

The role of motivation in predicting academic success of Medical students in Online Courses

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ABSTRACT

Objective: To assess the correlation and predictive value of different constructs of motivation in achieving academic success in online medical course.

Study Design: Cross sectional, analytic study using Convenience sampling.

Place and Duration: The study was conducted in the Anatomy Department at Foundation University Medical College 1st June 2020 to 1st Dec 2020.

Methodology: First and Second year MBBS Students (n=210) undergoing an online course were administered the “Motivational strategies” component of “Motivated Strategies for Learning Questionnaire” in which the students rated themselves on Likert scale. After the course, the students were assessed by a test. The “Motivational constructs” which included, “Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task value, Control of Learning Belief, Self-efficacy for learning and performance and Test Anxiety” were considered as independent variables, whereas the test scores were the dependent variable. The normality of the data was confirmed and Correlation coefficient for each scale with the test scores was calculated using Pearson’s test. Significance was calculated using ANOVA. A p value of ≤ 0.05 was considered statistically significant. Predictive validity of motivational scales for academic success were calculated for both courses by applying Multiple Regression analysis.

Results: The Correlational coefficient was highest for “Test Anxiety”(r=-0.718). Multiple Regression analysis revealed that 71.9% (R square=0.719) of the variance is explained by “Test Anxiety” and “Extrinsic goal orientation.” The Beta value “Test anxiety” was -0.576 making it the largest contributor to the variance.

Conclusion: Among the Motivational constructs, “Test Anxiety” has the strongest correlation and is a powerful negative predictor of Academic success in online medical course.

Keywords: Academic success, Extrinsic Goal Orientation, Intrinsic Goal Orientation, Motivation; Online course, Test Anxiety

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INTRODUCTION

At the onset of 2020 the COVID-19 emerged and engulfed the entire world leading to an unprecedented pandemic, which to date has led to 539 906 deaths worldwide.¹ Countries all over the world responded by imposing social lockdowns and stay at home orders, the scale of which was unprecedented in the

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history of mankind. As a result, institutions of learning also switched over to online teaching to replace face to face campus teaching.² For medical educators, this was a unique experience and a challenge as health care related online courses are infrequent and less popular as compared to other disciplines.³ As the pandemic continues, and face to face interactions are discouraged, the popularity of online medical courses is increasing exponentially. This along with the facility of flexibility of studying on self -pace and time and the fact that it is cost effective⁴ has further increased the popularity of on line teaching in universities all over the world.⁵

As the demand for online teaching is increasing, the medical educationists are appreciating the need to study in depth this mode of teaching and to identify the various factors which relate to student achievement in online courses. Apart from its benefits, a large number of educationists are also raising some concerns related to online courses which might be affecting the process of learning. These include the feeling of isolation, difficulty in staying motivated, lack of face-to-face interaction, and the existence of reliable access and knowledge of technology. Some or all of these factors might be affecting academic performance, however, the vast majority of concerns

focus on Motivational behaviors, as the key to student performance.^{6,7} Multiple Studies confirm this and show that motivation fortifies and directs behaviour toward success and so is known to be an important contributing factor of academic achievement. Motivation encompasses multiple concepts like beliefs, task value, goals and achievement motives.⁸ Motivation as a predictor of academic achievement can be studied using multiple tools, among them is the “Motivated Strategies for Learning Questionnaire (MSLQ)”. This was developed by Pintrich, Smith, Garcia, and Mckeachie (1993) to assess academic motivation as well as learning strategies and their relation to academic success.⁹ It is based on social-cognitive learning theories according to which the specific learning context influences the motivations and the learning strategies that the student employs.¹⁰ It is a self-report instrument with 81-items assessed on a Likert scale. It consists of 6 scales which measure motivation, each of which can be used together or singly. The scales related to “Motivation include; Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task value, Control of Learning Belief, Self-efficacy for learning and performance and Test Anxiety”.⁹ Multiple studies have confirmed its reliability and validity for predicting grades.¹¹ “MSLQ” has been widely used in a variety of different contexts, but there is very scanty literature related to studies regarding the online medical courses.

With this background in mind, this study was planned to assess the correlation and predictive value of different constructs of motivation in achieving academic success in online medical course. It is hoped that the results of this study will help to give an insight into different aspects of Motivation towards online teaching of medical courses and develop strategies to improve academic performance and e learning in health sciences.

