**ORIGINAL ARTICLE**

# Self Directed Learning (SDL), an Effective Method for Teaching Physiology to Medical Students

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## ABSTRACT

**Background:** Self-directed learning (SDL) is considered a vital learning parameter in health professions studies. This dynamic technique helps the medical graduates to take initiative for solving their learning problems and become a lifelong learner to meet the challenges in health care profession.
**Methods:** The 100 students of first year M.B.B.S were randomly divided into two batches of 50 students each. In first session both batches were given one hour lecture on "Physiological Causes of Different Types of Shocks". Then an SDL session was conducted on the same topic to "Batch A" only. At the end of session both batches were evaluated by ten multiple choice questions (MCQ) to be solved in ten minutes. In the second session again both batches were given one hour lecture on another topic "Physiology of Platelets and Coagulation". This time SDL session was conducted to "Batch B" followed by MCQs test for a maximum of 10 marks to both batches.
**Results:** The mean scores on first topic are 6.5±1.47 and 4.8±1.38 for Batch A and B. Similarly the mean scores on second topic for Batch B and Batch A are 6.3±1.14, 4.6±1.42 respectively. The students attended additional SDL session scored higher marks as compared to students who attended the lecture only. The *P* value is statistically significant in both cases.
**Conclusion:** SDL can be used as an additional tool of learning along with didactic lectures in medical studies.
**Keywords:** Self-directed learning, Physiology lecture, Medical education

## INTRODUCTION

Self-directed learning (SDL) is considered a vital learning parameter in health professions studies. SDL is used widely in the education of medical and other healthcare professional students all over the world[1]. It enables the health professionals to continue their learning and updating their knowledge during their careers to cope with the challenging health care environment[3].

According to researchers SDL is an individual's behavior towards learning[1].In this technique individual decide themselves at what depth and breadth they need to learn[2].They formulate their own learning goals, identify reading material and implement appropriate learning strategies, in contrast to traditional method of teaching in which a teacher delivers to a large audience of students[4]. In past few years new teaching methods like problem based learning (PBL) and SDL have emerged in medical studies with great success[5].

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In medical schools of Pakistan physiology is usually taught by means of didactic lectures, tutorials,and practical classes. Such a system is teacher centered with minimal active participation from the students[5,6]. On the other hand, Self-directed learning (SDL) allows the teachers to take alternative measures apart from didactic lectures to help students in achieving their educational objectives. This dynamic learning technique helps the medical graduates to take initiative for solving their learning problems and to become a life-long learners[3].

According to academic needs SDL has been conducted with different approaches. One form of SDL exercise practice is to give case-based scenarios to the students in small groups and guide them with leading questions, students are advised to answer those questions by using recommended learning resources[6].Numerous studies have proved SDL an effective methodology for learning gross anatomy and physiology in medical schools[8,9].

In the light of emerging trends on student centered learning techniques, we planned to practice self directed learning technique to study physiology along with traditional lectures to first year medical student. A learning format was designed that would give the students an interesting approach to study, without deviating from the regular didactic lecture classes.

This study was conducted to compare the effectiveness of lecture plus an SDL session (with the same content area) with a typical lecture only, on two different topics in the physiology curriculum for first year medical students.

## MATERIALS AND METHODS

This analytical study was conducted in the month of February 2016 by physiology department at University Medical & Dental College, Faisalabad after getting approval from ethical committee of the Institute. The study was conducted through hundred 1st year MBBS students, volunteer to participate. An analytical study was conducted to compare the effectiveness of two teaching methodologies on first year medical students on two different topics. One hundred students from first year M.B.B.S voluntarily willing to take part in research were included in the study.

The 100 students enrolled into the first year M.B.B.S were randomly divided into two batches of 50 each (Batch A and Batch B). The topics for the study involved the basic physiological concepts along with case-based scenarios. The topics were selected from recommended text book "Guyton & Hall Textbook of Medical Physiology, 12th Edition".

**1ST SESSION**

**Topic**: **Physiological Causes of Different Types of Shocks:** A 60 minutes lecture was delivered to both batches (Batch A & B) on the said topic and next day an additional SDL session was conducted on same topic to Batch A only.

**Preparation of SDL material:** The material for SDL was prepared by constructing three short and specific case based scenarios from the specified topic. Each case was followed by four questions, answers of which could be found by the student using the recommended text book.

**SDL Session**: The students of "Batch A" were further divided into four groups for SDL session. During the session, the students were asked to go through each case independently and to find the answers for the questions. The tutor for each group followed the students' discussion and encouraged critical thinking; however, the tutor acted only as a facilitator of learning without giving answers. This session lasted for 30 minutes.

**Evaluation:** The students were evaluated by a multiple choice question (MCQ) based test. The test was conducted after the SDL session for Batch A. The Batch B students received the test without the SDL session. The test comprised of 10 MCQs (to be answered in 10 minutes) for a maximum of 10 marks and covered the same content areas as the lecture and SDL session, respectively. The MCQ papers were collected and evaluated manually with no negative marking.

**2nd SESSION**

**Topic: Physiology of Platelets and Coagulation:** A 60 minutes lecture was delivered to both batches (Batch A & Batch B) on the said topic and after lecture next day an additional SDL session was conducted on same topic to Batch B only.

