

Comparative Study of Perception of Pharmacology Students about Power Point, White Board with Talk and Mixed Strategy as a Teaching Tool

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Abstract

Objective: To compare the general perception of students of pharmacology about three different teaching strategies (PPT, Whiteboard, mix strategy) for better teaching and learning.

Method: This study was conducted in Pharmacology department of Shaikh Khalifa Bin Zayed Al Nahyan Medical & Dental College (SKZMDC) Lahore. It was a Quantitative, questionnaire-based, cross-sectional study, conducted on 99 students of 3rd year, who were divided into three batches each of 33 students. Three different lectures were delivered via PPT, whiteboard and by mixed strategy. At the end of each lecture students filled a validated questionnaire, containing various questions about each method. Data collected was entered and analyzed by using SPSS version 20. Comparison among three strategies was done by using GLM-ANOVA. Post-hoc Tukey's test was used to make pair wise comparison among three strategies and type of lectures.

Results: The results of this study showed that students were most satisfied on whiteboard as compared to the teaching on PPT and with mixed strategy. Whiteboard was considered best for clarity and understandability, stimulation of interest, ability of taking notes, ability to copy diagrams, information received, solution of problems, flow of thoughts, proper summary, recalling of important points.

Conclusion: This study showed students' perception about various teaching tools. They considered whiteboard much better as compared to multimedia alone or with concomitant use of board and multimedia, for various aspects of teaching and learning. So, the total reliance on PPT is questionable.

Keywords: Pharmacology, teaching tools, PPT, Whiteboard, Mix strategy.

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Introduction

Teaching and learning is an art that allows the students for better understanding. It is a continuous pro-

cess by which the students not only gain the professional values but also the behavioral, clinical, social and psychomotor skills.¹ Proper and effectively made teaching skills can always improve these competencies among students. There are various methods used as learning and teaching tools. It includes lectures, small group discussions (SGD), large group discussions (LGD), tutorials, seminars, books, posters, handouts, audio-visual aids and information & communication technology.²

Lectures are the most common form of teaching and learning since the ancient times. Well organized lectures can be very effective tool to present integrated information from multiple sources.³ There are various Pros and cons of every strategy; if we compare the Whiteboard or chalk & talk with that of the power point presentation

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(PPT), both have different advantages. Whiteboard is an inexpensive way whereby the students can always keep pace with the teacher. It is not dependent upon electricity.⁴ Teacher can erase, redraw or even modify the material written on board according to understanding of students. But the disadvantage is that it is time consuming and it can be really troublesome for a large group of audience because it is difficult to have a continuous eye contact with the class. The other common problems are related mainly with training, support and practicalities. For examples, lack of trainings and inadequate IT supports can impede and frustrate teachers. Other issues addressed are: the position of whiteboard within a classroom, the day light reflection on board and shadow of the user on board can hinder and affect learning.⁵

PPT on the other hand is commonly used tool nowadays for delivering lectures. It has very many advantages as every student is well aware of modern technology. PowerPoint presentations are perceived as more fascinating than traditional lectures. Besides that, blending the lectures with PowerPoint presentations enhances students' self-efficacy.⁶ Students feel that it is easier to understand the course material and to take notes when PPT is used. The enhanced self-efficacy of the students may be steered by their perception that the PPT lectures were better structured and accentuate the key points better than traditional lectures.

But it's not the fact that PPT always comes up with flying colors; if not properly used it can totally spoil the learning process. Most of the time, the students are passive listeners. Use of improper font size, dim light, crowded slides, too much of the information in order to pass the allotted time are the major flaws of PPT.⁷ According to many critics PPT encourages simplistic thinking, with complex ideas being squashed into bulleted lists, and stories with beginning, middle, and end being turned into a collection of disparate, loosely disguised points. This may present a kind of image of objectivity and neutrality that people associate with science, technology, and "bullet points". Its outline format leads presenters to arrange material in an unnecessarily deep hierarchy, itself subverted by the need to restart the hierarchy on each slide.^{8,9}

Keeping in mind all of the above mentioned studies and the feedback response from the students of given institute, we have decided to find statistical data from our students regarding subject of pharmacology. This study can guide us to find a better teaching tool which might be helpful and effective to improve the cognitive

skill of students. We wanted to establish an evidence for our subject in pharmacology department, regarding which strategy is better than the other.

Material & Method

It was a Quantitative, questionnaire-based, cross sectional study conducted in Pharmacology department of Shaikh Khalifa Bin Zayed Al Nahyan Medical & Dental College (SKZMDC) Lahore, after the IRB approval (UHS/Education/128-17/487). The class of 99 students was divided into three batches as A, B and C to look for the three teaching strategies.

