Role of language proficiency and personality traits upon the academic performance of undergraduate medical students

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Abstract:

BACKGROUND: Academic performance of medical students is governed by various factors. Personality traits such as core self-evaluation (CSE) and locus of control (LOC) are a few of the most important factors that could govern academic performance. The medium of communication is another important factor, especially in a country with language diversity that could affect the academic performance of the new medical entrants. The study aims to examine the effect of LOC, CSE score, and English Language proficiency on the academic performance of undergraduate medical students.

MATERIALS AND METHODS: Ninety undergraduate medical students of a premier central government medical institute of India has been recruited for the study after due ethical clearance from the Institutional Ethical Committee. A standard questionnaire for all the parameters to be studied had been filled by the participants. The academic performance has been judged on the basis of the professional examination's marks score.

RESULTS: The multiple regression analysis considering all the variables, the English language proficiency appears to be the most important factor with $R^2 = 0.106$ and $P = 0.003$. Most of the academic performers have shown the dominance of internal LOC and moderately high CSE scores though not statistically significant.

CONCLUSIONS: Language proficiency appears to be one of the most important determinants of academic performance in the medical entrants of Indian subcontinent. LOC and CSE could be an important yardstick for academic performance, but that needs to be confirmed with another study with a bigger data set.

Keywords:

Academic performance, core self-evaluation, English proficiency, Indian medical entrants, locus of control

Introduction

The present era is rapidly growing and changing. It is of utmost importance for organizations to adapt such changes and think about student's life for the success of the institution and student's future.[1]

Educational psychologists and theorists of learning define varied factors that affect academic performance and future of students. The factors are of two types, academic and nonacademic.

One nonacademic factor includes the constructs of internal and external locus of control (LOC) in learning. In personality psychology, LOC is the degree to which people believe that they have control over the outcome of events in their lives, as opposed to external forces beyond their control. Understanding of the concept was developed by Rotter in 1954 and has since

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become an aspect of personality studies. A person's "locus" (plural "loci," Latin for "place" or "location") is conceptualized as internal (a belief that one can control one's own life) or external (a belief that life is controlled by outside factors which the person cannot influence, or that chance or fate controls their lives).[2] Internals believe that outcomes in their lives depend on their own actions and choices while externals believe that outcomes depend on chance, fate, or powerful other people.[3] LOC tells how a student adapts changes to keep learning effective. For example, an internal LOC student, who studies hard and does well on a test, will attribute the success to his/her own actions. He will not believe that his fate will be decided by factors, not under his control. Instead, this student will keep studying hard, with an expectation to succeed in future. Furthermore, good results give a feeling of pride for the successes, which strengthens the expectation and motivation. On the other hand, an external LOC student may study and do well on a test but may believe the success is due to an easy test, or attribute it to luck, or a variety of other factors. This student does not attribute success to his/her own actions, and so may not be consistent in the study.[4] Student's attitude toward life should be studied using LOC. For this, there is a need to define LOC of an individual's behavior over long time.[1] Internal-external LOC refers to an individual's beliefs that she or he can control.[5,6] Previous research showed that internals report more stressors and strains than Externals.[7,8] Individuals with internal LOC have been found to score greater academic achievement, with effects in the small to medium range in comparison to those with external LOC.[9]

Another nonacademic factor is core self-evaluation (CSE). CSE defines personality trait, which shows how a person evaluates his or her own worth, competence, and capability. Positive CSE makes the individuals better performers because they are predisposed to evaluate the situations optimistically. According to the Self-verification theory, individuals seek to verify their self-concepts by selecting the situations that will supply them with feedback and reinforce their self-concept (Swann *et al.*, 1992). Thus, in the job context positivity of CSE directs the individual to select the positive aspects of the job and enhance the performance, whereas negative CSE opt for the negative aspects and hinder the performance at work.[10]

In general, students who scored high on CSE set higher grade goals and perform better in examinations.[11]

One of the academic factors which is very pertinent, especially in Indian Subcontinent is the proficiency in the language of communication and instruction during the teaching-learning process. The medium of instruction and evaluation in most of the Indian medical Institutions is English which sometimes acts as a barrier in communications between the students and their instructors due to diverse language backgrounds of the students. As English is the principle medium of communications, it is presumed that students week in English proficiency are apparent sufferers at academic front despite reasonable competency otherwise. However, there is no concrete data to support this presumption. The training in medical English, though limited, is assumed to help students perform significantly better in formative assessment components such as student assignments, oral assessment sessions, and written tests. This is especially true for the institutes which has pan subcontinent catchment area including the institute where this study has been undertaken. Theoretically, proficiency in the English language would affect each component of the medical assessment.[12]

