57	2.67	.40
4	44	3.48	.28
Total	198	2.62	.60

An attempt was also made to examine whether differences in the academic achievement of the students in the four clusters (as shown in Table 3) is statistically significant. Using cluster membership as independent variable with four levels and CGPA as dependent variable, ANOVA revealed that there was a statistically significant difference in academic achievement among the clusters, $F(3, 194) = 240.30, p < .05$. Closer examination of the data using Scheffe's post hoc comparison test revealed that the students in clusters 1 and 2, 1 and 3, 1 and 4, 2 and 4, and 3 and 4 differed significantly with respect to their academic achievement. Besides, ANOVA showed that good quality study approach students rated their academic performance significantly higher than those in other clusters, $F(3, 194) = 11.47, p < .05$.

In order to tackle the second research question, simple regression analysis was used. This analysis showed a statistically significant model for approaches to studying, $F(1, 193) = 64.41, p < .05$. In addition, approaches to studying accounted for about a quarter of the proportion of the variance in academic performance (adjusted $R^2 = 24.70\%$) with positive and significant beta weight ($\beta = .50, p < .05$). Moreover, deep ($r = .27$) and strategic ($r = .31$) approaches were found to positively and significantly ($p < .01$) correlate with

CGPA. But surface approach was negatively related to CGPA ($r = -.43$, $p < .01$).

On the other hand, interviewees reported that they tended to use the strategic approach to studying more often. Here is an excerpt from the interview.

If there is no test or examination, my study is not from the bottom of my heart. ... still now I ask my seniors for information regarding the behavior of the lecturer who had been teaching them and assigned for us; the examination types he likes more (essay, choice...) and for lecture notes and handouts they were given for the same course. ... While doing assignments, to find points that lecturers require to be included, I can say, there is no book that I do not refer.

(High Achieving Student, Department of Sociology)

Also it appears that the students adopted the strategy of relying on their seniors for information about examinations in search of the easiest path to success. Regarding this, a low achieving student from English Department said, "... our seniors prepare us for examinations at least by suggesting topics that were asked in essay, choice or completion item types." Adopting such strategic approaches to studying may help students to get good grades. This was evidenced in the interview with a high achieving student from Accounting Department who said, "I ask my seniors how to get good grades. ... When examination days approach, I concentrate on my studying very much (sometimes throughout the night) and now I have a good cumulative grade point average."

In some circumstances, instructional contexts may hinder the adoption of deep approach to studying. In relation to this, high achieving student from Department of Sociology said, "I have interest for reading deeply to

understand some topics; however, the situation is not conducive. Some lecturers tell us that questions from the topics will not appear on tests or examinations." However, instructional contexts may not always hinder the adoption of deep approach to studying. This was indicated by a high achieving student from English Department who said, "If your appetite is open, that is, if your feeling is well, if you are willing to do, you may read beyond the topics assigned."

Discussion

This study examined the approaches to studying adopted by university students. Besides, an attempt was made to factor analyze the instrument used to measure this construct. Factor analysis indicated that 13 minor and 3 major factors could be retained for ASSIST. However, as suggested by some researchers (e.g., Richardson, 1993; Ramsden and Entwistle, 1981), it was difficult to clearly distinguish the strategic approach in this study. This is because most of the minor subscales of the strategic approach loaded on factor 1, which was named as the deep approach factor. But in the present study, the strategic approach was considered to exist because (a) one minor subscale of the strategic approach loaded highly on the third factor, and not on any other factor, (b) deep and surface minor subscales did not load on the third factor and (c) data gathered through the interview indicated that the students adopt the strategic approach.

Study Approach Profiles

Two-step cluster analysis revealed four subgroups of students with different study approach profiles. These were very poor, poor, moderate and good quality study approach groups. The four cluster solution was heterogeneous in terms of its study approach profiles. As one moves from cluster 1 to cluster 4, scores on the good quality components (deep and strategic approaches) increase whereas score on the surface approach generally decreases. Moreover, discriminant analysis indicated that, on average, about 98% of the students were correctly classified. These pieces of evidence

could imply that the four cluster solution is adequate in this sample and that the clusters have internal validity.

The external validity of the cluster solution was checked against academic performance (CGPA and Self-rated). Scheffe's post hoc comparison test showed significant difference in academic performance between clusters 1 and 2, 1 and 3, 1 and 4, 2 and 4, and 3 and 4. Also students who tended to adopt good quality study approaches rated their academic performance significantly higher than those who tended to adopt very poor quality study approaches. This could be evidence for the external validity of the cluster solution.

Majority of the students (48.99%) were found to adopt very poor and poor quality study approaches. That is, they predominantly adopt the surface approach. Only very small number of students (22.22%) were found to adopt good quality study approaches (more seeking of meaning and higher grades and less use of rote learning). Although their deep and strategic approach scores were average, even moderate quality approach students displayed more than an average level of surface approach use.

