

## A COMPARISON OF DIDACTIC LECTURES TO SELF-DIRECTED LEARNING IN MEDICAL EDUCATION

Fatima Shamsuddin<sup>1</sup>, Laila Mohamed Ilias<sup>2</sup>, Sily Sreedharan<sup>3</sup>

<sup>1</sup>Associate Professor, Department of Pathology, Malabar Medical College and Research Center, Modakkallur, Atholi, Calicut.

<sup>2</sup>Associate Professor, Department of Pathology, MES Medical College, Perinthalmanna.

<sup>3</sup>Associate Professor, Department of Pathology, Malabar Medical College and Research Center, Modakkallur, Atholi, Calicut.

### ABSTRACT

#### BACKGROUND

Newer learning methods like Self-Directed Learning (SDL) are being experimented in medical education. SDL has been advocated as an effective learning strategy for medical students to achieve competency.

#### MATERIALS AND METHODS

This is a comparative study done on 98 second year MBBS students. They were divided into 2 batches (Batch A and B) of 49 each. On the first day, Batch A was given a didactic lecture (1 hour), while Batch B underwent a self-study session (1.5 hours) with all the study materials provided. A pre and post-questionnaire (15 MCQs) was administered. On the second day, the batches were reversed and another similar topic was dealt with. A pre and post-test questionnaire was administered.

#### RESULTS

There was statistically significant gain in knowledge following both methods of learning, but the gain in knowledge was more following traditional lecture. The mean ( $\pm$ SD) value of the score of gain in knowledge was  $3.99 \pm 1.88$  ( $n=98$ ) for the batch of students who had didactic lecture while the mean ( $\pm$ SD) gain in knowledge for the batch who underwent SDL was  $2.63 \pm 2.31$  ( $n=98$ ). A paired t-test comparing didactic lectures with self-directed learning also showed that the scores following didactic lectures were more compared to SDL and the results were statistically significant. An independent t-test comparing didactic lectures to SDL also showed statistically significant gain in knowledge following didactic lectures.

#### CONCLUSION

For second year medical students, traditional didactic lectures are more effective compared to self-directed learning. A feedback from students pointed out the fact that a judicious combination of both is desirable compared to either method used alone.

#### KEYWORDS

Didactic Lecture, Self-Directed Learning, Medical Education.

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#### BACKGROUND

Medical students have to spend a considerable time acquiring information, which gets updated at a pace, which is hard to keep up with, in addition to learning necessary life-saving skills. The rapidity of change, continuous updating of new knowledge and an expansive access to the latest information makes such acquisitions necessary. Much of this learning has to take place through the learner's initiative, even if available in formal settings.<sup>1</sup>

Self-Directed Learning (SDL) has been suggested as a promising methodology for lifelong learning in medicine. The Accreditation Council for Graduate Medical Education (ACGME) recommended that residents should become self-

directed learners, evaluate their learning with innovative tools such as computerised diaries and portfolios and facilitate the learning of others.<sup>2</sup>

In a review article on self-directed learning, Murad et al concluded that SDL is a potential methodology to promote lifelong learning in medical education. With the explosion of new content and competency based education that requires SDL, there has been increasing interest in SDL among educators.<sup>3</sup>

Self-Directed Learning (SDL) has been an essential issue in medical education due to the expansion of knowledge, accessibility to information and greater emphasis on reflection. If SDL in educational research lacks a clear definition, terminological confusion may hinder the application of results to practice. A study by Anoida et al tries to review and categorise various forms of SDL described in contemporary literature.<sup>4</sup>

Various definitions for self-directed learning that they found after a MEDLINE literature search from 2000 to 2004 are as follows-

- Preparedness of a student to engage in learning activities defined by himself rather than a teacher.<sup>5</sup>

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Corresponding Author:

Dr. Fatima Shamsuddin,

No. 33/4073, "Bismi" Malaparamba,  
Calicut, Kerala-673009, India.