**SDL Session**: A 30 minutes session was conducted on the said topic to "Batch B" Just as the previous session and at the end evaluation was conducted.

**Evaluation:** The students were evaluated by MCQ based test. The test was conducted after the SDL session to Batch B. The "Batch A" students received the test without the SDL session. The test comprised of 10 MCQs (to be answered in 10 minutes) for a maximum of 10 marks and covered the same content areas as the lecture and SDL session, respectively. The MCQ papers were collected and evaluated manually with no negative marking.

**Statistical analysis:** The data obtained was analyzed on computer software SPSS (Statistical Package for Social sciences) version 20.0. The scores (maximum of 10) obtained by the students were further grouped into low scorers (1-5) and high scorers (6-10). The percentages of scores obtained in both assessments were calculated. The test scores of the two groups were compared by using an independent sample t-test. A *p* value of less than 0.05 was considered to be statistically significant.

## RESULTS

The mean scores on first topic for Batch A is 6.5±1.47 (n=100) and Batch B 4.8±1.38 (Table 1). The mean scores on second topic for Batch A and Batch B are 4.6±1.42 and 6.3±1.14, (n=100) respectively (Table 2). The scores percentage of students exposed to SDL session after lecture is higher than those who attended the lectures only (Fig.1). The *P* value less than 0.05 is highly significant in both sessions.

Table 1: Mean test scores after two different learning methods on "Physiological Causes of Different Types of Shocks"

| Batch A (Lecture+SDL) | | Batch B (Lecture) | |
|---|---|---|---|
| **Mean** | **SD** | **Mean** | **SD** |
| 6.5 | 1.47 | 4.8 | 1.38 |

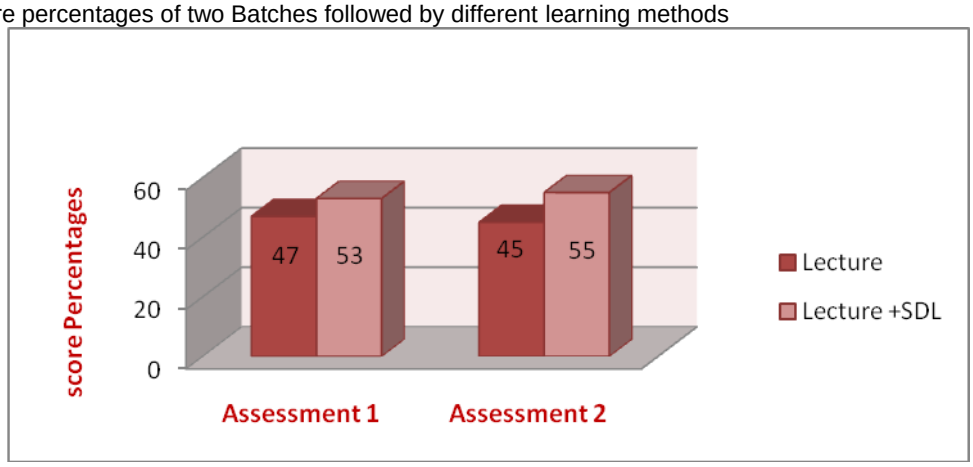
P value 0.002

Table 2: Mean test scores after two different learning methods on "Physiology of Platelets and Coagulation"

| Batch A (Lecture) | | Batch B (Lecture+SDL) | |
|---|---|---|---|
| **Mean** | **SD** | **Mean** | **SD** |
| 4.6 | 1.42 | 6.3 | 1.14 |

P value 0.001

Fig.1: Test Score percentages of two Batches followed by different learning methods




## DISCUSSION

In the first session after one hour lecture to all students the batch A was supplemented with an additional session of SDL, similarly in second session the students of batch B were exposed to SDL after regular lecture class. On evaluation students who were exposed to both sessions gave better results of MCQs test as compared to those students who attended the lecture only.

In first assessment 53% students scored higher marks (more than 50%) that had SDL session in addition to lecture, on the other hand 47% students scored low grades who attended the lecture only. The previous studies have also proved that self-learning is helpful in increasing the knowledge and clinical management[10].

Similarly in second session 55% students were of higher scores who were supplemented with SDL and 45% students were of low grades (less than 50%) who attended the lecture only. A significant difference is seen in the results of students who were facilitated with self directed learning sessions along with didactic lectures of physiology. In our study we exposed different batches to SDL session i.e., batch A in first session and batch B in second session so that the whole class can get the opportunity of this advanced teaching methodology and to prevent be biased with a specific batch of good students. SDL has proved to be sufficient for knowledge acquisition for first year medical students[5].

A significant difference is seen in the student's performance after an additional session of SDL in the physiology topics is suggestive that this learning tool is helpful to students in scoring higher grades in their academic career along with gaining knowledge [1,2]. However the present study was very limited because it covered only small portion of the subject and only one text book was used in the SDL session, many other recommended books and recourses can be used to enhance the effectiveness of the session in future.

## CONCLUSION

Self directed learning can used as an additional tool along with lectures to enhance the learning and understanding of students in medical studies. It not only enhances the concepts about the subject but also helps the students in making lifelong learners.

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