

# Assessment of Self Regulated Learning Strategy Using Motivated Strategies for Learning Questionnaire in Anatomy Course Among Undergraduate Medical Students in Bangladesh

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## Abstract

**Background:** 'Self-Regulated Learning (SRL)' means one's ability to organize and control their learning environment. Self regulated learners develop a deep understanding of subject matter which positively influences academic performance. On this basis, the present study is aimed to assess student's anatomical 'SRL' strategies and to investigate whether anatomical 'SRL' can predict academic performance in Anatomy course.

**Methods:** This was a cross-sectional study. The study group consisted of a convenient sample of 105 first year undergraduate medical students of Bangladesh who were learning Anatomy for last 6 months. The 'Motivated Strategies for Learning Questionnaire' was used. Information regarding age, gender, medium they were studying prior entering into M.B.B.S course and their anatomy result was collected. Data were analyzed using SPSS version 19.

**Results:** The present data suggests that the study group was sufficiently motivated for learning in Anatomy as measured by intrinsic goal orientation, task value and self-efficacy of learning and performance. It also demonstrates that students who were more likely to use learning strategies such as rehearsal, elaboration, organization, peer learning and help seeking had higher levels of academic performance. Female students and those from Bangla medium reported more effective study habits.

**Conclusion:** These results indicate that adopting SRL strategics are likely linked to Anatomy performance.

**Key words:** Self-regulated learning; Anatomy; MSLQ; Medical students; Bangladesh.

## INTRODUCTION

'Self-Regulated Learning (SRL)' means one's ability to organize and control their learning environment and evaluating their learning behavior<sup>1,2</sup>. It is going on in three phases. The first phase is during the initial learning, the second phase is when a problem comes during learning and the third phase is when learners are trying to teach others<sup>3</sup>. Self regulated learners are the students who ask questions, take notes, and allocate their time and resources to help their own learning<sup>4</sup>. Thus develop a deep understanding of subject matter which positively influences academic achievements<sup>5</sup>.

Everyday medical science is constantly changing. It is important that doctors must be life-long learners to allow quicker and more accurate diagnosis and better patient care to save lives. It can achieve, if medical professionals take control of their learning needs and activities through 'SRL'<sup>6</sup>. It is reported that incorporation of 'SRL' into the medical curriculum is important to improve the clinical skills of medical students<sup>7</sup>. 'SRL' can be influenced by gender, educational environment, teaching methods, personality and family background<sup>8</sup>.

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The undergraduate medical curriculum in Bangladesh is a five year medical college training. Anatomy is taught in the Phase I. It is expected that at the end of the Anatomy course, the students will be able to acquire adequate knowledge of the structural components of the human body & correlate it with normal human body functions and with other subjects of medical science<sup>9</sup>.

The 'Motivated Strategies for Learning Questionnaire (MSLQ)' is commonly used by a number of researchers to assess students' 'SRL' strategy for a college course<sup>10,11</sup>. Although MSLQ was designed for undergraduates, it is likely to be equally effective in medical students<sup>12,13</sup>. The acceptable reliability and validity of items of MSLQ for medical students in anatomy courses has been reported by Pizzimenti and Axelson<sup>14</sup>.

Within the context of the medical anatomy curriculum, 'SRL' strategy of a student includes an individual's judgment of their ability to complete tasks such as dissection, learning anatomical knowledge, and applying anatomical knowledge to clinical situations. It is important both for the faculty members and the students to understand the students' level of engagement for better learning outcomes. There is no previous published research that has investigated 'SRL' strategy of student for first year medical anatomy courses in Bangladesh. On this basis, the present study is aimed to assess student's anatomical 'SRL' strategies and to investigate whether it can predict academic performance in Anatomy.

### MATERIALS AND METHODS

This was a cross-sectional study, carried out in the Chattogram Maa-O-Shishu Hospital Medical College (CMOSHMC) during the study period of 2018. The study group consisted of a convenient sample of 105 first year undergraduate medical students of Bangladesh from one Private Medical College of Chattogram, who were learning Anatomy for last 6 months. The study was approved by Ethical Committee of CMOSHMC. The students were informed briefly regarding the nature and purpose of the study. Confidentiality was confirmed. Students were encouraged to participate in this study voluntarily. The questionnaire was distributed to the students during their regular class and was given 45 minutes to complete it and to return it to the researcher. Information regarding age, gender, medium they were studying prior entering into M.B.B.S course and their anatomy result was collected.