E-mail: fatimahaneeshkhanie@gmail.com

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- An independent pursuit that involves a philosophy of personal autonomy and self-management.<sup>6</sup>
- Self-learning with searching skills.<sup>7</sup>
- Independent study.<sup>8</sup>
- Operationally defined as average time per week spent for independent study.<sup>9</sup>

Self-directed learning has existed from antiquity and played an important role in the lives of many Greek philosophers like Socrates, Plato and Aristotle.<sup>10</sup>

Early efforts to understand self-directed learning started some 150 years ago in the United States with Craik, documenting the self-education efforts of many famous personalities.<sup>11</sup>

However, it is during the last three decades that self-directed learning has become a major research area. A research by Houle in 1962 classified adult learners into three categories based on participation in learning.<sup>12</sup>

- (A) Goal-oriented, who participate mainly to achieve some end goal;
- (B) Activity-oriented, who participate for social or fellowship reasons;
- (C) Learning-oriented, who perceives learning as an end in itself. It is this latter group that resembles the self-directed learner identified in subsequent research.

In 1975, Knowles popularised the term 'andragogy' with corresponding adult instructional processes.<sup>13</sup> His publication 'self-directed learning', provided foundational definitions and assumptions that guided much subsequent research. He put forward several important findings;

- Self-directed learning assumes that humans grow in capacity and need to be self-directing.
- Learners' experiences are rich resources for learning.
- Individuals learn what is required to perform their evolving life tasks.
- An adult's natural orientation is task or problem-centred learning.
- Self-directed learners are motivated by various internal incentives, such as need for self-esteem, curiosity, desire to achieve and satisfaction of accomplishment.

In an important research effort by Guglielmino in 1977, she developed the Self-Directed Learning Readiness Scale (SDLRS), an instrument subsequently used by many researchers to measure self-directed readiness or to compare various self-directed learning aspects with numerous characteristics.<sup>14</sup>

The historical picture is completed by the establishment of an annual international symposium on self-directed learning in 1987 by Long and his colleagues. The Symposia have spawned many publications, research projects and theory building efforts by researchers throughout the world.<sup>15</sup>

In the recent years, newer methods of teaching in medical education has been introduced in addition to the traditionally followed didactic lecture classes with audio-visual aids or just a blackboard. Newer learning methods like

problem-based learning and self-directed learning have emerged with many studies comparing their efficacy over the traditional methods.<sup>16</sup>

## AIMS AND OBJECTIVES

- To compare self-directed learning with didactic lectures for teaching pathology among second year medical students in a private medical college.
- To assess the perception and preference among the two learning methods by the students.

## Methodology

**Study Design-** Comparative study.

**Study Population-** Second year medical students in a privately managed college in Kerala.

**Study Period-** May to August 2015.

**Sample Size-** 98 second year MBBS students fulfilling the inclusion and exclusion criteria.

## Inclusion Criteria

All 2<sup>nd</sup> year (5<sup>th</sup> semester) MBBS students who gave consent and participated in the sessions were included in the study.

## Exclusion Criteria

Students with specific learning disabilities or who were unable to attend the programme.

## MATERIALS AND METHODS

The 98 students in the second year (5<sup>th</sup> semester) were randomly divided into two batches, A and B to attend the didactic lecture and faculty-guided self-directed learning sessions.

The topics for study involved application of pathology of the cardiovascular system to clinical scenario. The questions were so designed that the students can correlate the clinical manifestations with the pathological aspects. The students involved in the study had not received lecture classes on the same topics previously.

## Methodology- Session I

Topic- Atherosclerosis and Aneurysm

1. Preparation of SDL material.
2. SDL session.
3. Assessment of SDL.
4. Lecture classes and assessment.

### 1. Preparation of SDL Material

The material for SDL was prepared by constructing a case history with reference to the pathogenesis and clinical implications. Students were requested to bring their laptops. Textbooks, reference material (from Robbins and Cotran Pathologic Basis of Disease, 8<sup>th</sup> Edition), images, gross specimen and microscopy slides were provided to the students. The power point presentations were the same as that used to take didactic lecture class.

**2. SDL Session**

The students were asked to sit separately with their textbooks and laptops and an assistant professor was present to guide the students during the session. Batch B underwent a faculty-guided SDL session on the first day while Batch A attended the didactic lecture on the same topic. During the SDL session, students were asked to go through the materials provided and to find answers for the questions. The interaction between the students was kept to a minimum during the session. The tutor supervised the session closely and provided assistance whenever required. The session lasted one and a half hours.

**3. Assessment of SDL**

The students were given a pre-test and post-test questionnaire just before and after the SDL sessions using a set of 15 MCQs (to be answered in 15 minutes). The maximum marks were 15 and covered the same content areas as the SDL session and lecture classes. Both (pre and post-test) MCQ questionnaires were collected and evaluated manually with no negative marking. The results were tabulated.