As expected, Scheffe's post hoc comparison procedure revealed that students in the good quality study approach profile had significantly higher CGPA than those in other profiles. In the cluster solution, with the increasing level of use of deep and strategic approaches, there was a generally significant increase in the academic performance. This result indicates that there is a significant difference in academic performance with respect to approach to studying. The finding could also imply that high achievers tend to use good quality study approaches whereas low achievers adopt poor quality approaches.

Students who tended to adopt good quality study approaches academically surpass those who tended to adopt surface approach probably due to the intention they have for understanding, engaging with and valuing the

courses they learn. In contrast, surface predominant students memorize information needed for assessment and would be at a risk of obtaining lower grades either if the memorized information is forgotten in examination room or if exam items are not correctly answered with sole memorization.

The above results are generally consistent with the research literature. Hughes and Peiris (2006) found three clusters from ASSIST in which the cluster of the students dominated by a surface approach performed significantly less than those adopting the good quality approaches. Likewise, Svensson (1977) reported that most of the students who consistently adopted good quality study approaches passed all their examinations, whereas less than a quarter of those using surface approach were fully successful.

It is interesting to note that the approach to studying adopted by most female students was, at most, of moderate quality. Compared to male students, majority of the female students used very poor quality (very high surface and very low deep and strategic) study approaches. This may partly explain why the academic performance of most of the female students was low. Consistent with this result, Richardson (1997) found that in two successive research sessions, majority of male students were classified as having meaning orientation (good quality study approach) while majority of the female students were regarded as having a reproducing orientation (poor quality study approach). Likewise, Kelly et al. (1990) reported that female students scored higher than male students on the surface approach while male students scored higher than female students on the deep approach.

On the other hand, interviewees indicated that they tend to adopt the strategic approach to studying. They pointed out characteristics of the strategic students such as searching for materials and information regarding examinations from their seniors. The contextual dependence of deep approach as reported by a student, who had interest to read deeply but the assessment system tended not to demand it, was also found to be consistent with the findings of Marton and Saljo (1976b). Marton and Saljo

disclosed that even if many students are capable of using deep or surface strategies, and if existing assessment system requires students mainly to recall factual information, deep level understanding will be in jeopardy. It was also pointed out that unless students realize that deep approach to learning is required, deep level processing is unlikely to take place (Entwistle, 1993).

Contribution of Approaches to Studying Academic Achievement

As demonstrated in the results section, the regression model for approaches to studying was able to explain a considerable proportion of the variance (Adjusted $R^2 = 24.70\%$) in academic performance. This implies that approaches to studying contribute a lot to academic performance. Also the deep and strategic approaches displayed positively significant correlations with academic performance. These results indicate that students who adopt good quality approaches are more likely to perform better academically than those who adopt poor quality approach. The findings also imply that academically better students are likely to adopt good quality approach more so than those who tend to be less effective in their academic performance. Further evidence could come from the negative and significant correlation found between surface approach and CGPA. That is, the more the students adopt surface approach to studying, the less is their academic performance .

The above findings are consistent with existing research literature. Deep and strategic approaches, either alone or in combination, were found to predict high academic achievement while low achievement was predicted by a surface approach to learning (Burton et al., 2009). Disorganized study methods were found to be significantly associated with low marks and surface level learning strategies were major indicators of low grades (Watkins, 1986). In addition, good quality approaches to studying and good study habits were found to be positively related to academic performance while the relation between low quality approach and performance was negative (Gadzella, Ginther and Williamson, 1987; CRLI, 1997).

Conclusion and Implications

Focusing on the central idea that improving the quality of the students' learning requires improving the quality of their study approaches, the present study investigated University students' approaches to studying. The results generally indicated that majority of the students adopted poor quality study approaches. Particularly female students appeared to be more vulnerable to this problem than male students. Also, approach to studying was found to significantly contribute to academic performance. Moreover, students' academic performance differed significantly with respect to approach to studying. This is because students who were predominantly adopting deep and strategic approaches to studying appeared to be academically more successful than those who were predominantly adopting surface approach to studying. Thus, it appears that better academic performance requires adopting good quality approaches to studying.

The present study has important implications for teaching and learning in that, first, students should consider whether they have good quality study approaches. The approach the students adopt in a particular situation depends on a complex array of factors (Felder & Brent, 2005). Some of these factors are intrinsic to the student (e.g., possession of prerequisite knowledge, skills and motivation to learn the course), while others are determined more by the instructional environment (e.g., the nature and quality of the instruction and assessment). As a result, helping students to adopt good quality study approaches calls for intervention from instructors, counselors and university administrators. Thus, the more students, instructors, counselors and administrators work to enhance and maintain good quality study approaches, the better the students' academic performance, quality and transferability of learning will be.