The MSLQ was used in this study with little modification. The questionnaire was composed of 74 items regarding the students' self-regulated learning strategy for Anatomy. The participants answered all the items via a seven-point Likert scale. The scoring of items was as follows: "7 = very true", "6 = true", "5 = somewhat true", "4 = neutral", "3 = somewhat untrue", "2 = untrue" and "1 = very untrue".

Data were analyzed using SPSS version 19. Cronbach's alpha coefficient was measured. The Pearson's correlation test and independent t-test was done.  $p = 0.05$  was considered statistically significant.

### RESULTS

Demographic characteristics of the participants of this study were shown in Table I. A total 105 students responded to the questionnaire. The mean age of the participants was  $19.96 \pm 0.69$  years.

**Table I :** Demographic characteristics of the participants

Variable	Frequency	Percentage (%)
Age group in years		
18 – 19	23	21.9
20 – 21	82	78.09
Sex		
Male	40	38.1
Female	65	61.9
Medium		
Bangla medium	94	89.5
English Medium	11	10.5

n = 105

The results of the MSLQ in the present study are shown in table II. Cronbach's Alpha coefficient of variables was 0.88. The alpha coefficients of subscales ranged from 0.42 (Effort regulation) to 0.79 (Peer learning), with most of the alphas above 0.60. The MSLQ scales correlate moderately with the last final Score in Anatomy Course. Most of the scale show clear predictive validity. For motivation scales, the strengths of the relationships between intrinsic goal orientation and task value were moderate; and self-efficacy of learning and performance showed strong relationship with the last final Score in Anatomy. For cognitive and metacognitive scales, the organization seems to be the most highly predictive followed by elaboration and rehearsal [Table II]. For resource management strategy scales, peer learning and help seeking demonstrated strong relationship.

**Table II :** Analysis of the MSLQ scales with final score in Anatomy

Scales	Mean ± SD	Cronbach alpha	Correlation with last final score	p value
			Correlation coefficient (r)	
<b>Motivation</b>				
Intrinsic goal orientation	5.09 ± 1.00	0.66	0.20	0.04*
Extrinsic goal orientation	5.27 ± 1.03	0.60	0.11	0.29
Task Value	5.48 ± 0.76	0.55	0.22	0.03*
Control of Learning Beliefs	5.85 ± 0.87	0.60	0.01	0.94
Self-Efficacy of Learning and Performance	5.44 ± 0.73	0.57	0.26	0.01†
Test Anxiety	5.57 ± 1.18	0.66	-0.04	0.69
<b>Cognitive and metacognitive scales</b>				
Rehearsal	5.26 ± 0.87	0.60	0.22	0.02*
Elaboration	5.29 ± 0.88	0.76	0.29	0.00†
Organization	5.19 ± 0.91	0.61	0.35	0.00†
Critical Thinking	4.22 ± 0.95	0.60	0.06	0.56
Metacognitive Self-Regulation	4.73 ± 0.74	0.62	0.03	0.76

Resource management strategy						
Time and Study Management	4.35	±	0.92	0.71	0.06	0.52
Effort Regulation	3.94	±	1.08	0.42	0.01	0.95
Peer Learning	5.60	±	1.04	0.79	0.26	0.01†
Help Seeking	5.40	±	0.94	0.57	0.33	0.00†

n = 105

\*Correlation is significant at the 0.05 level

†Correlation is significant at the 0.01 level

Female students seem to have, better study habits. Their motivation and cognitive and metacognitive learning strategies means were higher are resource management strategies show statistically significant differences than their male fellow students. According to the scale means, there was also a difference in strategy-use between the students' from Bangla and English medium. Students who were from Bangla medium use more cognitive and metacognitive learning strategies and resource management strategy, particularly the 'Motivation' scale shows statistically significant differences [Table III].