**4. Lecture Classes and Assessment**

The lecture class on the same topic was taken for Batch A and was in the usual format using a power point presentation, which lasted for one hour. A pre and post-test MCQ was administered to this batch in a similar manner like the SDL session. The MCQ papers were collected, evaluated and results were tabulated.

**Methodology- Session II**

Topic- Ischaemic heart disease.  
The preparation, SDL session and assessment for SDL as well as didactic lecture class were same as that on day 1 with just one exception. Batch A received the SDL session on second day and Batch B attended the lecture classes. An overview of the study design is depicted in Table 1 and 2.

**OBSERVATIONS AND RESULTS**

Even though, there was a statistically significant gain in knowledge with both methods of learning, didactic lectures edged over self-directed learning methods in demonstrating the same. For the purpose of analysis, the marks of students who underwent traditional lectures on both days were grouped together while the marks of students who attended the self-study sessions on both days were also grouped together.

**Assessment of Knowledge Gained by Different Teaching Methods**

After conducting the two types of teaching methods, the gain in knowledge was assessed by pretest and post-test for each batch. The mean ( $\pm$ SD) value of the score of gain in

knowledge was  $3.99 \pm 1.88$  ( $n=98$ ) for the batch of students who attended didactic lecture while the mean ( $\pm$ SD) gain in knowledge for the batch who underwent SDL was  $2.63 \pm 2.31$  ( $n=98$ ). Independent t-test done for the same showed statistical significance (Table 3).

**Comparison of Both Teaching Methods**

A paired t-test comparing didactic lectures with self-directed learning showed that the scores following didactic lectures were more compared to SDL and the results were statistically significant (Table 4).

An unpaired t-test comparing didactic lecture to SDL also showed statistically significant gain in knowledge following didactic lectures (Table 5).

**Student Feedback**

Student feedback was collected according to Likert's scale. A graph comparing lectures to SDL shows significant positive feedback for lectures compared to SDL (Figure 1 and 2).

Few responses obtained when asked for additional suggestions were-

- 'I understood that I can "sit" and read for two hours.'
- 'A single day is not enough to grade both.'
- 'The result of lecture class will depend on the teacher while this is not applicable for SDL.'
- 'Self-study is not so effective, because it is very difficult to go through textbook without an overall idea and self-study requires a lot of time.'
- 'Most effective method will be when both methods are combined. Didactic lectures will give an overall idea of what to study while self-learning increases the depth of knowledge. It is easy to learn when we know what to learn, which is best achieved when both methods are combined.'

**Study Design Showing the Activities in Two Batches**

Group	Lecture	SDL
Batch A	Yes	No
Batch B	No	Yes

**Table 1. Topic- Atherosclerosis and Aneurysm, Day 1**

Group	Lecture	SDL
Batch A	No	Yes
Batch B	Yes	No

**Table 2. Topic- Ischaemic Heart Disease, Day 2**

T-L Methods	Number of Students	Knowledge Gain	t value and p value
Didactic lecture	98	$3.99 \pm 1.88$	t value=4.37 p value=0.001
SDL	98	$2.63 \pm 2.31$	

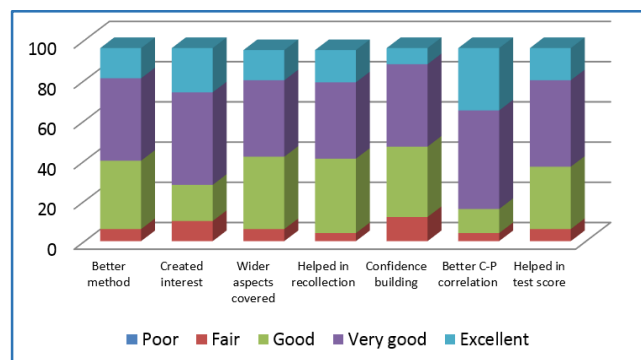
**Table 3. Comparison of Gain in Knowledge Among the Two Lecture Methods (Independent t-test)**

T-L Methods	Number of Students	Pre-Test Mean±SD	Post-Test Mean±SD	t value and p value
Didactic lecture	98	6.57±1.717	10.56±1.393	t value=21.04 p value=0.001
SDL	98	6.49±1.763	9.13±1.552	t value=11.2 p value=0.001