Medicare needs of the society largely depend on the academic excellence of its newer generation medical entrants. The academic excellence, in turn, is affected by multiple sociocultural factors, especially in a country like India. Due to its diversity in cultural and academic fronts as well as the cosmopolitan composition of students in central academic Institutes, language of communication and instructions as well as inherent personality traits of the aspirants that too among the new entrant medicos probably holds a decisive role in the academic performance. English is rarely spoken as the first language or mother tongue in most parts of India, but paradoxically, it is the sole medium of instruction and academic communication in medical institutes, it is imperative to study the effect of English proficiency along with other psychosocial traits in the academic performance of the new medical entrants.

The definition of quality of education varies from culture to culture.[13] The surroundings and the learner's attitude play an important role in their academic success. The school and family members and communities give support to students which improve quality of their academic performance. This social assistance has a crucial role for the accomplishment of performance goals of students at school.[14] Besides the social structure, parents' involvement in their child's education also increases the rate of academic success of their child.[15] Language ability depends on the environment provided by the family and peer group.

Medical education being one of the highly demanding courses in terms of length of the study, continuous assessment pattern, and persistent competitive environment, academic excellence of an individual is largely determined by one's ability to get benefited from academic teaching, his/her self-confidence, and determination and his belief system. Language proficiency

becomes an important determinant in academic teaching where a student is coming from a regional language background. This becomes more pertinent when the new entrants are from a cosmopolitan cohort of pan India territories with diverse background, and the academic environment is very demanding and competitive.

The present study aimed to examine the factors that may affect the academic performance of new medical entrants at an Institute of National Importance including their LOC CSE (as a yardstick for the evaluation of self-confidence) and subjective evaluation of their English language proficiency and its relationship with their academic performance.

Research hypothesis

We hypothesized that English language proficiency, LOC and level of self-confidence (measured by CSE score) are good predictors of academic performance among new medical entrants besides their academic excellence.

Materials and Methods

The study aims to find if the LOC, the ability of retrospection (CSE), and the proficiency in the language of communication in the academic environment have any impact on the academic performance of the undergraduate students or not.

The study group included 90 medical students of a premier central Institute of India, aged 16–25 years (All students of the 1st year were included in the study). Ethical clearance had been taken from the Institutional Ethical Committee before the start of the study. Students of 1st year were included for the study after due written informed consent. Students not interested in study were excluded from the study. During orientation program, data was collected from students. After briefing the students about the study protocol and taking basic demographic details from them the self-reported CSE, LOC, and English proficiency pro forma was given to them to fill up. CSE was done according to the CSE scale developed by Judge *et al.*,[16] a direct and relatively brief measure of trait. It consists of several statements related to self-esteem, generalized self-efficacy, neuroticism, and LOC. Answers are on a Likert scale from strongly agree to strongly disagree. The total score gives CSE. LOC was measured by a questionnaire on internal and external LOC by Mohd *et al*.[17] It consists of 29 questions with answer as a or b depicting internal or external LOC. One point is given in each question for external LOC. The total score is computed which measures the internal or external LOC. A high score means external LOC and a low score means internal LOC. English ability was measured by asking questions using Likert scale for spoken English, writing ability in English, comprehension in oral and

reading English and command on grammar. Percentage of marks during their first professional was used to assess their academic performance.

Results

The 90 undergraduate students who consented for participation in the study, have been studied for the three important determinants of academic performance, i.e., LOC, CSE Score and English language proficiency level. The mean LOC score, CSE score, and English proficiency score are summarized in Table 1. It was a standard questionnaire-based cross-sectional study.

The CSE score has further been stratified arbitrarily into four groups of low CSE group with score of 20–29, medium CSE group with score of 30–39, high CSE group with CSE score group of 40–49, and a very high CSE group with CSE score of 50–59. The participants with CSE score of moderately high group have shown better academic performance in comparison to other groups [Figure 1]; though no statistically significant difference in the academic performance has been found between different CSE groups [Table 2].