METHODOLOGY

This cross sectional, analytic study was conducted at the Anatomy Department of Foundation University Medical College from 1st June 2020 to 1st Dec 2020. Convenience sampling technique was used to collect the data. Minimum sample size of 169 was calculated using online sample size calculator with 95% confidence level, 5% margin of error and target population of 300. The sample size was inflated to 210 to increase the reliability of the study.

The first and second year MBBS students at Foundation University Medical College (2020) who were involved in online courses were included in the study. The online teaching was Synchronous type, conducted on MS teams in which the teachers and learners met online for a session at a decided time.¹² Students who did not have access to internet facilities and could not participate fully in online courses were excluded from the study.

At the end of the course, the students were requested to participate in the study keeping in mind their online course. The Motivated Strategies component of “Motivated Strategies for Learning Questionnaire (MSLQ)” was made available to the students on Google forms. The first section of the questionnaire included the consent with a brief description of the “MSLQ”, and

basic demographic information. The students who volunteered to participate were then administered the “Motivational strategies component of MSLQ questionnaire” in its original English version. The students rated themselves on a seven-point Likert scale (1 = “Not at all true of me” to 7 = “Very true of me”). After collection of the data, it was entered in SPSS for further analysis. After the course, the students were assessed by an MCQ test, the scores of which were entered and analyzed in the light of the data collected. The “Motivational scales” which included, “Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task value, Control of Learning Belief, Self-efficacy for learning and performance and Test Anxiety” were considered as independent variables, whereas the test scores were the dependent variable.

Data Analysis: Further analysis was done using SPSS. The normality of the data was confirmed by tests of Normality, which included Kurtosis, Skewness, Shapiro-Wilk test and by curves of Normality. Correlation coefficient for each Motivational scale with the academic performance was calculated using Pearson’s test. All the 6 scales of motivation acted as independent variables whereas the test scores were the dependent variable. Significance for each correlation was calculated using ANOVA. A p value of less than 0.05 was considered statistically significant. Predictive validity of different scales for academic performance were calculated for both courses by applying Multiple Regression analysis.

RESULTS

A total of 210 participants completed the survey out of which 157 were female and 53 were males. The average age of participants was 19.97 ± 1.02 years (range of age was 17-24 years).

The data was analyzed for Normality. Kurtosis was -0.183 whereas Skewness was 0.107 . As suggested by Hair et al.¹³ and Bryne¹⁴ the data is considered normal if skewness is between -2 to $+2$ and kurtosis is between -7 to $+7$. The Shapiro-Wilk Test was 0.993 with Sig. value of 0.388 , which also indicated a Normal data. Moreover, histogram and Q-Q plot of marks also confirmed a fairly normal data. The result of the above tests and the graphs given below, it can be safely concluded that the data can be considered to have Normal distribution.¹⁵

Pearson’s correlation was calculated between all the independent variables and the test scores, which is the dependent variable, for all students and for male and female students separately (Table - I). In female students, the r value was more than 0.3 for all variables except for “Intrinsic Goal Orientation”, “Control of learning belief” and “Task value”. The r value was greatest for “Test anxiety” ($r=0.732$), but it was negative. This was followed by “Extrinsic Goal Orientation” ($r=0.603$) and “Self efficacy for learning and Performance” ($r=0.433$). In male students, the r value was more than 0.3 for all variables except “Control for learning belief” ($r=0.195$). In males, the Pearson’s correlation was highest for “Extrinsic Goal Orientation” ($r=0.706$) followed by “Test anxiety” ($r=-.665$).

Table – I: Pearson’s correlation between Scales of Motivation and Tests scores.

	Test Scores: Female			Test Scores: Male			Test Scores: Both Male & Female		
	N	Pearson’s	p value	N	Pearson’s	p value	N	Pearson’s	p value
Mean Intrinsic Goal Orientation	157	.178*	.013	53	.324**	.009	210	.211	.001
Mean Extrinsic Goal Orientation	157	.603**	.000	53	.706**	.000	210	.646	.000
“Mean Task Value”	157	.262**	.000	53	.435**	.001	210	.316	.000
“Mean Control of Learning Belief”	157	.199**	.006	53	.195	.081	210	.195	.002
“Mean Self efficacy for learning and Performance”	157	.433**	.000	53	.506**	.000	210	.423	.000
“Mean Test Anxiety”	157	-.732**	.000	53	-.665**	.000	210	-.718	.000

