



Effectiveness of SDL in learning clinical anatomy topics by first-semester MBBS students ascertained through recapitulation

Running Title: **Effectiveness of SDL in learning clinical anatomy**

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ABSTRACT

Background: The traditional teaching method includes theory classes, practicals, clinics, and many more. Though an older concept, self-directed learning (SDL) was recently introduced in Competency Based Medical Education (CBME) by the Medical Council of India. It is an effective learning strategy for Medical Students to develop competence in acquiring knowledge. It is a process in which individuals ideally take the initiative and responsibility for their learning. The teacher's role is to facilitate the student's progress.

Aims and Objectives: The objective of the present study was to determine the effectiveness of SDL on a clinical anatomy topic learned through Self Directed Learning (SDL) 15 days ago by phase 1 MBBS students through a tool of "Capitulation".

Materials and methods: A structured questionnaire was distributed to 125 MBBS students in the first semester through "Google Forms". The study group included 100 male and 25 female phases 1 MBBS students.

Results: 32.8% of students showed decreased scores. The Recapitulation test conducted 15 days after the test taken immediately after SDL showed a decrease in score of 32.8%, an increase in score in 28% of students. There was no change in score in 20% of students, while 19.2% were absent on either test.

Conclusion: The recapitulation of the topics learned through SDL has considerable recapitulation power.

Keywords: Teaching methods, Competency Based Medical Education (CBME), Self-directed learning (SDL), Recapitulation, Google form.

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Introduction

Medical Students build their clinical knowledge on the grounds of the previously gained/acquired basic

information in various setups like theory classes, practicals, clinics, and many more. The portion of knowledge retained by the students seems to be the central question



for Medical Education (1). If students cannot use the knowledge they had once acquired, this newly acquired knowledge becomes inert and inaccessible, and the teaching-learning process of such acquired knowledge becomes questionable (2–4). Some studies have reported considerable knowledge decrement among medical students in basic science courses over time, doubting their relevance later in clinical work or studies (5–8). To form a sound foundation for clinical subjects, basic sciences subjects must be taught to remember information gained in the early phases of medical courses when required in the clinical years.

Though an older concept, self-directed learning (SDL) was recently introduced in Competency Based Medical Education (CBME) by the Medical Council of India (8). SDL is defined as learning on one's initiative, with the learner being primarily responsible for planning, implementing, and evaluating the effort (9). In medical education, SDL is the process in which medical students take the initiative, with or without the help of others (e.g., instructors and colleagues), determine their learning needs, set learning goals, identify resources for learning, choose and implement learning strategies to acquire knowledge and finally evaluate learning outcomes (10). It is advocated as an effective learning strategy for Medical Students to develop competence in knowledge acquisition (11). It has been emphasized as a process in which individuals ideally take the initiative and responsibility for their learning.(12)¹ It would help them to be aware of their

lacunae in learning (8). It also enables health professionals to continue learning and updating knowledge during their careers.(13)¹ The teacher's role would be to facilitate the student's progress. Shaping the teaching-learning activities to meet a learning need would also assist lifelong learning (14). Moreover, SDL has a practical approach to enabling independent decision-making and improved communication skills (15,16).

The primary aim of SDL is to produce learners who can manage their learning in their careers and have a continuous quest for knowledge through critical thinking that will enhance retention and recall of information to promote better decision-making (17).

In this study, we aim to study SDL's effectiveness in recapitulating a clinical anatomy topic learned by SDL 15 days ago by phase I MBBS students.

Materials and methods

The study was conducted in Department of Anatomy at Dr. Baba Saheb Ambedkar Medical College, Rohini, New Delhi.

Inclusion criteria: 125 MBBS students of first semester (2019-20 batch) of both genders (100 males and 25 females) participated in this study.

Methodology: Session I

1. *Preparation of SDL material and preliminary information:* Students were informed about the topic "Nerve Injuries of Upper Limb" for self-directed learning (SDL) a week before the SDL session. They were also provided resources such as books, the internet, cadavers, and bones for the session.

2. *SDL session:* 125 students were divided into seven groups for the SDL session.



Each group had 17-18 students, with a separate facilitator.

