

Learning and study strategies of medical students in Mashhad University of Medical Sciences & Health Services

Talat Khadivezadeh¹, Ali-Akbar Saif², Naser Valae³

Abstract

Purpose: This study explores the use of and the role of learning strategies in the educational success of Iranian undergraduate medical students using an inventory of learning and study strategies

Materials and method: 412 students in the first to third year of study were selected randomly. A questionnaire based on the LASSI questionnaire (developed by Weinstein et.al which included ten areas of attitude, motivation, time management, anxiety control, concentration, data processing, selecting the main idea, study guide line, self-testing and test strategies) was distributed to the students. In all, there were 77 questions with a five scale response. The educational success of the students was determined on the basis of semester scores from the final report card and the personal characteristics of the students were collected from their educational dossier.

The students were classified on the basis of the educational progress in three groups (strong, average, weak) and the score percentiles for each area of studying and learning strategies were calculated and compared with a normal sample of American students. The role of different areas of studying and learning strategies on the educational progress of students was determined with multiple trend analysis.

Findings: This study showed a significant correlation between the educational progress of students with studying and learning strategies (motivation, attitude, time management, anxiety control, concentration, data processing, selecting the main idea, self-testing and test strategies). Only the study guideline strategy didn't correlate with the educational success of the students.

Seven areas of studying and learning strategies related with the educational progress in multiple trend analysis. Only

¹ Lecturer in Mashad UMSHS

² Professor of Educational Psychology in Allame Tabatabaie University

³ Lecturer in Shaheed Beheshti UMSHS

motivation had a significant and strong relationship with the educational progress of students. There is also a positive correlation between test strategies and educational progress.

Conclusion: The present study confirms other studies that motivation had a clear and independent effect on the educational success. It is therefore necessary to increase the students' motivation if they are to succeed educationally.

Keywords

Study strategies, learning, educational success.

Introduction

The problem of the unsuccessful learner is one of the key issues in any system of education including higher education. Accurate data regarding the numbers of students dropping out or failing their course of studies are hard to come by but what evidence there is suggests the presence of this problem. Failure for the learner can be traumatic in many ways. Apart from the fact that it often delays the time of entry into the job market, it can also cause frustration and a sense of inferiority (Nafisi 1984). On a more societal level, this problem imposes a drain on the resources of the community and the country.

Educational research that studied successful learning initially attempted to understand it through how teachers maximized learning. In recent decades, however, cognitive psychologists have moved towards highlighting the role of learners in the learning process. Theories of cognitive psychology suggest that the learner is the main determinant in the acquisition of information. Studies performed on students' cognition shows that learning strategies, by facilitating the

learning process, improve their academic performance (Mayo 1993).

More recently, studies carried in the past decade have borne out this positive correlation between learning strategies and academic success (Prus 1993, Chissom et al 1992). These learning strategies include data processing, selecting the main idea, self-testing, time management, concentration, study guideline, self-testing, test strategies as well as levels of motivation and anxiety control. Studies conducted by Gaden (1994), Prus (1995) and Gordon (1996) show that there is a clear relationship between motivation and academic success of students (11-17, 3). In Lindgren's study (1994) regarding time management, detailed and precise planning was found to exist in 38% of the successful students and free and flexible planning was found to exist in 32% of the successful students (Gaden 1994). Prus and Kean found that there was a correlation between anxiety control and concentration and the average of academic scores. (Prus 1995, Keane 1993). Chissom (1992) found a positive correlation between self-testing, the monitoring of understanding that is an ultra cognitive strategy, and educational progress (Chissom 1992). In the study conducted by Prus, there was a strong relationship between test strategies and educational progress of the students.

Olausson (1998) conducted a study in Norway where the correlation between the scales of studying and learning strategies was low in most cases and ranged between 75% (between time management and motivation) and 22% (between motivation and anxiety control) in the assessment of the relationship of studying and learning strategies and educational progress. In Keane's study of students who were non-native speakers of English,

in multiple trend analysis, only data processing and selecting the main idea had a positive correlation with the educational progress of students. These two strategies may have higher significance here because data processing and selecting the main idea in the information that are in a foreign language are difficult for foreign students.