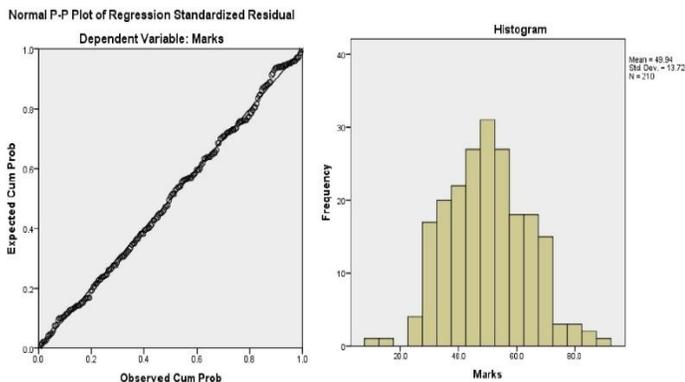


Figure – I: Graphs showing Normality of Data regarding the test scores achieved by students

Table – II: Model summaries of Regression Analysis

Model	Test Scores: Female (n=157)		Test Scores: Male (n=53)		Test Scores: Both Male & Female (n=210)	
	R Square	p value	R Square	p value	R Square	p value
1	.535	.000 ^b	.498	.000 ^b	.515	.000 ^b
2	.706	.000 ^c	.724	.000 ^c	.719	.000 ^c

- a. Predictors: (Constant), “Mean Test Anxiety”
- b. Predictors: (Constant), “Mean Test Anxiety”, “Mean Extrinsic Goal Orientation”
- c. Dependent Variable: Test Scores

Overall data of male and female students combined showed highest value of Pearson’s correlation for “Test Anxiety” ($r = -0.718$). In all groups the correlation with “Test Anxiety” was negative. For all the pairs tested, the p value was less than or equal to 0.001 which shows a statistically a highly significant

relationship.

Multiple Regression Analysis¹⁶ was applied to calculate the predictive value of the independent variables. Two models were calculated. In the first model “Test anxiety” was the only variable included, whereas in the second model “Test Anxiety” and “Extrinsic goal orientation” were included and all the remaining variables were excluded.

In the first model, the R square (coefficient of determination for that model) was 0.515, which means that 51.5% of the variance in academic performance is explained by this model. The value R square was higher for the second model (All students: 0.719, for female students: 0.706, for male students 0.724), therefore further calculations were done on this model. Coefficient of determination (R square) for a model tells us how much variance in the outcome i.e test scores is accounted for by the model using the independent variables. Therefore, in other words, 71.9% of the variance in academic performance of all students is explained by the second model. Applying ANOVA to the model showed a P value of 0.000 which indicates that the model gives a statistically highly significant predictive value. (Table II: Model Summary)

The Beta value (Standardized Coefficient) for each of the variables in the second model and their p value is given in Table III. This tells us about the strength of effect of each of the predictors (independent variables) to the dependent variable (test scores). The Beta value was highest for “Test anxiety” (All students: -0.57, for female students: -0.610, for male students -0.557) which means that this predictor makes the largest contribution to the variance in the outcome in all students. The significance value for “Test Anxiety” and “Extrinsic goal Orientation” was 0.000 which is highly statistically significant.

Table – III: Beta value and Correlations between Scales of Motivation and Tests scores

Model		Female Students (n=157)			Male Students (n=53)			Both Male & Female Students (n=210)		
		Standardized coefficients: Beta	Sig. P value	Correlations : Part	Standardized coefficients: Beta	Sig. P value	Correlations : Part	Standardized Coefficients: Beta	Sig. P value	Correlations : Part
1	Mean Test Anxiety	-.732	.000	-.732	.706	.000	.706	-.718	.000	-.718
2	Mean Test Anxiety	-.610	.000	-.585	.557	.000	.532	-.576	.000	-.549
	Mean Extrinsic Goal Orientation	.431	.000	.413	-.499	.000	-.476	.473	.000	.451

The part correlation coefficient of each predictor is given in Table III and tells us the unique contribution of each of the independent variables in the total R square. The square of the part correlation coefficient tells us the percentage which that variable contributes to the R square value (predicting the test score). The square of part correlation coefficient in the second model is highest for "Test anxiety". This value is 0.3014 which means that test anxiety contributes 30.14 % in predicting the examination scores in our model in all students combined, 34.22% in female students and 28.30% in male students. This is followed by "Extrinsic goal orientation" in which the square of part correlation coefficient is 0.2034 which means that in our model, "Extrinsic goal orientation" contributes 20.34% in predicting the examination scores.