The SDL session was conducted in 2 parts, the assessment being the third part of it.

In the first part of the session, the topic was briefly introduced to each group for half an hour. Then the students were asked to make the Specific Learning Objectives (SLO) using the resource material and study the topic accordingly. The facilitators also made a separate set of SLOs on the same topic.

In the second part, the SLOs made by students of each group were compared to the SLOs made by the facilitator of that group, and the topic was discussed.

3. Assessment of SDL: In the third part of the session, each student's knowledge of the topic was evaluated by an assessment in the form of a questionnaire immediately after the second part of the SDL session via Google Form. The questionnaire had ten questions, including one image-based question. The link to the Google Form was sent to the (officially created) WhatsApp group of first semester MBBS students. All questions were 'single response' type and were mandatory to be attempted. One mark was awarded to every correct answer, with no negative marking for wrong answers. The link for "Google Form" was kept live for 10 minutes. Each student has to submit their form within this timeframe. The questionnaire score was displayed on the same day, along with the correct answer and explanation of the questions.

Session II

Recapitulation test: After a gap of 15 days, without prior information to the students,

the same questionnaire (recapitulation test) was given to the same group of students via Google Form.

Analysis: The scores of the recapitulation test were compared with the previous scores obtained by the test conducted immediately after SDL.

Results:

The test score conducted immediately after SDL ranged from three points to 10 points, with a mean and standard deviation of 7.25 ± 1.60 , respectively.

A total of 795 marks were obtained in the recapitulation test compared to 674 marks obtained just after SDL, which were 17.95 % higher.

The score of the recapitulation test conducted 15 days after SDL ranged from two points to 10 points, with a mean and standard deviation of 7.04 ± 1.98 , respectively.

After the recapitulation test was conducted 15 days later than the test taken immediately after SDL, the following changes were recorded [Figure 1]:

1. Decrease in score was observed in 32.8 % of student's score
2. Increase in score was observed in 28 % of student's score
3. No change in score was observed in 20 % of student's score
4. 19.2% of students participated in the questionnaire only once (students were absent on one of the tests)

The range of the change in marks between the two tests was - 8 to + 8. The difference in marks between the two tests was ± 1 mark (along with no change in marks) amongst 64 (63.36 %) students who appeared on both the tests, while



this change in marks was >1 mark in 37 (36.63 %) students.

Figure 1: Comparison of recapitulation test scores with the test's previous scores conducted immediately after SDL.

Discussion:

SDL is an effective teaching strategy for learning Anatomy, which helps in understanding the topic better. Retention of the acquired knowledge of the given topic of basic science subjects forms a background for clinical expertise in subsequent phases (18). In this study, there is a positive correlation between learned Clinical Anatomy concepts and the marks obtained in the recapitulation test. Recapitulation was tested in 80.8% of students (19.2% didn't participate in the recapitulation test). 48% of students showed positive recapitulation, which is significant as it accounts for 59.4% of 80.8%.

Lazic *et al.* found that core basic knowledge is lost during clinical years of medical studies (17). Alam reported that students could not recall information from basic science courses in the clinical years attributed to teaching methods (19). Pai *et al.* concluded that SDL is an effective teaching strategy for learning basic science subjects in their study (10).

Premkumar *et al.* studied the self-directed learning readiness of Indian medical students. It concluded that the current medical curriculum might require increased learning activities promoting SDL (9).

Murad *et al.* suggested that SDL in health professions education is associated with moderate improvement in the knowledge domain compared with traditional

teaching methods (20). Previous studies proved self-learning to help increase knowledge about clinical medical management and self-directed curriculum reflected in improving the quality care of patients (20,21). The present study suggests that retention of knowledge acquired through SDL persists over a long period.

The study by Shershneva *et al.* implied that medical teachers could employ learning resources to facilitate self-directed learning for physicians-in-training (22). In the present study, the resource material was issued or recommended in various forms like textbooks, handouts from reference books, internet links, bones, and many more.

Some studies reported that the performance of self-learning groups is better than in traditional large group lectures (23–26). In contrast, few studies suggested self-study groups be equivalent to the combination of the group plus traditional classroom teaching (27–29). The persistence of knowledge of a clinical anatomy topic learned through SDL over a substantial time in the present study suggests SDL be a suitable teaching-learning method.