In 1993, the third international conference of medical education emphasized the need for better learning and teaching strategies as a way for improving the quality of medical education (Worlds federation 1993). To date, few studies have been performed on studying and learning strategies of students in Iran. With this mind, this study was aimed at the use of and the role of learning strategies in the educational success of Iranian undergraduate medical students using an inventory of learning strategies developed by Weinstein et al (1987). The intention was also to compare the findings of this study with findings from North American studies.

Materials and methods

The present study is a descriptive-analytical study which was carried out in 1999 at Mashhad University of Medical Sciences and Health Services. 412 students in the first to third year of study were selected randomly. 225 of the subjects (54.6%) were medical students, 121(29.4%) were dentistry students and 66 subjects (16.0%) were pharmaceuticals students. These 412 students included 214 female and 198 male students who were 21.1 \pm 1.9 years of age. Foreign students were excluded from the study,

The data were collected on the basis of the studying and learning strategies LASSI questionnaire developed by Weinstein et.al

(1987). This questionnaire included ten areas of attitude, motivation, time management, anxiety control, concentration, data processing, selecting the main idea, study guide line, self-testing and test strategies and in total included 77 questions. Each question had the possibility of 5 types of responses (completely, usually, partially matches with me, usually doesn't match with me, doesn't match with me at all).) The LASSI questionnaire was translated into Persian and then a trial was conducted using two methods of eliciting information (questionnaire and interview) with 10 students. The internal correlation coefficient was calculated for each scale of the studying and learning strategies questionnaire developed in Persian.

After preliminary meetings to explain the project, the questionnaires were distributed to students and collected after completion. The educational success of the students was determined on the basis of semester scores from the final report card and the personal characteristics of the students were collected from their educational dossier. The students were classified on the basis of their educational progress in three groups (strong, average, weak) and the score percentiles for each area of studying and learning strategies were calculated and compared with a normal sample of American students.

Correlation between studying and learning strategies with educational progress of students was determined and analyzed with the Crosstal and Alice tests. The role of different areas of studying and learning strategies and educational progress of students was determined with multiple trend analysis.

Findings

The mean score on the theoretical lessons was 15.4 ± 2 (minimum 7.6 and maximum 19.98) and total average was 15.5 ± 1.9 (minimum 8.2 and maximum 19.8). 48 subjects had little educational progress, 249 subjects (60.4%) had average educational progress and 512 subjects (27.9%) had good educational progress. Table 1 relates to the status of studying and learning strategies and shows that most students see test strategies as the best way of learning and concentration and anxiety control in second and third places. On the other hand, self-testing was regarded as a poor way of learning.

In table 2, except for the area of study guideline, there was a correlation between each of the studying and learning strategies and the educational progress of the students. This correlation is stronger between strategies in all areas and the average score of the theoretical lessons. Multivariate regression analysis showed that the self-testing, test strategies, data processing and anxiety control areas have an independent role in the educational progress of students.

There is significant and strong correlation between all studying and learning strategies with each other. Thus, there is a high probability that in the multiple regression pattern these variables substitutes each other. Tables 3 and 4 show that only test strategies, self-testing and data processing had independent effects both on the theoretical and total average.

This study showed a significant correlation between the educational progress of students with studying and learning strategies (motivation, attitude, time management, anxiety control,

concentration, data processing, selecting the main idea, self-testing and test strategies). Only the study guideline strategy didn't correlate with the educational success of the students.

7 areas of studying and learning strategies related with the educational progress in multiple trend analysis. Only motivation had a significant and strong relationship with the educational progress of students. There is also a positive correlation between test strategies and educational progress.

There was a significant correlation between the positive attitude towards study and the educational progress of students, so that the higher the positive attitude of the student, the better the progress.

Positive correlation was also found between time management and educational progress. Data processing, self-testing and selecting the main idea correlated with educational progress. There was also an association between anxiety control of the students and their educational progress

50 percentile of the grades in each of the areas of studying and learning strategies was compared with a normal sample of American students. The motivation score was between 10 and 15 percentile and the self-testing score was about 35 percentile of a normal sample of American students. This suggests very low motivation and low self-testing among these students of the present study.

Figure 1 shows the mode of grades in studying and learning strategies in strong, average, and weak students of Mashhad University of Medical Sciences compared with a normal sample of American students. Mode of scores in studying and

learning strategies among students with good educational progress was greater than those of the average and weak students.