Second, in addition to the apparent problem that many students adopt surface approach to studying, data from interview indicated that the instructional context seemed to prohibit the use of the deep approach. Such instructional contexts should encourage, not discourage, the use of the deep

approach to studying. Because our objectives in education, at whatever level, should be to help students both to utilize their own learning approaches most effectively and transcend the limitations which those approaches carry with them, deep and strategic approaches to learning should be encouraged at the expense of the surface approach (Entwistle, 1993; Marsh, 2006). There are various strategies that should be incorporated into the instructional process, assessment, curriculum and administrative procedures to discourage surface and to encourage deep and strategic approaches (Marsh, 2006). One such strategy that appears to be applicable in our context is introducing learning and study skills components into the structure of a course. Although integrating these skills into every course could help, providing a 'Study Skills Course' separately is another option that could probably help more. This course may be given to all students, especially at the freshman year coupled with such issues as 'Managing Stress' and 'Adapting to a New Environment'. One reason that justifies the need for this course could be that because of the uses of surface approach to learning in previous subjects (probably at high school), many students may not have the study skills required in higher education institutions, at least, at the beginning of their study. Thus, the students may find the academic environment of the university stressful and therefore need support.

Another technique for encouraging deep and strategic approaches and discouraging the surface approach is to structure instructional contexts so that students realize that high quality approaches are demanded. This is because students tend to modify their approach to studying if the context (e.g. teaching, assessment) forces or requires it. When teachers structure classroom situations so that students perceive them differently, the students approach the situations differently (Schmeck, 1988 cited in Ropo, 1993). Assessment systems should also be planned carefully and demand deep level learning. This is because many of the teacher-made assessment items are usually criticized as simply requiring students to recall factual information at the expense of higher order thinking skills. Teachers, specifically, those

involved in teaching in higher education institutions, are advised not to include items that encourage the regurgitation of factual answers. Such items are likely to shift students towards surface approach to studying (Marton & Saljo, 1976b).

Third, it appears that female students need particular attention. This is because they tended to lag behind their male counterparts in adopting good quality approaches to studying. Thus, instructors, counselors and administrators need to help these students in order to at least minimize this problem. Possible ways of helping female students may be (1) providing study skills trainings and workshops, (2) encouraging them to adopt high quality study approaches (deep and strategic) when they study and (3) encouraging them to have positive self-concepts about their academic competence. This does not mean, however, that male students do not need help. The implication that could be drawn from the present study regarding gender is that all students who tend to be surface approach adopters need special help from instructors, counselors, and administrators. Nonetheless, because female students were found to be relatively more vulnerable to this problem, more attention should be given to them.

However, in interpreting and using the results of the present study, the following limitations should be considered. First, many of the findings of this study depend on self-report data. Thus, the items of the questionnaire and the interview were susceptible to response set such as social desirability in which the students could respond not on the basis of what they really feel, but on the basis of what they think are socially acceptable or desirable.

Second, although the participants that were excluded analyses by analyses due to missing data and outliers appeared to assume nearly random subsample of the original sample, their exclusion could have a detrimental influence on the generalizability of the results.

Third, although the general rule of thumb for internal consistency of scales is over .70, in the present research, the internal consistency reliability of the

strategic and surface approaches were lower than .70 but none is below .50. Nevertheless, attempts made to improve the psychometric qualities of the instrument were evident from the comparison of pilot and main studies. The reliability coefficients of the full scale and its subscales showed improvements in the main study relative to reliability coefficients found in the pilot study. Likewise, effort has been made to examine internal factor structures of the tool and its dimensionality through factor analysis. This analysis indicated some evidence of the construct validity and existence of different components of ASSIST.

The present study has also theoretical implications for future research. First, future research should substantiate consistency of findings of the present study. Special attention should be given to the study approaches used by male and female students. This is because the literature shows that most research in this area ignored gender as a social variable and that few previous studies found inconsistent results (Richardson, 1993).

Second, further research needs to be conducted in our context to confirm factor structures of ASSIST that were found in the present research. Particular attention should be given to its strategic component because, relative to others, this factor was not clearly distinguished. Furthermore, although an attempt was made to check adequacy of the cluster solution through discriminant analysis, further studies should substantiate stability and validity of the clusters found in the present study. This is because validity, stability and interpretation of the clusters are among the known problems of cluster analysis.

Finally, the descriptive nature of the present study precludes making any causal statements. However, results show differential trend in academic performance between students who adopt high and low quality study approaches. Thus, several questions can be proposed: Does adoption of deep and strategic approaches result in a better academic performance? Does adoption of surface approach to studying lead to poor academic

performance? These are among the questions to be answered by careful and systematic experimentation.

Note

¹Sample of the Items of ASSIST that were Used in the Main Study:

Deep:

- When I read handouts or books, I try to find out for myself exactly what the writer means.
- When I study, I try to relate ideas I come across in other topics or other courses.
- I look at evidence carefully and try to reach my own conclusion about what I study.
- When I study, I like to find out the reason behind what I am reading.

Strategic:

- I am good at following up the reading assignments suggested by lecturers.
- I study hard to get a good grade even when I do not like the course.
- Before starting to work on an assignment, I think how best to do it.
- I think I am systematic and organized when studying for exams.

Surface:

- I read very little outside what is actually required to pass tests or exams.
- I have a problem of giving meaning to things I have to remember.
- I focus on only memorizing much of what I have to learn.
- I like exams or tests which focus only on materials provided in our lecture notes.

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