

Use of Activity-Based Learning to Improve Students' Drive for Knowledge and Enhance Their Academic Performance in the Subject of Forensic Medicine: A Cross-Sectional Survey from a Private Medical College of Faisalabad, Pakistan

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ABSTRACT

Objective: To assess the effect of activity-based learning on students' drive to acquire knowledge of the subject and enhance their academic performance.

Methodology: A cross-sectional observational study was conducted among the students of a private medical college in Faisalabad, Pakistan. A total of 101 students of 3rd year MBBS of Aziz Fatimah Medical and Dental College were selected using non-probability sampling after informed consent. Data was collected after approval from Institutional Ethical Review Committee of AFMDC using a pretested self-structured questionnaire. Data analysis was done by the Statistical package for social sciences version 25.

Results: Majority of the participants (56.4%) chose the Activity Based Learning (ABL) in small groups as their favorite learning methodology, followed by 18.8% (19 out of 101) who opted for ABL as a whole class. Approximately 59% students found ABL very interesting and useful while 41.5% of the participants considered ABL as a source of good understanding of the basic items/topics in forensic medicine. Similarly, majority of the participants were found completely motivated and satisfied with ABL and gained a lot, while 17.5% of the participants liked the traditional lecture-based system. Participants when asked about their opinion regarding implementing ABL in forensic medicine lecture, 80.5% supported ABL and responded that it should be continued.

Conclusions: Our study showed that Activity Based Learning proved very helpful for the students in improving their academic knowledge.

KEYWORDS: Forensic, Forensic Medicine, Activity Based Learning

INTRODUCTION

Globally, teaching strategies have been improving with time and new techniques and methods are being introduced, tested, accepted, or rejected for the improved education as a whole. One of such very famous and old technique is the Activity Based Learning (ABL) methodology.¹ This technique

involves a range of educational activities meant to teach students through hands-on practice of the subject matter. It involves intelligently designed activities that can help clear student's concepts and enhance not only their learning experience but also their academic performance.¹

The basic concept behind the ABL teaching methodology is that active learning is a more preferable method to educate students as compared to passive learning. The more traditional and very common method of teaching being implemented in Pakistan is the lecture-based method.² This didactic teaching methodology is also implemented in most medical colleges of Pakistan specially in Forensic medicine.² The reason for its prevalence is that this is quite cost-effective and compared to the cost its efficiency is also reasonable especially for preclinical years of teaching. However, it is not an up-to-date method in medical education that promotes student-centered learning and active learning.²

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The main pillars of any institution are the teachers and the methodologies they adopt to ease the educational journey of students. It is the responsibility of teachers to innovate educational techniques in a productive way to achieve better learning outcomes. One of the most important factor to understand here is the motivation or drive behind the efforts to gain education. From a student's perspective it may differ from case to case but it is responsibility of the teachers to make sure they adopt such teaching methods that benefit all the students in their class irrespective of their personal agendas to gain education. In a study it was shown that motivation is a key ingredient for students' participation and understanding in the subject under study.³ This means that when motivation is down, the learning potential will also be down.³ Interactive learning methodologies promote better communication and interaction skills in students and are effective techniques of learning.⁴

One important aspect in improving the quality of education is to improve the techniques designed for learning. Educators must adopt up-to-date teaching methods to reach this goal.⁵ The study i.e Forensic medicine contains lot of topics that are difficult to grasp without the active involvement of the students. This subject is important because the medical professionals after graduation perform an active role in law and jurisprudence by performing medico-legal work and autopsies. The education that medical professionals get to perform their medico-legal duties stems from the subject of Forensic medicine. It is therefore very important that the students must be educated using an up-to-date methodology so that they can grasp the concepts that will enable them to perform their duty practically in an efficient manner after graduation.⁵ The teachers have a prime responsibility as a study revealed that the role of preclinical teachers apart from only teaching is also to enable students to learn, retain, and apply what has been already taught to them in the books.⁶