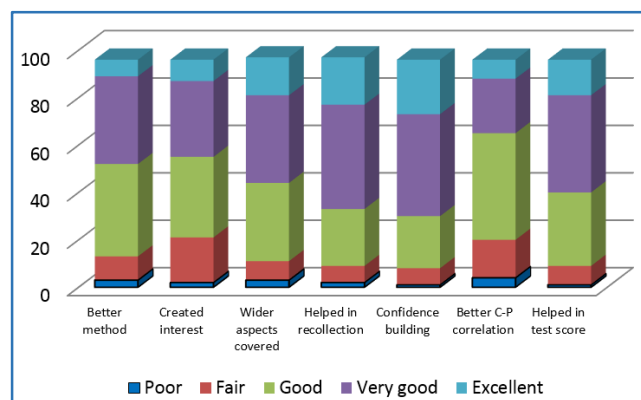
**Table 4. Comparison of Pre-Test and Post-Test Scores (Paired t-Test)**

Didactic Lecture- SDL	t value	p value
	4.355	0.000

**Table 5. Unpaired t-Test Comparing Didactic Lecture to SDL**



**Figure 1. Student’s Feedback on Didactic Lecture**



**Figure 2. Student’s Feedback on Self Learning**

**DISCUSSION**

The present study shows that the gain in knowledge was significant in both groups, but this was more in the group, which attended the lecture classes. This shows that lecture classes are more effective in learning those particular topics. Overall, in the present study, didactic lecture has proved to be more effective than self-directed learning for understanding certain topics in medical education. This is in contrast to many of the previous studies, which showed a significant advantage for SDL over didactic lectures.<sup>17,18,19</sup>

In a study of self-directed learning in relation to anatomy, gross dissection at the Medical School of the University of Castilla-La Mancha, Spain, Mdel et al found that an objective-oriented self-learning approach provides maximal autonomy and independence in the achievement of objectives by the students in close association with academic staff. The data obtained from the study indicated that students engaged in self-directed learning through small groups working with faculty staff are able to self-improve their anatomical skills.<sup>20</sup>

A study done by Abraham RR et al at Melaka Manipal Medical College to determine the effectiveness of SDL, compared SDL session evaluation scores with didactic lecture exam scores using Student’s paired t-test. Lecture exam scores were significantly lower than SDL exam scores (72±0.40 vs. 76±0.21). These results suggest that SDL may be an effective learning tool. Furthermore, feedback from the students showed more of a positive approach to this strategy even though a few students were negative.<sup>21</sup>

Murad et al implied that SDL is more suitable for adult learners who already have a reservoir of knowledge and can apply their learning immediately to their practices and recommended it for heterogeneous groups of learners with different past experiences.<sup>3</sup>

A study conducted by Grieve C on a group of forty-six students of physiology compared the knowledge increment following three different teaching methods. The three methods assessed were- (1) A lecture with audio-visual aids; (2) A formal didactic lecture and (3) A self-study tutorial. The results indicated a favourable increment for the audio-visually aided lecture and for the self-study tutorial. There was no significant increment for the didactic lecture. A questionnaire completed by the students indicated an overall preference for the audio-visual aided method and a lesser preference for the self-study tutorial. The formal didactic lecture found no favour with the students.<sup>22</sup>

A randomised control trial done on second year medical students attending the University of Hong Kong’s five year undergraduate medical program came to the conclusion that PBL (a form of self-directed learning) was less effective at imparting knowledge than the usual teaching programme (directed learning) of a lecture followed by a group tutorial. In-depth, qualitative interviews also revealed that the students were less satisfied with the PBL teaching method perhaps because they found this constructivist educational model frustrating and inefficient, viewing it as the uninformed leading the ignorant.<sup>23</sup>

Both of the above findings are in accordance with our study where the results are more in favour of lecture classes (preferably with audio-visual aids) compared to self-study.

The role of SDL is probably limited in second year as the students are just exposed to clinical postings and it may be difficult for them to integrate the clinical aspects of a disease with pathology. A faculty-guided discussion or a short lecture class, followed by self-study sessions maybe better in this setting.

**CONCLUSION**

Traditional didactic lectures are more effective over SDL for large group students and for covering a wider area. For any given topic, self-learning will need more time to comprehend

and reproduce the topic. From the student's feedback, it can be inferred that a judicious combination of both the methods maybe preferred over implementing either method alone. SDL helps in increasing the depth of knowledge, while lecture covers larger topics in a shorter span of time.