DISCUSSION

In the present study, we evaluated "Motivation" for an online medical course and analyzed which aspects of motivation were related with academic success and were good predictors of achieving high scores. Motivation involves a variety of constructs such as: "Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task value, Control of Learning Belief, Self-efficacy for learning and performance and Test Anxiety", all of which were assessed in the present study. We observed a significantly high Pearson's correlation for "Test Anxiety," "Extrinsic Goal Orientation", "Task value" and "Self-efficacy for learning and performance" and a very weak correlation of "Intrinsic goal orientation", "Task value" and "Control of Learning Belief" with test scores. Previous studies, show a lot of variation in this regard; some studies show a strong influence of "Intrinsic motivation" and "self-efficacy" with student performance.¹⁷ Whereas other studies show notable correlations of "self-efficacy", "intrinsic & extrinsic motivation" and "task value" with academic performance.¹⁸ However, a study by Martens et al. (2004) revealed that students with high intrinsic motivation in an online course, do not necessarily achieve higher scores, as they tend to be easily deviated away from the actual objective towards other aspects. This may be due to increased curiosity of these students which may result in more exploratory study behaviour.¹⁹ This could provide an explanation of why in our study the "Intrinsic goal motivation" did not show a strong correlation with academic scores. Yet, other studies prove that among the motivational beliefs, "extrinsic goal orientation" has the highest correlation with exam scores,²⁰ which is also in accordance to the findings of our study. In the present study, although the Pearson's correlation of "Test anxiety" with academic performance was strong, but it was negative. This negative correlation was stronger in the female students as compared to male students, which may indicate less ability in female students to cope with academic stress in distant learning.

On applying Multiple Regression, the value R square was higher for the second model (0.719), in which "Test Anxiety" and "Extrinsic goal orientation" were included and all the remaining variables were excluded. This is the "coefficient of determination" for that model. It tells us how much variance in

the outcome i.e academic performance (exam scores) is accounted for by the model using the independent variables. In other words, this means that 71.9% of the variance in academic scores is explained by the "Test Anxiety" and "Extrinsic Goal Model", and so they are the strongest predictors in our study. Among them, "Test Anxiety" was found to be an inverse predictor of academic success and more so in the females. This is in accordance with multiple studies which reinforce our findings that "Test anxiety" has negative effect on participants' academic performance.²¹ In contrast, another study proved that "self-efficacy" and "extrinsic" instrumentality are strong predictors of academic success in online courses.²² Still other studies indicate "self-efficacy, Intrinsic goal orientation"¹⁷ and "Intrinsic Motivation" as the most important predictor of student scores in distance learning.¹⁹

In the present study, the Beta value in all students was highest for "Test anxiety" (-0.576) which means that in the present study, this predictor makes the largest contribution to the variance in the outcome. However, in female students the contribution in variance by "Test anxiety" was 61.0% (Beta= -0.610) whereas its contribution in males was 49.9% (Beta= -0.499). This once again corresponds to our previous findings related to increased correlation of "Test Anxiety" with exam scores in female students. This increased anxiety in females may be attributed to decreased computer skills on which online courses are dependant.⁶ Or may be due to increased overall stress in females as compared to males as is indicated by previous researches which suggest that anxiety states are more prevalent and more disabling in females as compared to males.²³ It is therefore recommended that further studies may be conducted to assess the reasons for high anxiety in students which may be affecting their performance in online courses. Furthermore, students should be guided by appropriate counselling regarding stress management²¹ and workshops may be arranged for them to increase their computer skills. It is hoped that these measures will help to reduce anxiety, increase their confidence, and ultimately improve the academic performance of students in online courses.

CONCLUSION

It can be concluded that among the various Motivational constructs, "Test Anxiety" has the strongest correlation and is a powerful negative predictor of academic success in online medical course and so may be responsible for students' underachievement in e learning.

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REFERENCES

1. WHO. Coronavirus disease 2019 (COVID-19) Situation Report - 81 [Internet]. 2020 [cited 2020 Apr 12]. Available from: <https://www.who.int/docs/default->