The sample size of 33 in each group was estimated by using 95% confidence level. The sample size was estimated with error standard deviation of 1.40 and effect size of 0.3610 Power & precision 3.0 software was used. Purposive sampling. We wanted to compare the perception of students about the various teaching strategies for pharmacology so students of 3rd year MBBS were taken as purposive sampling. All the students of 3rd year MBBS class (both male and female), present in pharmacology lecture and willing to participate in this study, were included. While those who were absent and not interested, were excluded from this study. A validated questionnaire was used to determine their perception about various teaching strategies. Fifteen different aspects were included in the questionnaire regarding easiness, understandability, comfort, and interaction and response was taken on Likert scale and score were measured by summing up the scores for all fifteen items¹¹. The class of 99 students was divided into three groups so as to expose every student to every topic and strategy. To minimize the confounding factors, groups were shuffled so as each group was taught by every instructor with all of the three strategies. A validated questionnaire was given to each student at the end of every lecture. Three lectures of pharmacology as lecture 1 (L1) on anti-hypertensive drugs, lecture 2 (L2) on anti anginal drugs and lecture 3 (L3) on drugs for congestive cardiac failure (CCF), were prepared by three different strategies as strategy 1(S1) i.e. by Power Point presentation/PPT, strategy 2(S2) by using white board only and strategy 3(S3) by the concomitant use of PPT and board and talk. All the 99 students were divided into 3 batches as A (n=33), batch B (n=33) and batch C (n=33) by random allocation. In first week, batch A was given L1 by Power Point, batch B was taught the same lecture L1 on whiteboard with talk and L1 was delivered to

batch C by mixed strategy i.e. PPT with concomitant use of whiteboard and talk. In second week batch A was taught the L2 by whiteboard, batch B got the same lecture i.e. L2 by mixed strategy and batch C was taught the same lecture by PPT. In third week of study L3 was

WEEK 1	
Batch A	→ L1 → S1
Batch B	→ L1 → S2
Batch C	→ L1 → S3
WEEK 2	
Batch A	→ L2 → S2
Batch B	→ L2 → S3
Batch C	→ L2 → S1
WEEK 3	
Batch A	→ L3 → S3
Batch B	→ L3 → S1
Batch C	→ L3 → S2

given to batch A by mixed strategy, batch B got the L3 by PPT and batch C was taught the L3 on whiteboard. (Fig 1)

Fig-1: Methodology of Research Groups

All the three lectures were prepared and conducted by 3 different instructors of equal qualification and experience, so as to minimize the instructor bias. All the instructors were properly guided and informed about the purpose and data collection technique, beforehand. The lecturers prepared their lectures by mutual discussion, so as to keep maximum uniformity in three types of strategies.

Data collected was entered and analyzed by using SPSS version 20. Data for response to each item in the questionnaire was described by using frequency and percentages. Mean ± SD (where data were normally distributed) and median (IQR) (where data distribution was skewed) were used to describe the scores for each strategy. Comparison of scores among three strategies and interaction with gender were made by using GLM-ANOVA. Post-hoc Tukey’s test was used to make pair wise comparison among three strategies and type of lectures. Box plots were used to see the distribution of scores for each strategy. Association of three teaching strategies for total scores for each lecture and overall was measured by using likelihood ratio test. P value ≤ 0.05 was considered statistically significant.

Results

When the response recorded against each strategy used for teaching, irrespective of the lecture, whiteboard

was considered best for organization, clarity and understandability, stimulation of interest, ability of taking notes, ability to copy diagrams, information received,

Table 1: Response of students for different aspects of three different strategies (N=number of students responded)