A comparison of 50 percentile of studying and learning strategies of strong, average, and weak students of Mashhad University of medical sciences with normal sample of American students has also been conducted.

The mode of scores in the motivation area was 15 percentile and mode of scores in test strategies area was 80 percentile and concentration score was equal to 75 percentile of a normal sample of American students.

In the present study, the Correnbach alpha correlation coefficient for the scores of different scales of the questionnaire was: total 0.85, attitude 0.62, motivation 0.64, time management 0.64, anxiety control 0.79, concentration 0.83, data processing 0.75, selecting the main idea 0.62, study guideline 0.61, self-testing 0.67, test strategies 0.77. In the Braten study in Norway (1998) the Correnbach alpha correlation coefficient for the scores of different scales of the questionnaire ranged between 0.68 to 0.86.

Discussion

Research shows that among the ten strategies of studying and learning, self-testing, test strategies, and data processing strategies have an effective role in academic success. In Prus, et al. (1975) study there was a strong relationship between test strategies and educational progress of the students and the results of this study confirmed that. In all cases, the average scores in the theoretical lessons were more strongly correlated with studying and learning strategies than the total average. It could

be that writing tests and theoretical lessons have more of a relationship with studying and learning of students in the minds of the students.

In assessing the relationship between studying and learning strategies and educational progress, using multiple trend analysis, studies have found that self-testing, data processing, test strategies, and time management have independent and positive effects on the total average. Self-testing, data processing, test strategies, and time management had positive and independent effects on the theoretical lessons average. Thus self-testing, data processing, and test strategies had a clear relationship both with total average and theoretical lessons average.

In this study, time management had a significant relationship only with theoretical lessons average. This is probably due to fact that since success in the theoretical courses is linked to memorizing lessons and understanding them, planning and time management have a strong role. In the practical tests, where a student is individually and orally evaluated, anxiety control may have stronger effect on test results.

The level of anxiety control in strong students was considerably less than average and weak students. Since in the multiple trend analysis anxiety control had independent effects on total average too, an evaluation of factors that produce anxiety control and evaluation of the ways to confront it is necessary.

In the present study, the level of self-testing in strong students was more than in average and weak students. In the multiple trend analysis, self-testing had independent effects on the total average

too. Several studies have shown that weak learners can increase their understanding and the level of memorization of information by means of learning of ultra cognitive strategies. In another study, the weakest learners gained mostly from the learning ultra cognitive strategies. In this research, multiple trend analysis showed that cognitive strategies of data processing and test strategies have independent effects on total averages.

The average regarding anxiety control is about 75% of the normal sample of American students and has a higher mode than other areas of comparison with the American sample. This suggests less anxiety control in this study's students when compared with American students. In evaluating the studying and learning strategies of Norwegian students, the mode of scores of the Norwegian students in 8 areas was close to 50 percentile of the reported norm for America. The scores of attitude of Norwegian students were close to 65 percentile and their motivation grades were between 15 and 20 percentile reported from America. The researchers described that Norwegian students believe that education is an important and valuable objective that is parallel with their other objectives and attitudes (Gadan, 1994).

The control of anxiety and concentration in strong students was equal to 90 percentile and test strategies were equal with 85 percentile in the normal American sample. With average students, motivation and self-testing were below 50 percentile of normal American sample and in weak students the scores of this two areas was below 50 percentile of normal American sample.

The motivation scores of the present study's students are even less than the Norwegian student's (Braten, 1994). In the present study, the mode of acquired scores

for each of areas of questionnaire in strong, average and weak students was evaluated and showed that motivation in weak students was between 10 to 15 percentile of normal sample of American students. This means little attempt made by students for success. The low motivation of these students may result from the belief that success is more related to invariable factors such intelligence, family, facilities and so on than personal attempt and activity. However, these results need to be treated with caution until there is adequate information about the beliefs of these students.

Conclusion

In this study, test strategies and concentration and anxiety control strategies are regarded as excellent strategies and self-testing is regarded as a poor strategy by the students. However precise interpretation of these results can be made only when normal values of studying and learning strategies, evaluated with this questionnaire, are compared with other Iranian students.