### Limitations

In this study, however, only few topics could be covered from the total content of second year MBBS curriculum. A study of longer duration covering a wider range of topics and preferably integrated into the routine teaching schedule is required to ascertain the efficacy of traditional teaching methods over newer methods.

### Implications

- Newer Teaching Learning (T-L) methods have to be adopted so as to sustain student interest in learning.
- With introduction of newer methods, traditional T-L methods should not take a backseat.
- Emphasis has to be laid on a judicious combination of different T-L methods.
- With continually decreasing mandatory staff requirements, lectures certainly will be the most practical tool for a large group setting.

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### REFERENCES

- [1] Hiemstra R. Self-directed learning. In: Husen T, Postlethwaite TN, eds. The international encyclopedia of education. 2<sup>nd</sup> edn. Oxford: Pergamon Press 1994.
- [2] Accreditation Council for Graduate Medical Education. 2001. Outcome project timeline-Working guidelines. [http://www.acgme.org/outcome/project/timeline/TIM\\_ELINE\\_index\\_frame.htm](http://www.acgme.org/outcome/project/timeline/TIM_ELINE_index_frame.htm)
- [3] Murad MH, Coto-Yglesias F, Varkey P, et al. The effectiveness of self-directed learning in health professions education: a systematic review. *Med Educ* 2010;44(11):1057-1068.
- [4] Ainoda N, Onishi H, Yasuda Y. Definitions and goals of self-directed learning in contemporary medical education literature. *Ann Acad Med Singapore* 2005;34(8):515-519.
- [5] Schmidt HG. Assumptions underlying self-directed learning may be false. *Med Educ* 2000;34(4):243-245.
- [6] Candy PC. Self-direction for lifelong learning. San Francisco, California: Jossey-Bass Publishers 1991.
- [7] Gillespie LD, Gillespie WJ. Finding current evidence: search strategies and common database. *Clin Orthop Relat Res* 2003;413:133-145.
- [8] Rahman ME, Rahman S, Musa KM, et al. Knowledge and attitude of faculty members on problem based learning. *Mymensingh Med J* 2004;13(1):20-24.
- [9] Ozuah PO, Curtis J, Stein RE. Impact of problem-based learning on residents' self-directed learning. *Arch Pediatr Adolesc Med* 2001;155(6):669-672.
- [10] Kahn CH. Plato and the socratic dialogue. Cambridge: Cambridge University Press 1996.
- [11] Craik GL. Pursuit of knowledge under difficulties: its pleasures and rewards. New York: Harper & Brothers 1840.
- [12] Houle CO. The inquiring mind. Madison, Wisconsin: The University of Wisconsin Press 1961.
- [13] Knowles MS. Self-directed learning: a guide for learners and teachers. New York: Cambridge Book Co 1975.
- [14] Guglielmino LM. Development of the self-directed learning readiness scale. Doctoral dissertation, University of Georgia. Dissertation Abstracts International 1978;38:6467A.
- [15] Long HB. Associates. Self-directed learning: application and research. Norman, Oklahoma: Oklahoma Research Center for Continuing Professional and Higher Education, University of Oklahoma 1992.
- [16] Barrows HS. Problem-based, self-directed learning. *J Am Med Assoc* 1983;250(22):3077-3080.
- [17] Pai KM, Rao KR, Punja D, et al. The effectiveness of self-directed learning (SDL) for teaching physiology to first-year medical students. *The Australas Med J* 2014;7(11):448-453.
- [18] Anderson SM, Helberg SB. Chart-based, case-based learning. *S D Med* 2007;60(10):391-399.
- [19] Holmboe ES, Prince L, Green M. Teaching and improving quality of care in a primary care internal medicine residency clinic. *Acad Med* 2005;80(6):571-577.
- [20] Arroyo-Jimenez Mdel M, Marcos P, Martinez-Marcos A, et al. Gross anatomy dissections and self-directed learning in medicine. *Clin Anat* 2005;18(5):385-391.
- [21] Abraham RR, Upadhyaya S, Ramnarayan K. Self-directed learning. *Adv Physiol Educ* 2005;29:135-136.
- [22] Grieve C. Knowledge increment assessed for three methodologies of teaching physiology. *Med Teach* 1992;14(1):27-32.
- [23] Johnston JM, Schooling CM, Leung GM. A randomised-controlled trial of two educational modes for undergraduate evidence-based medicine learning in Asia. *BMC Medical Education* 2009;9:63.