Original Research Article

Assessment of learning levels of students using 'Dennis Congo study skill inventory' & evaluation of protocol for slow, average & advanced learners in medical education

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ARTICLE INFO

ABSTRACT

Background: Students starting their medical education congregate from diverse educational environments and varied learning experiences. Hence, they would have developed individual preferences in learning styles for obtaining and refining information. Some students need accelerated approach so that they can learn things in the syllabus at their own speed. While some lack focus and understand topics at a slower pace compared to their peers. The process of assessment of the learning levels of students and conduction of activities for them can open up a new window for the teachers in adopting different teaching learning methods and result in more dynamic classroom interaction. This also paves way for adoption of appropriate strategies to address the concerns of all learners. The study was done with the aim to explore the study skills and determine any correlation between study skills of the students and their academic performance.

Materials and Methods: This is a cross-sectional observational, questionnaire - based descriptive study involving undergraduate students enrolled in medical college. A predesigned, pretested structured and validated questionnaire, the Denis Congo Study Skills Inventory was administered on the sample. Study Skills Efficacy Scores were determined using the same. Learners were categorized as slow, average and advanced based on their scores in the first internal examination. These scores were aligned with the study skills used by the learner and the data was analysed using Microsoft Excel 2010 & IBM SPSS Statistics 28.0.1.1 Windows software to find out any correlation.

Results: It was found that all the six skills included in the Dennis Congo study skill inventory may need to be developed in slow learners with equal emphasis so as to facilitate them in becoming average learners. All the six skills also require improvement in average learners to become advanced learners, however our study shows that more emphasis needs to be laid on the development of skills of note-taking, memory enhancement, test preparation and concentration. Out of these, note-taking and test preparation are skills which might be easier to work on as compared to memory and concentration, as a part of these skills are inherent to the individual. Teachers can play a significant role in helping the students in acquiring the skills.

Conclusions: Factors affecting student academic performances is a multidimensional issue which has to be identified at individual level. Deficient study skills appear to be a statistically significant cause for poor academic performance. With the objective to change the learner's behaviour, it can be conveyed to learners what exactly is to be accomplished by providing a direction in the planning of a learning activity.

This study assesses student learning levels in medical education using the 'Dennis Congo Study Skill Inventory'. It further evaluates a tailored protocol designed for slow, average, and advanced learners, aiming to enhance learning outcomes across diverse proficiency levels."

1. Introduction

It is a well understood reality that to become a medical professional, it requires a lot of rigorous hard work. A new study of 1,000 medical students from 70 institutions across India has revealed that a large number of them felt like dropping out of the course while a majority of students were physically or mentally affected during the coursework. Many factors influence the academic performance of undergraduate students.

Identification of these factors would help towards developing appropriate measures to facilitate the students to improve their academic performance.Moreover, medical education is undergoing revolutionary reforms in response to scientific advances and societal needs. All students do not have the same study skills and capability to cope up with the multidimensional factors which affect academic performance and this also varies at individual level.

So, it is of utmost significance in the current scenario that students be identified as per their study skills and learning capability, and customized measures be taken to meet with individual needs to improve their academic performance in a stress free environment.

This study was done with the objectives of giving equal opportunity to all students from diverse background and learning styles, so that they can gain knowledge and skill for improving their academic performance and overall, to provide a desirable and amicable solution both for the slow learners and advance learners without any discrimination between them so that they, in due course of time all students are at par with each other in building a successful career.

So, overall aim of this study was to evaluate the factors and identifying the grey areas which need to focused on and design appropriate remedial measures and provide support to the students for a better academic performance and overall professional development.

2. Materials and Methods

The study was based on the primary data analysis. The study protocol was approved by the Institutional Scientific & Ethical Review Committee, Gujarat Cancer Society Medical College Hospital & Research Centre (GCSMCH&RC), Ahmedabad, Gujarat, India.

2.1. Study setting

It was a cross-sectional observational, questionnaire- based descriptive study involving First Year MBBS students admitted to medical College in 2021, who had voluntarily agreed to participate. However, the institute discourages discrimination among students on the basis of their academic performance and identifies students as complete individuals in their own rights. So, identification of learners as slow, average and advanced was done discretely without the knowledge of students and measures for improvement were planned for all students.