The present study confirms other studies that motivation had a clear and independent effect on the educational success. It is therefore necessary to increase the students' motivation if they are to succeed educationally. These activities include studying books, preparing for classes, finishing homework on time, and persistence in studying, even when the issue is not interesting for them. In addition, learning has to be made interesting for them. In this research, the stronger students had a better attitude to education. The use of an effective study guideline increases learning and increases learner self-sufficiency but a study guideline didn't have a clear relationship with educational progress and confirms the

findings of other studies (Prus 1995, Keane 1993). In our study, the use of a study guideline by strong, average and weak students is less than that of the American students. This is probably due to a lack of familiarity with the idea of a study guideline.

Studying and learning strategies evaluated in the questionnaire developed by Weinstein et al have an acceptable correlation with educational progress of students and its feedback can be used for resolving the learning problems. In order to use LASSI questionnaire as a detecting device for resolving the learning problems, normalization of this questionnaire for Iranian students is recommended.

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Learning and study strategies....

Table 1. Students' study strategy use based on percentages

Status of studying and learning strategies	Excellent Very high	Good High	Average Average	Poor Low
Attitude	29.3	42.7	18.1	-
Motivation	7.8	48.8	37.3	6.1
Time management	7.3	39.1	44.2	9.4
Anxiety	40.5	43.9	11.7	3.9
Concentration	30.3	45.1	19.8	4.6
Data processing	27.9	51.5	20.6	-
Selecting the main idea	34.7	52.7	12.6	-
Studying guideline	5.8	42	52.2	-
Self testing	7.3	26.3	43.9	14.8
Test strategies	52.2	35.9	11.9	-

Table 3: multiple trend analysis with step-by-step method for assessment of studying and learning strategies that affect educational progress

Area	Regression coefficient	Level of test significance
Self testing	0.079	0.0000
Test strategies	0.089	0.0007
Data processing	0.039	0.059
Anxiety	0.045	0.024
Fixed number	11.05	0.000

Table 4: multiple trend analysis with step-by-step method for assessment of studying and learning strategies that affect theoretical lessons average

Area	Regression coefficient	Level of test significance
Self testing	0.069	0.0007
Test strategies	0.076	0.0035
Data processing	0.048	0.025
Time management	0.038	0.039
Fixed number	10.88	0.000

Table 2. Correlation among the study stragy inventory, learning and progress.

	Anxie ty	Attitud e	Concentr ation	Data Process ing	Motiva tion	Self Testing	Selectin g The Main Idea	Studyi ng Guidel ine	Time Manage ment	Test Strate gies
Attitude	0.3067 0.000									
Concentrat ion	0.4221 0.000	0.6119								
Data processing	0.2399 0.000	0.2066 0.000	0.3051 0.000							
Motivation	0.1294 0.000	0.4573 0.000	0.4791 0.000	0.4043 0.000						
Self testing	0.1294 0.000	0.2698 0.000	0.4089 0.000	0.4929 0.000	0.4877 0.000					
Selecting the main idea	0.4048 0.000	0.3849 0.000	0.5032 0.000	0.3971 0.000	0.2909 0.000	0.4075 0.000				
Studying guideline	0.1139 0.000	0.2207 0.000	0.2327 0.000	0.5582 0.000	0.3499 0.000	0.5014 0.000	0.3367 0.000			
Time management	0.1858 0.000	0.4955 0.000	0.5484 0.000	0.2605 0.000	0.6495 0.000	0.3924 0.000	0.2838 0.000	0.2380 0.000		
Test strategies	0.6244 0.000	0.4742 0.000	0.5893 0.000	0.3601 0.000	0.3288 0.000	0.2828 0.000	0.6071 0.000	0.2482 0.000	0.3524 0.000	
Theoretica l average	0.3083 0.000	0.1689 0.001	0.2650 0.000	0.2621 0.000	0.2587 0.000	0.2488 0.000	0.1927 0.000	0.0816 0.098	0.2258 0.000	0.3212 0.000
Total average	0.3020 0.000	0.1662 0.001	0.2543 0.000	0.2479 0.000	0.2452 0.000	0.2329 0.000	0.1723 0.000	0.0766 0.120	0.2107 0.000	0.3059 0.000