There are many comparisons of how active learning techniques like ABL are better than passive learning techniques like lecture-based learning. To know which method is better we believe the best judges are the students themselves. Teachers can introduce both methods of learning and leave it to the students to understand what works best for them. Many teachers and institutions have taken up

this challenge and found positive results favoring the ABL methodologies. However, results have been different for different subjects. By using various techniques, it is found that the ABL is a tool that can be used for student motivation and for the students to find what works best for them in-terms of learning their subject.⁷ One such example is a study done in the subject of physiology which concluded that active learning enhanced the academic performance of students.⁸ A step further than the implementation of a new methodology of teaching is to understand whether it was worth applying. It has been practically demonstrated in a study the effectiveness of active learning techniques (ABL) in comparison to didactic lectures (traditional lecture based learning) showing better student satisfaction, greater understanding of the topics, and improved learning outcomes.⁹

In Pakistan, particularly in medical colleges, educators should understand that ABL is a useful tool for keeping students motivated to learn and to exchange their ideas of learning with their teachers as what works best for them, to develop a deeper understanding of their theoretical knowledge and test run their education practically in activities before starting clinical training. A study to determine the effects of activity based teaching and traditional lecture based learning on students' achievement was done among two groups of students where one experimental group was exposed active methods and one was kept as a control group.¹⁰ The study showed that a majority of students' scores increased in experimental group as compared to the control group. Additionally, majority of students found the activity-based teaching to be more interesting than lecture-based teaching.¹⁰ Another study showed that there was positive feedback regarding the usefulness of the ABL method in creating interest in the topics taught and understanding of the concepts. Majority of the students agreed that they were driven to resources in an attempt to solve the activities.¹¹ So, we planned to conduct a study in the subject of forensic medicine with the aim to determine the effect of ABL on students' drive to get knowledge of the subject and enhance their academic performance.

METHODOLOGY

This cross-sectional observational study was conducted among the students of 3rd professional

MBBS of Aziz Fatimah Medical and Dental College (AFMDC) within 3 months after approval by the Institutional Ethical review committee of AFMDC reference no: IEC/170-22 dated 11/2/2022. All 101 students of 3rd year MBBS were recruited using non-probability (convenience) sampling technique after informed consent. They were also ensured that their identities would not be disclosed. The objective of the study was to see if ABL would improve students' learning outcomes. Data was collected using a pretested self-structured questionnaire. Questionnaire contained a section for demographic details of the participants. Questions regarding the effectiveness of teaching methods; students' engagement in studies; their favorite learning strategy was asked from the participants. Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 25. The percentages and frequencies of all the questions mentioned in the questionnaire were calculated. Chi-square test of independence was also applied ($p < 0.05$ considered significant).

RESULTS

This study comprised of 101 participants. Findings of the academic interest survey are shown in Table 1. Results showed that 57 (56.4%) out of 101 participants chose ABL in small groups as their favorite method of learning, followed by 19 participants (18.8%) who opted for ABL as a whole class. Participant's perception about the empirical teaching methodology was assessed by asking the question "what is your perception about a new experience with activity-based learning in forensic medicine" to which, 59 (58.8%) responded that they found ABL very interesting and useful and 41.5% participants considered ABL as a source of good understanding of the basic items/topics in Forensic medicine. Similarly, the participants were also enquired about their motivation and personal satisfaction about ABL and 76.8% were found completely satisfied with ABL and gained a lot, while 17.5% liked the traditional lecture-based system (Table 2).

Participants when asked about their opinion regarding ABL in forensic medicine lecture, 80.5% supported ABL and responded that it should be continued (Figure 2). Participants' feedback about ABL; 31.8% marked satisfactory, 30% chose very good and 28.5% selected the option of Excellent (Figure 3).

Table 1: Findings of the Academic Interest Survey

Questions		Frequency			p-value
		Male (n=51)	Female (n=50)	Total (n=101)	
Student's favorite methodology of learning	Traditional lecture-based learning	2(3%)	7 (14%)	9 (8.9%)	0.19
	Activity-based learning (in small groups)	33(64%)	24 (48%)	57 (56.4%)	
	Activity-based learning (as a whole class)	8(15.6%)	11 (22%)	19 (18.8%)	
	Self-study	8 (15.6%)	8 (16%)	16 (15.8%)	
Student's perception about the empirical methodology of teaching	Interesting & useful	32 (62.7%)	27 (54%)	59 (58.4%)	0.37
	Good understanding of basic terms	19 (37.2%)	23 (46%)	42 (41.5%)	
	Boring & not much useful	0	0	0	
	Misuse of time, no gain	0	0	0	