- source/coronaviruse/situation-reports/20200410-sitrep-81-covid-19.pdf?sfvrsn=ca96eb84_2
2. Zumla A, Hui DS, Perlman S. Middle East respiratory syndrome. *Lancet*. Elsevier Ltd; 2015;386(9997):995–1007.
 3. Liyanagunawardena TR, Williams SA. Massive Open Online Courses on Health and Medicine: Review [Internet]. *Journal of Medical Internet Research*. 2014 [cited 2021 Oct 3]. p. e191. Available from: <http://www.jmir.org/2014/8/e191/>
 4. Fidalgo P, Thormann J, Kulyk O, Lencastre JA. Students' perceptions on distance education: A multinational study. *International Journal of Educational Technology in Higher Education*; 2020; 17(1):1–18.
 5. Allen IE, Seaman J. Digital Compass Learning: Distance Education Enrollment Report 2017 [Internet]. Babson survey research group. 2017 [cited 2021 Sep 6]. p. 39. Available from: <https://eric.ed.gov/?id=ED580868>
 6. Alkış N, Temizel TT. The Impact of Motivation and Personality on Academic Performance in Online and Blended Learning Environments. *Educational Technology & Society* 2018; 21(3):35-47.
 7. Stark E. Examining the role of motivation and learning strategies in student success in online versus face-to-face courses. *Online Learn J*. 2019; 23(3):234–251.
 8. Steinmayr R, Weidinger AF, Schwinger M, Spinath B. The importance of students' motivation for their academic achievement-replicating and extending previous findings. *Front Psychol*. 2019; 10(1730):1–11.
 9. Pintrich PR, Smith D, Gracia T, Mckeachie W. A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ). [Internet]. National Center for Research to Improve Postsecondary Teaching and Learning. 1991 [cited 2021 Apr 4]. Available from: <http://files.eric.ed.gov/fulltext/ED338122.pdf>
 10. Duncan TG, Mckeachie WJ. The Making of the Motivated Strategies for Learning Questionnaire The Making of the Motivated Strategies for Learning Questionnaire [Internet]. *Educational Psychologist*. 2005 [cited 2021 May 22]. p. 117–28. Available from: http://dx.doi.org/10.1207/s15326985ep4002_6
 11. Credé M, Phillips LA. A meta-analytic review of the Motivated Strategies for Learning Questionnaire. *Learn Individ Differ*. 2011;21(4):337–346.
 12. Watts L. Synchronous and Asynchronous Communication in Distance Learning: A Review of the Literature. *Q Rev Distance Educ*. 2016;17(1):23–32.
 13. Hair J, Black WC, Babin BJ AR. *Multivariate data analysis* (7th ed.). Upper Saddle River, New Jersey: Pearson Educational International. 7th ed. Upper Saddle River, New Jersey: Pearson Educational International; 2010.
 14. Byrne BBM. *Structural Equation Modeling With AMOS*. Second. New York: Routledge; 2013. 22–24 p.
 15. Stats C, Simon S, Jr H, Wc B, Data M, Fifth A, et al. Testing normality including skewness and kurtosis [Internet]. 2011 [cited 2022 Feb 2]. p. 9–10. Available from: <https://imaging.mrc-cbu.cam.ac.uk/statswiki/FAQ/Simon>
 16. Field A. *Discovering statistics using SPSS: and sex and drugs and rock 'n' roll*. 3rd ed. London: SAGE Publications; 2009. 1–816 p.
 17. Chyung YS, Moll AJ, Berg SA. The Role of Intrinsic Goal Orientation, Self-Efficacy, and E-Learning Practice in Engineering Education. *J Eff Teach*. 2010; 10(1):22–37.
 18. Lynch, Douglas J. Motivational Beliefs and Learning Strategies As Predictors of Academic Performance in. *Coll Stud J*. 2010; 44(4):920–927.
 19. Martens RL, Judith G, Theo B. The impact of intrinsic motivation on e-learning in authentic computer tasks. *J Comput Assist Learn*. 2004;20:368–376.
 20. Charles Gbollie PKH. Student Academic Performance: The Role of Motivation, Strategies, and Perceived Factors Hindering Liberian Junior and Senior High School Students Learning [Internet]. *Education Research International*. 2017 [cited 2021 Oct 6]. p. 6–8. Available from: <https://doaj.org/article/66dd0d61d24d472e9e638321e51095c9>
 21. Alemu B. The relationship between test anxiety and academic achievement of grade ten students of Shirka Woreda, Oromia Regional State, Ethiopia. *African Educ Res J*. 2020; 8(3):540–550.
 22. Hobson TD, Puruhito KK. Going the distance: online course performance and motivation of distance learning students. *Online Learn J*. 2018; 22(4):129–140.
 23. Mclean CP, Asnaani A, Litz BT, Hofmann SG. Gender Differences in Anxiety Disorders: Prevalence, Course of Illness, Comorbidity and Burden of Illness. *J Psychiatr Res*. 2011; 45(8):1027–1035.