Swanson *et al.* used the United States Medical Licensing Examination (USLME) Part 1, primarily a basic science examination, as their reference point. They tested the same group of students approximately 15 months later with a basic science test and discovered a decline of 2.9 percentage points on average between the scores of the two tests (30).

D'Eon found in his study that there is a relative knowledge decrement of over



52% of neuroanatomy topics in 11 months (7).

Watt found a decline of 21.5% in pre-clinical knowledge 20 months later (6). Kerbs *et al.* discovered that medical students retained only 65% of basic science knowledge (31).

In our study, immediate display of the correct answer and explanation for each question individually after the test conducted following SDL has helped the students remember the concept better for a long period. The factor that seemed to make a difference was reinforcement.

Conclusion:

The study suggests that the clinical anatomy topics learned through SDL have a considerable recapitulation power. The knowledge gained through SDL enhances retention of the topic, and the information can be recalled for an extended period.

Limitations of the study:

Although SDL is a suitable teaching-learning method in CBME, promoting the developing professionals to become lifelong learners. However, SDL sessions could cover only a few topics from the total contents in the curriculum of the first-year MBBS program.

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Figure

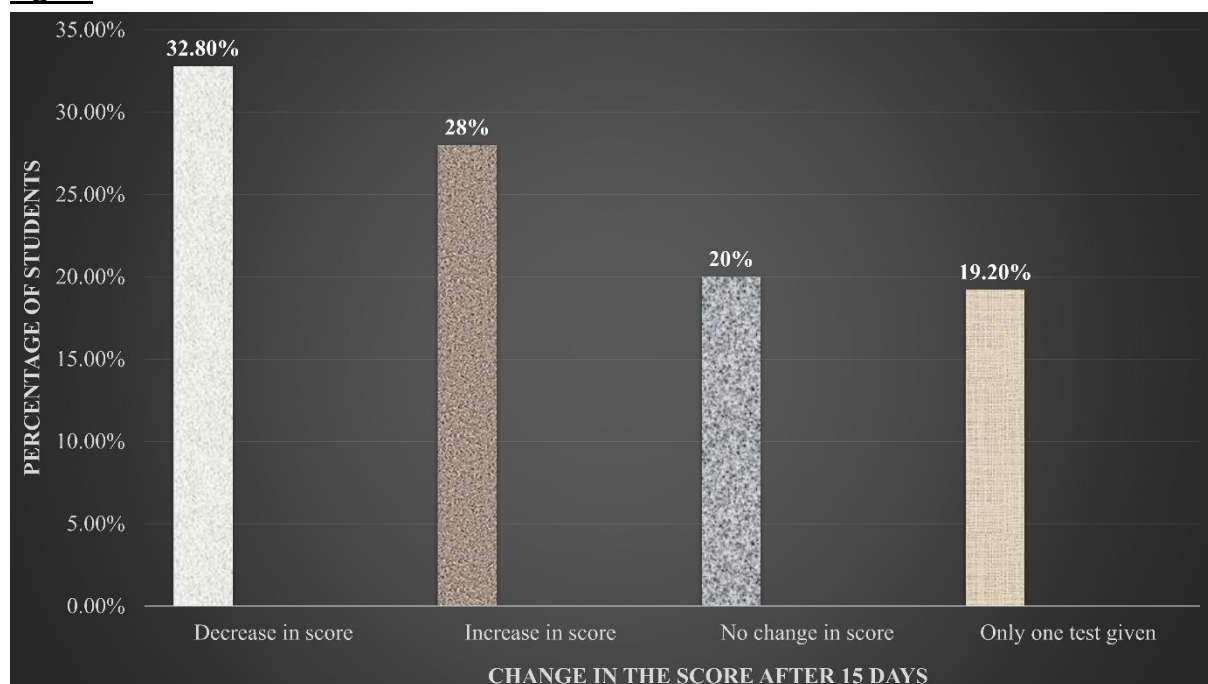


Figure 1: Comparison of recapitulation test scores with the test's previous scores conducted immediately after SDL.