2.2. Data sources

Questionnaire was prepared on Google Form based on Dennis Congo Study Skill Inventory (DCSSI), which is a predesigned, pretested structured and validated questionnaire, to collect data on the study skills used by each student. It consists of six domains, namely textbook reading, note taking, memory, test preparation, concentration and time management. Each of these six domains had 5 to 13 components which were assessed using sentences to compositely indicate each component on a five point rating scale. Study Skills Efficacy Scores were determined using DCSSI. In Textbook Reading Skill (TBR), a score less than 30 suggests that changes in textbook reading skill are likely to increase the academic grades; in Note-Taking Skill (NT), a score of less than 20 suggests that changes in Note-taking Skill are likely to increase the grades; a score of less than 30 in Memory Skills (Mem), suggests that changes in Memory Skill are likely to increase the grades; in TestPreparation Skills (TP), a score of less than 40 suggests that changes in Test Preparation Skills are likely to increase the grades; in Concentration Skills (Conc), a score of less than 35 suggests that changes in Concentration Skills are likely to increase the grades and in Time Management Skills (TM), a score of less than 35 suggests that changes in Time Management Skills are likely to increase the grades.

Scores obtained in the internal examination were also taken into account. Link to the google forms were shared with the participants. Responses from learners were compiled in a spreadsheet. The data was analyzed using the SPSS statistical package.

2.3. Data analysis

Based on Marks scored in Internal Examination, Students were categorized as slow, average and advanced learners. Students securing <40% are termed as slow performers and more than 75% as advanced learners. The Academic scores were aligned with the study skills utilized by individual students. The skills involved were text book reading (TBR), notes taking (NT), memory (Mem), test preparation (TP), concentration (Conc) and time management (TM).

Data was analysed using Microsoft Excel 2010 &IBM SPSS Statistics 28.0.1.1 Windows software.

Mean & Standard deviation (SD) of each skill in slow, average and advanced learners were calculated.

Comparison of each skill between groups was done. The difference between the observed means in the samples was calculated and significance value (P-value) and Confidence Interval (CI) of the difference was noted. Annova test was
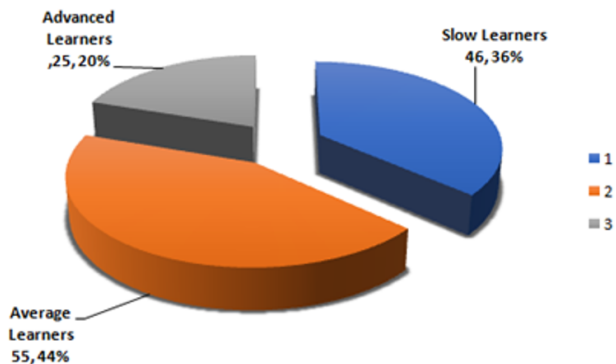
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applied to determine the significance.

3. Results

Based on the scores of internal examination, out of the 126 participants, 46 (36.51%) were found to be slow learners, 55 (43.65%) average learners and 25 (19.84%) advanced learners. (Figure 1)

Figure 1: Number of slow average and advanced learners and their percentage out of total number of participants

100% of the Slow Learners were found to have poor study skills related to concentration & time management, 97.83% had poor skills related to preparation for a test or examination, 93.48% had poor skills in memorizing and 91% had poor skills in textbook reading & notes- taking.

Among the average learners 9.09% had poor skills in textbook reading, 7.27% in notes- taking, 3.64% in memory, test preparation & concentration skills and 1.82% in time management skills.

In case of advanced learners, all 126 students scored above the minimum values. (Table 1)

We utilized the Anova test between the scores of learning skills for all the three groups of learners. The difference was found to be statistically highly significant between the groups across all the skills. For the slow and average learners the statistical significance was the same between both the groups for all six skills.

However it is noteworthy that for TBR & TM skills, we found that the difference in scores was relatively less statistically significant between average and advanced learners as compared to the remaining four skills where the statistical significance was equal for all the four skills between the two groups. P-value 0.00641 (TBR), 0.0020 (TM). (Table 2)

4. Discussion

In a study on study skills conducted in Kempegowda Institute of Medical Sciences, Bengaluru, Karnataka, India, note taking in particular was found to be a statistically significant cause for poor academic performance.[1]

Choudhary and Garg, who carried out a study on academic performance of various categories of students at Lady Hardinge Medical College, New Delhi, retrospectively, found that out of three categories in which the students were divided into, based on the government guidelines and criteria of entrance into medical college, the results of the first category was remarkably better than that of the other two categories, which, according to them makes it necessary for planning remedial measures at the earliest.[2]