The LOC score has also been arbitrarily stratified into three categories, i.e., external LOC group with LOC score of 16–29, internal LOC group with LOC score of 1–10, and an intermediate group with LOC score of 11–15.

The participants scoring low on the scale, i.e., internal LOC have shown better academic performance in comparison to the participants with higher score [Figure 2].

Table 1: Score distribution of core self-evaluation, locus of control and English ability

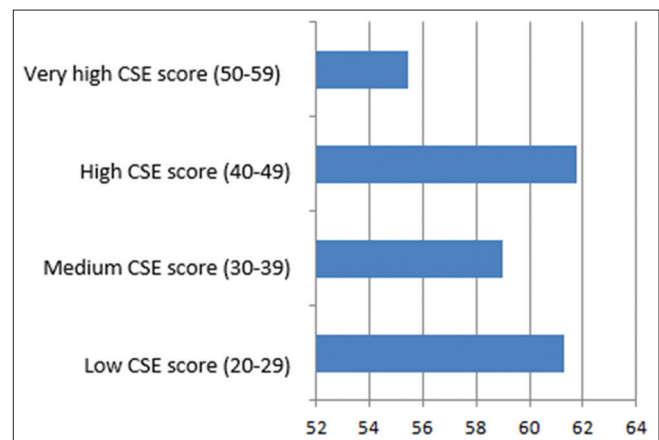| Score	Mean	Standard deviation
Core self-evaluation	38.79	5.548
Locus of control	12.256	4.2415
English ability	9.2	2.455

Figure 1: Percentage marks distribution of subjects with different scores of core self-evaluation

Despite some apparent relationship between the LOC score and academic performance, no statically significant difference could be figured out in the academic performance of participants with varying LOC [Table 3].

The participants have been assigned a rank based on their academic performance to further study the relationship between academic performance and LOC. The Kruskal–Wallis test has shown no statistical difference among different groups academic performance [Table 4].

Table 2: ANOVA to compare the differences in academic performance among the different groups of core self-evaluation score

CSE score	50-59	40-49	30-39	20-29	*P*
Percentage mean	55.47	61.75	58.98	61.28	0.533

Table 3: ANOVA to compare the differences in academic performance among the different groups of locus of control score

LOC score	1-9	10-15	15-29	*P*
Percentage mean	58.48	58.89	60.736	0.316

Table 4: Kruskar Wallis test to compare differences in ranks based on different locus of control groups. Independent/grouping variable=LOC (LOC score). Dependent variable: ranks of students.

Groups	*n*	Mean rank
1	15	44.13
2	60	46.49
3	15	42.90
Total	90	

Table 5: The test statistic (Chi Squire test)

	LOC score
χ^2	0.278
Df	2
Asymp significant	0.870

LOC=Locus of control

Table 6: Linear Regression- Model summary

Model	Statistic
R	0.305
R^2	0.093
Adjusted R^2	0.083
Df	1,88
F	9.034
Significant	0.003

Students were divided into three groups on the basis of LOC score; first 15 students with lowest LOC scores were taken into the first group, next 60 in the second group, and next 15 with maximum LOC scores in the third group.

Mean rank: Mean rank for each group can be used to compare the effect of different LOC score. Test statistic and Chi squire test is presented in the table no. 5.

There was no statistically significant difference in rank class between different LOC (χ^2 (2) =0.278, P = 0.870) with a mean rank class score of 44.13 for the first 15 students, 46.49 for the next 60 students, and 42.90 for the last 15 students.

The English proficiency has been tested by a Likert scale-based questionnaire for subjective feedback of verbal, written and grammatical language proficiency of the participants. The linear regression analysis between English proficiency and academic performance shows that there is a significant impact of English proficiency on the academic performance of the students]. (Table 6 and Table 7)

A multiple regression analysis considering all the variables being studied taking academic performance as a dependent variable, shows the pattern of the outcome as presented in Table 8.