**Table III :** Comparison between demographic characteristics and MSLQ Scales in Gross Anatomy Course

Scales	Variable	n	Mean	±	SD	Statistical Significance	
						t value	p value
<b>Gender</b>							
Motivation	Male	40	5.33	±	0.64	1.89	0.06
	Female	65	5.52	±	0.38		
Cognitive and Metacognitive	Male	40	4.86	±	0.81	0.90	0.37
	Female	65	4.98	±	0.53		
Resource management strategy	Male	40	4.63	±	0.77	2.47	0.02*
	Female	65	4.94	±	0.49		
<b>Medium</b>							
Motivation	Bangla	94	5.49	±	0.46	2.55	0.01†
	English	11	5.10	±	0.67		
Cognitive and Metacognitive	Bangla	94	4.97	±	0.65	1.44	0.15
	English	11	4.67	±	0.63		
Resource management strategy	Bangla	94	4.84	±	0.61	0.97	0.33
	English	11	4.64	±	0.73		

n = 105

\*Correlation is significant at the 0.05 level

†Correlation is significant at the 0.01 level

## DISCUSSION

The MSLQ is designed to measure student motivational beliefs and strategy-use. Cronbach's alpha was used to estimate the internal consistency of MSLQ. Pintrich et al reported that alphas ranged from 0.52 (Help seeking) to 0.93 (Self-efficacy of learning and performance)<sup>15</sup>. Pizzimenti and Axelson reported that alphas ranged from 0.24 (Rehearsal) to 0.91 (Task value)<sup>14</sup>. The alpha coefficients of this study ranged from 0.42 (Effort regulation) to 0.79 (Peer learning). Although Pizzimenti and Axelson reported that rehearsal and organization subscales were not reliable, but in this study, the alpha of all subscales of Cognitive and Metacognitive scales was in acceptable range<sup>14</sup>.

Intrinsic goal orientation is the real interest of a learner to increase their knowledge<sup>16</sup>. Task value is the degree of personal interest for a given task<sup>17,18</sup>. This study shows that study subjects had necessary intrinsic goal orientation and task and task value in Anatomy. The self-efficacy of learning and performance is a person's judgment of their ability. Persons having high self-efficacy of learning and performance show confidence in their skills and achieve higher levels of academic performance<sup>18</sup>. This study showed that the study subjects had clear perceptions of their ability to learn and understand the basic concepts and complex materials taught in Anatomy. Pizzimenti and Axelson also reported that intrinsic goal orientation, task value and self-efficacy of learning and performance were significantly associated with performance in Anatomy<sup>14</sup>. Although they reported that control of learning beliefs and test anxiety were significantly associated with performance, but in this study, these subscales showed statistically non-significant difference with the last final Score in Anatomy<sup>14</sup>.

This study suggest that the degree to which students engage in rehearsal, elaboration and organization strategies is correlated with last final Score in Anatomy. Rehearsal is a strategy where learner stores information through processes of naming, repeating, and reciting<sup>19</sup>. Elaboration is a strategy where learner paraphrases or summarizes learning material to understand the material<sup>19</sup>. Organization involves methods of outlining, taking notes, mapping or connecting key ideas in learning material<sup>19</sup>. Pizzimenti and Axelson also reported that elaboration was significantly associated with performance in a Anatomy Course<sup>14</sup>. These strategies used by them will be useful to develop deeper concepts in Anatomy and to allow them to store information from short-term memory to long-term memory. Although Pizzimenti and Axelson reported that critical thinking was significantly associated with performance, but in this study, it showed statistically non-significant difference with the last final Score in Anatomy<sup>14</sup>.

Peer learning involves using peers (Friends, classmates) to collaboratively understand course material<sup>20</sup>. Pintrich et al. have shown that collaboration with peers has positive effects on achievement<sup>11</sup>. Help seeking allows a learner to optimize learning by seeking help from instructors, peers, tutors or even additional textbooks<sup>21</sup>. In the new Undergraduate Curriculum, lecture hour is reduced in Anatomy<sup>9</sup>. This change is necessary for group discussion and self study of medical students. In a study Holla et al. reported that self-study using library and group discussion significantly helped the students to develop their own framework of core anatomical knowledge<sup>22</sup>. High-achievers have been found to engage in help seeking. The present data suggest that the degree to which students engage in peer learning and help seeking is correlated with last final Score in Anatomy which will help them to receive more mastery experiences of anatomical concepts and content.

## CONCLUSION

The present data suggest that the study group has sufficient internal drive to succeed in Anatomy. They use rehearsal, elaboration, organization, peer learning and help seeking strategies to achieve higher levels of academic performance. Female students and those from Bangla medium reported more effective study habits. These results indicate that adopting as SRL strategies are likely linked to anatomy performance.

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## DISCLOSURE

The author declared no competing interest.

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