Pearson Chi- Square test with p value <0.05 as significant

Table 2: Comparison of Motivation and Satisfaction for Activity Based Learning

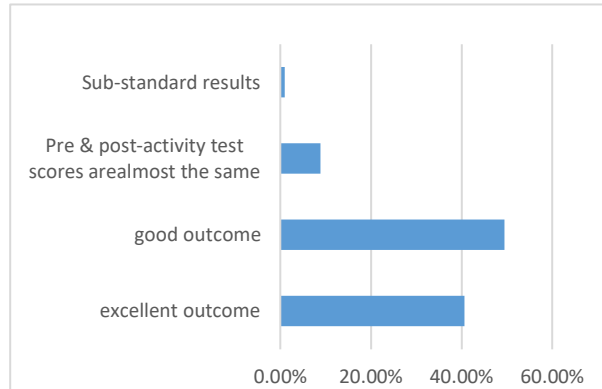
Questions		Frequency			P value
		Male (n=51)	Female (n=50)	Total (n=101)	
Student's element of motivation	Fun & curious atmosphere of class	4 (7.8%)	7 (14%)	11 (10.8%)	0.59
	Encouraging atmosphere to perform well	12 (23.5%)	11 (22%)	23 (22.77%)	
	Good interaction with teachers	10 (19.6%)	6 (12%)	16 (15.8%)	
	Better understanding as compared to traditional lecture-based learning	25 (49%)	26 (52%)	51 (50.4%)	
Student's Level of effectiveness & satisfaction	Completely satisfied & gain a lot	43 (84%)	35 (70%)	78 (77.6%)	0.28
	Only a little difference	2 (3.9%)	2 (4%)	4 (3.8%)	
	Not satisfied & gain nothing remarkable	0	1 (2%)	1 (0.99%)	
	More satisfied with traditional lecture system	6 (11.7%)	12 (24%)	18 (17.4%)	

Pearson Chi- Square test with p value <0.05 as significant

DISCUSSION

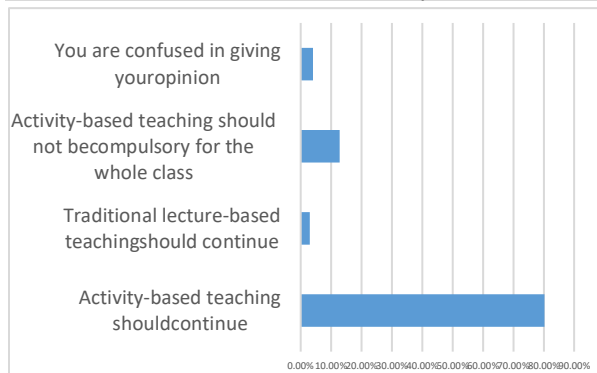
Activity based learning is very effective method for the development of higher order thinking skill in the students, increasing motivation and improving academic outcomes.^{12, 13} This study was conducted to assess the efficacy and supremacy of ABL strategy in Forensic medicine over the traditional didactic lecture-based learning by using a pretested

Figure1: Student's Pre & post activities reviews by student's regarding academic outcome (scores)



self-structured questionnaire. In this study, 56.4% of the participants considered ABL in small groups to be more beneficial while 18.8% preferred activity-based learning as a whole class. Similar results were shown in a study conducted by Dixit *et al.* in India, which shared the experiences of medical graduates to peer teaching in large groups.¹⁴ The study depicted that 60% of the students of 1st year MBBS found improved facilitation of learning in the subject of human anatomy with the help of active learning as compared to the didactic lectures. It also revealed that 30% of the participants found the peer group learning a great help in preparing the topic for presentation.¹⁴

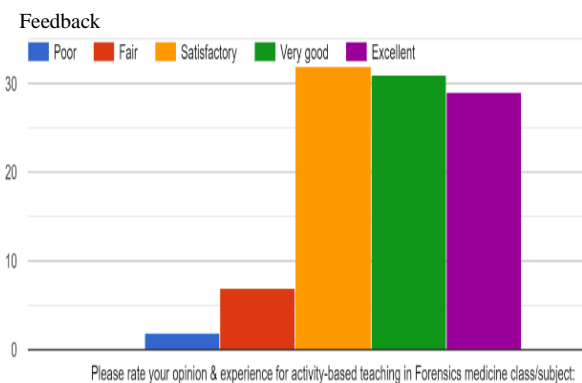
Figure 2: Student's opinion about teaching methodologies (in forensic medicine class only)