According to Nouhi et al. studying study habits and skills and academic achievement of students in Kerman University of Medical Sciences,major defects in the study skills of the students were planning and time management followed by concentration and note taking skills. Study skills had a significant correlation with educational achievement ($r = 0.101$, $P < 0.05$).[3]

Nourian et al., in a similar study also used a general information questionnaire and a specific researcher developed validated questionnaire on study skills. However, he did not relate their results to the term ending examinationswhereas in our study, we correlated the study skills with the term ending examinations. Nourian et al. also suggested the establishment of training courses in learning skills at universities. We also suggest putting in place a support system in the form of study skills to help the students to improve their academic performance.[4]

From our study, we inferred that all the six skills may need to be developed in slow learners with equal emphasis so as to facilitate them in becoming average learners. All the six skills also require improvement in average learners to become advanced learners, however our study shows that more emphasis needs to be laid on the development of skills of note-taking, memory enhancement, test preparation and concentration. Out of these, note-taking and test preparation are skills which might be easier to work on as compared to memory and concentration, as a part of these skills are inherent to the individual. Looking at the P-value, we also infer that it will be easier to work on the average learners in terms of TBR & TM skills to bring them at par with the advanced learners, when the same is compared between slow and average learners.

Way back in 1977, Frank studied the effects of study skills workshop, at York College, Pennsylvania and concluded that conducting study skill classes for the 1st year medical students would help in improving the academic performance.[5]

In a study conducted by A. Mandal and coworkers, the key areas assessed were concentration, interest and understanding of the subject and other perceived causes of poor performance.[6]

From this study, it can be concluded that teachers can play a significant role in helping the students in acquiring the study skills. Learners can be familiarized and encouraged to apply textbook study system such as

Table 1: Study skill efficacy scores of slow, average and advanced learners and their percentage out of all participants

	Slow Learners (total 46)	Average Learners (total 55)	Advanced Learners (total 25)	Total (out of 126)
Textbook Reading Skills Score < 30	42 (91%)	5 (9 .09%)	0	47
Note-taking Skills < 20	42 (91%)	4 (7.27%)	0	46
Memory Skills < 30	43 (93.48%)	2 (3.64%)	0	45
Test Preparation Skills < 40	45 (97.83%)	2 (3.64%)	0	47
Concentration Skills < 35	46 (100%)	2 (3.64%)	0	48
Time Management Skills < 20	46 (100%)	1 (1.82%)	0	47

Table 2: Mean, SD, F-ratio & P-value of scores and comparison between groups

	Slow Mean (SD)	Avg Mean (SD)	Adv Mean (SD)	f-ratio	P-value
TBR	23.34 (3.44)	33.30 (2.65)	35.46 (1.89)	170.06	<0.00001*
NT	16.52 (2.85)	22.29 (2.04)	28.44 (3.34)	169.81	<0.00001**
Mem	26.30 (2.11)	35.16 (2.33)	40.24 (01.47	407.42	<0.00001***
TP	35.36 (1.88)	45.94 (4.16)	57.12 (2.52)	389.91	<0.00001#
Conc	32.13 1.82	38.19 (2.43)	45.48 (2.06)	316.45	<0.00001##
TM	15.14 (1.27)	24.58 (1.84)	26.04 (1.16)	578.07	<0.00001###

SQ3R (a reading comprehension method named for its five steps: Survey, Question, Read, Recite, and Review.), OK5R (Overview – Key Ideas – Read – Record – Recite – Review – Reflect), etc. They can be provided guidance in formulating questions while reading a textbook. Learners can be motivated to take notes during lectures.[7]

5. Conclusion

Factors affecting student academic performances is a multidimensional issue which has to be identified at individual level. Deficient study skills appear to be a statistically significant cause for poor academic performance. Students can do well if they are provided guidance regarding the skills they need to acquire while reading a textbook, while taking notes, while memorizing, preparing for a test or exam and how to concentrate & keep focused and to manage time. With the objective to change the learner's behaviour, it can be conveyed to learners what exactly is to be accomplished by providing a direction in the planning of a learning activity.

6. Source of Funding

None.

7. Conflicts of Interest

None declared.

Acknowledgment

The authors would like to thank Dennis H Congos for giving permission to use the DCSSI inventory. The authors wish to express their gratitude to the participants of the study, the Medical Education Unit of GCSMCH&RC, for their support and encouragement during the conduct of the study.

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