The variables statistically significantly predicted percentage marks, *F* (3, 86) =3.391, P ≤ 0.05, R^2 = 0.106. English proficiency score variable added statistically significantly to the prediction, *P* < 0.05.
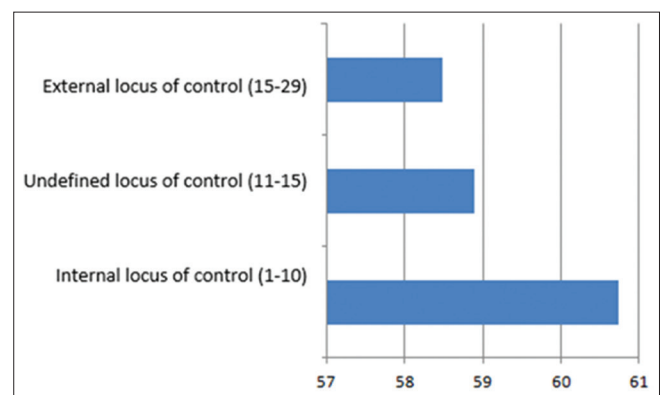

Figure 2: Percentage marks distribution of subjects with different scores of locus of control

Table 7: Coefficients linear regression analysis of academic performance with the English language proficiency

Model	Unstandardized coefficients		Standardized coefficients (β)	*t*	Significance
	B	SE			
Constant	61.533	4.062		15.149	0.000
English ability	1.283	0.427	0.305	3.006	0.003

Table 8: Multiple regression to predict percentage marks from English proficiency, core self-evaluation, and locus of control

	Unstandardized coefficients		Standardized coefficients (β)	t	Significant
	B	SE			
Constant	42.559	7.917		5.376	0.000
Core self-evaluation score	0.172	0.157	0.115	1.096	0.276
English ability	1.096	0.358	0.326	3.060	0.003
LOC	−0.052	0.204	−0.027	−0.254	0.800

Dependent variable: percentage of marks; predictors: LOC, core self-evaluation score and English language proficiency) from the above table is apparent that the variables are able to predict significantly the English proficiency as the sole predictor of academic performance among the variables recorded in the present study with R^2 value of 0.106 ($P<0.05$). LOC=Locus of control, SE=Standard error

From the observations, it is apparent that English proficiency appears to be the only factor significantly affecting the dependent variable academic performance ($P = 0.003$).

The participants with CSE score of the moderately high group has shown better academic performance in comparison to other groups [Figure 1] The participants scoring low on the scale, i.e., internal LOC have shown better academic performance in comparison to the participants with higher score [Figure 2]. The Kruskal–Wallis test was applied considering data as ranked data; it has shown no statistical difference in LOC among different groups academic performance [Table 4]. The linear regression analysis between English proficiency and academic performance shows that there is a significant impact of English proficiency on the academic performance of the students. A multiple regression analysis considering all the variables being studied taking academic performance as a dependent variable shows that there is a significant impact of English proficiency on the academic performance of the students.

Discussion

Inherent personality traits and medium of communication are some of the important factors expected to affect the academic performance of the students, especially in a highly competitive and demanding academic environment like medical curriculum. Few piecemeal studies had been performed earlier to address the issue with mixed results.[4,11,12]

In the present study, LOC and CSE scores have been used as a tool to assess the inherent personality trait of the medical students and a possible factor that may be one of the determinants of their academic performance. Both the tools had been used earlier for similar purposes and are well-validated for the purpose. English proficiency has been taken as a yardstick to gauge the proficiency of the participant in the medium of communication for educational purpose. In the Indian context, English is by and large used as a principal medium of instruction for the medical undergraduates.

The participants with moderately high CSE score have shown better academic performance in comparison to other groups with very low or very high CSE score, though the result is not statistically significant. This trend may be an indicator of a balanced approach of introspection that may be required for better academic performance than the overenthusiastic or nonconfident approach. A study found that participants' CSE tendencies had positive effects on their workplace well-being – namely compassion satisfaction and burnout – during their clerkship period. It revealed that participants' CSE tendencies had no statistically significant effect on their clinical competence during the clerkship. Preclinical academic performance, objective or subjective, was unrelated to their higher CSE tendencies at the statistically significant level. This study shows CSE properties, which characterize personality traits such as self-confidence, self-efficacy, and emotional stability, may be protective factors for the clinical training situations of medical students.[11]

LOC is a well-established factor responsible for the overall performance of an individual.[4] In the study, though the observed difference in the academic performances of participants with internal LOC and external LOC was statistically nonsignificant, a definite trend was obvious indicating better academic performance by the participants with internal LOC. Earlier too in some of the studies, it was apparent that the participants with internal LOC have shown better academic performance in comparison to other groups. People with internal LOC believe that outcomes in their lives depend on their own actions and choices while people with external LOC believe that outcomes depend on chance, fate or powerful other people. It was expected that students with internal LOC would perform better on academic front. However, it was found in this study that there is no statistically significant difference in academic performance among the different groups of LOC score.