In our study, 76.8% of the participants were found completely satisfied with the Activity based learning while 17.5% were in favor of the didactic lectures. On contrary to this, studies conducted by Hemalatha *et al.* and Khane *et al.* shown that majority of the students preferred learning physiology by the traditional lecture-based system using chalk and blackboards.^{15, 16}

This difference in results might be due to the difference in the nature of the subjects as our study was solely focused on Forensic medicine. So, in our study majority of the students opted ABL for improving their interest in the subject of Forensic Medicine.^{15, 16} While comparing the pre- and post-activities reviews by student's regarding academic outcome, 49.5% participants opined good outcome, 40.5% chose excellent outcome while only 8.5% of the participants were of the opinion that their pre- and post-activity test results were the same and ABL had no significant impact on their learning. Likewise, Anwer, F. checked the effectiveness of ABL on students' academic achievement by devising an experimental study in which two study groups (control group and experimental group) were formed.¹⁷

Figure 3: Percentages of various feedbacks for ABL from participants



In above mentioned study, data collection was done by two MCQ achievement tests as pre and post activity tests. The control group was taught using didactic lecture based teaching technique while the participants of experimental group were subjected to various modalities of active learning and not surprisingly, the results shown that the students in the experimental group (who were taught using ABL technique) had significant improvement in their scores in the post-test as compared to the control group.¹⁷ In our study, majority of the

participants, when asked about their opinion regarding the best and effective teaching methodology, opted for ABL system particularly for the subject of Forensic medicine. Similarly, Bi M. et al. compared case-based learning (a type of ABL) and traditional learning methodology in teaching the post-graduate students of medical oncology and they revealed that majority of the students preferred case based learning (CBL) over the traditional lecture system.¹⁸ Participants' perception regarding CBL was that it proved very helpful in improving their problems' analyzing, and solving, clinical thinking as well as their self-study ability.¹⁸ At the end of the questionnaire, the students were asked to give their feedback about ABL in Forensic medicine class to which, 31.8% marked satisfactory, 30% chose very good and 28.5% opined Excellent. This data is consistent with the study conducted by Patil U, *et al.* The participants gave their feedback that ABL helped them strengthen their theoretical knowledge; motivated them to get in touch with the real time scenarios; and also helped them in their preparation for final examination.¹⁹

Thus the data obtained from this study shows that ABL improves students' learning outcomes. Our study adds significant amount of data in the literature and suggests that ABL should be introduced in our education system as it keeps the students motivated, improves the sense of critical thinking in them and help them fortify their academic knowledge as well.

Limitations: This study had certain limitations:

1. It was conducted on a very small scale with a limited number of participants.
2. Non-probability (convenient) sampling technique was used.
3. As it only focused on a single subject, the assessment of effectiveness of ABL for rest of the medical science subjects could not be made.

Still our survey succeeded to cover the following aspects such as analyzing the efficacy of teaching methods; students' engagement in studies; their motivation and personal satisfaction and their favorite learning strategy. However, with the intention of getting improved results, this study should be conducted on a large scale using random sampling technique and should focus on multiple subjects.

CONCLUSION

Our study revealed that ABL proved very helpful for the students. It kept the students motivated and helped them fortify their academic knowledge. Majority of the students were completely satisfied with ABL and they were of the opinion that it should be continued in the Forensic medicine.

Acknowledgement: Prof. Dr. Khurram Sohail Raja, Head of Department of Forensic Medicine and Toxicology Aziz Fatimah Medical and Dental College Faisalabad, for his expert advice and cooperation to conduct this study.

Conflict Of Interest: None

Funding: None

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Authors' Contribution

Dr. Muhammad Asfand Yar	Study design, acquisition of data and manuscript writing. Revised and approved the articles.
Dr. Asma Yahya	Data acquisition, manuscript writing, Reviewed and approved the manuscript.
Dr. Saeed Akbar	Data acquisition, manuscript writing, Reviewed and approved the manuscript.
Dr. Ayesha Ramzan	Study design, data analysis and interpretation and write up of results Revising manuscript critically for important intellectual content.
Dr. Umna Khalid	Study design, Data collection Contributed to review the article and approved it.

All authors are responsible for the integrity of the data and the accuracy of the data analysis.

**Data availability statement:* All the data is provided in this manuscript

Date of Submission: 8-12-2022
Revised: 15-10-2023
Accepted: 30-12-2023