A study found a significant positive correlation was between internal LOC and academic performance. It states that regarding academic achievement, it seems logical that individuals with an internal LOC achieve more

academically than individuals with an external LOC. For example, an internal LOC student, who studies hard and does well on a test, will attribute the success to his/her own actions. He will not believe that his fate will be decided by factors, not under his control. Instead, this student will keep studying hard, with an expectation to succeed in future. Furthermore, good results give a feeling of pride for the successes, which strengthens the expectation and motivation. On the other hand, an external LOC student may study and do well on a test, but may believe the success is due to an easy test, or attribute it to luck, or a variety of other factors. This student does not attribute success to his/her own actions, and so may not be consistent in study.[4]

As far as language of communication is concerned, it is probably the most important determinant for the process of learning and academic communication. In the Indian context, it further gains added importance as in many instances, the medium of academic communication might not be the students' mother tongue or the student might not be proficient enough in the language of instruction. Such situation creates a big barrier in the two way communication process affecting the students' academic performance. In the present study, the findings strongly indicate the relationship between the language of communication (English) and academic performance of the students. The students found proficient in all the modalities of the English language were found to significantly better performers academically than those with poor self-reported language skills. English being the language of communication in the form of textbooks, medium of instruction, and medium of assessment in the backdrop of students non-English background (mostly from the Hindi speaking regions or regional language speaking regions), the study indicates the existence of a definite barrier in the two-way communication in the medical education system of the study population.

A study showed a significant positive correlation between the score in the English language assessment and the final summative part of the medical content assessment (including the written oral parts). This indicates that addressing the issue of English proficiency is very important in the context of medical education.[12]

Thus, English ability has been found to have a significant effect on students' performance.

Limitations
The study intended to address an important issue of academic performance of medical students and various factors affecting it. Being a pilot study, it has got certain limitations which need to be considered before drawing any conclusion. The factors such as CSE score and LOC have shown some ill-defined trend without any statistical significance. Such findings open the possibility of conducting the study with bigger database that may possibly show some significant result. The subjective feedback taken for various parameters carries some inherent bias that must be born in mind before drawing any conclusion.

Benefits from the study
A good correlation is found between English proficiency and academic performance. Training in the language during orientation program can help improve language proficiency and therefore academic performance of students of AIIMS Patna.

Conclusions

Academic performance of undergraduate medical students is influenced by multiple factors, of which inherent personality traits and language proficiency are important ones. The present study aimed to study a few of the important factor that may influence the academic performance of a medical student. Those factors include LOC, self-evaluation Score and language proficiency for the English language. LOC and self-evaluation score are well-validated test batteries based on the subjective feedback meant to have some insight to the participant's inherent personality trait in context to their academic performance and has also been used in the present study for the same purpose. English proficiency had been tested by introducing a subjective Likert scale questionnaire.

The observations of the study indicate that LOC and self-evaluation scores are not a significant determinant of the academic performance; though, they hold at least some importance for the same. Language proficiency has come out as a statistically significant determinant for academic success.

Following are the findings: the participants with CSE score of the moderately high group has shown better academic performance in comparison to other groups [Figure 1] The participants scoring low on the scale, i.e., internal LOC have shown better academic performance in comparison to the participants with higher score [Figure 2]. The Kruskal–Wallis test was applied considering data as ranked data; it has shown no statistical difference in LOC among different groups academic performance [Table 4]. The linear regression analysis between English proficiency and academic performance shows that there is a significant impact of English proficiency on the academic performance of the students. A multiple regression analysis considering all the variables being studied taking academic performance as a dependent variable shows that there is a significant impact of English proficiency on the academic performance of the students.

The study is applicable to the students of the Institute where it has been conducted. It does not show any statistically strong correlation between academic performance and CSE score or LOC. Training in the language during the orientation program can help improve language proficiency and therefore academic performance of students of AIIMS Patna.

As, the present study was a pilot study, the findings need to be confirmed with a bigger database before drawing any conclusion.

Conflicts of interest
There are no conflicts of interest.

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