		Strategy					
		Multi-media		White board		Mix	
		N	%	N	%	N	%
the lecture was more organized	strongly disagree	0	0.0	0	0.0	0	0.0
	Disagree	8	8.1	1	1.0	2	2.0
	Neutral	8	8.1	11	11.1	19	19.2
	Agree	61	61.6	45	45.5	44	44.4
the lecture was clear & understandable	strongly agree	22	22.2	42	42.4	34	34.3
	strongly disagree	0	0.0	2	2.0	0	0.0
	Disagree	3	3.0	0	0.0	0	0.0
	Neutral	16	16.2	8	8.1	18	18.2
stimulated the interest	Agree	54	54.5	41	41.4	42	42.4
	strongly agree	26	26.3	48	48.5	39	39.4
	strongly disagree	3	3.0	3	3.0	3	3.0
	Disagree	20	20.2	2	2.0	14	14.1
stressed the important points	Neutral	24	24.2	20	20.2	21	21.2
	Agree	34	34.3	42	42.4	34	34.3
	strongly agree	18	18.2	32	32.3	27	27.3
	strongly disagree	0	0.0	2	2.0	0	0.0
able to take notes	Disagree	5	5.1	0	0.0	6	6.1
	Neutral	18	18.2	7	7.1	17	17.2
	Agree	46	46.5	47	47.5	32	32.3
	strongly agree	30	30.3	43	43.4	44	44.4
able to copy the diagram/charts easily	strongly disagree	1	1.0	2	2.0	0	0.0
	Disagree	21	21.2	4	4.0	18	18.2
	Neutral	29	29.3	27	27.3	18	18.2
	Agree	34	34.3	34	34.3	40	40.4
better understanding of subject	strongly agree	14	14.1	32	32.3	23	23.2
	strongly disagree	2	2.0	0	0.0	0	0.0
	Disagree	26	26.3	13	13.1	22	22.2
	Neutral	25	25.3	37	37.4	32	32.3
well informative	Agree	33	33.3	27	27.3	23	23.2
	strongly agree	13	13.1	22	22.2	22	22.2
	strongly disagree	2	2.0	2	2.0	0	0.0
	Disagree	6	6.1	0	0.0	3	3.0
	Neutral	21	21.2	9	9.1	24	24.2
	Agree	49	49.5	37	37.4	39	39.4
	strongly agree	21	21.2	51	51.5	33	33.3
	strongly disagree	0	0.0	0	0.0	0	0.0
	Disagree	6	6.1	2	2.0	3	3.0
	Neutral	17	17.2	7	7.1	13	13.1
	Agree	41	41.4	45	45.5	53	53.5
	strongly agree	35	35.4	45	45.5	30	30.3

problem solving	strongly disagree	3	3.0	0	0.0	0	0.0
	Disagree	4	4.0	3	3.0	9	9.1
	Neutral	36	36.4	17	17.2	22	22.2
	Agree	39	39.4	47	47.5	43	43.4
	strongly agree	17	17.2	32	32.3	25	25.3
flow of thought is better	strongly disagree	0	0.0	0	0.0	0	0.0
	Disagree	14	14.1	1	1.0	9	9.1
	Neutral	19	19.2	13	13.1	17	17.2
	Agree	50	50.5	46	46.5	39	39.4
	strongly agree	16	16.2	39	39.4	34	34.3
properly summarized	strongly disagree	0	0.0	0	0.0	0	0.0
	Disagree	7	7.1	2	2.0	3	3.0
	Neutral	13	13.1	8	8.1	8	8.1
	Agree	51	51.5	37	37.4	42	42.4
	strongly agree	28	28.3	52	52.5	46	46.5
best mode to recall important points	strongly disagree	4	4.0	0	0.0	1	1.0
	Disagree	15	15.2	1	1.0	8	8.1
	Neutral	18	18.2	9	9.1	21	21.2
	Agree	30	30.3	31	31.3	33	33.3
	strongly agree	32	32.3	58	58.6	36	36.4
covers more topics/lectures	strongly disagree	1	1.0	1	1.0	2	2.0
	Disagree	8	8.1	11	11.1	3	3.0
	Neutral	16	16.2	17	17.2	20	20.2
	Agree	45	45.5	39	39.4	46	46.5
	strongly agree	29	29.3	31	31.3	28	28.3
better demonstration of clinical conditions	strongly disagree	0	0.0	0	0.0	2	2.0
	Disagree	11	11.1	7	7.1	12	12.1
	Neutral	24	24.2	20	20.2	14	14.1
	Agree	31	31.3	35	35.4	42	42.4
	strongly agree	33	33.3	37	37.4	29	29.3
better student/teacher interaction	strongly disagree	3	3.0	1	1.0	3	3.0
	Disagree	14	14.1	3	3.0	7	7.1
	Neutral	15	15.2	17	17.2	27	27.3
	Agree	29	29.3	32	32.3	28	28.3
	strongly agree	38	38.4	46	46.5	34	34.3

solution of problems, flow of thoughts, proper summary, recalling of important points, and better student teacher interaction with most of the students showing response of strongly agreed category. (Table.1)

The variation in distribution of score was recorded highest for anti-angina in all three strategies while smallest for anti-hypertension lecture. Generally, the scores for white board were higher for all anti-hypertension and CCF while mix for anti-angina. Also the man scores for CCF were relatively higher for all three categories. (Fig-2)

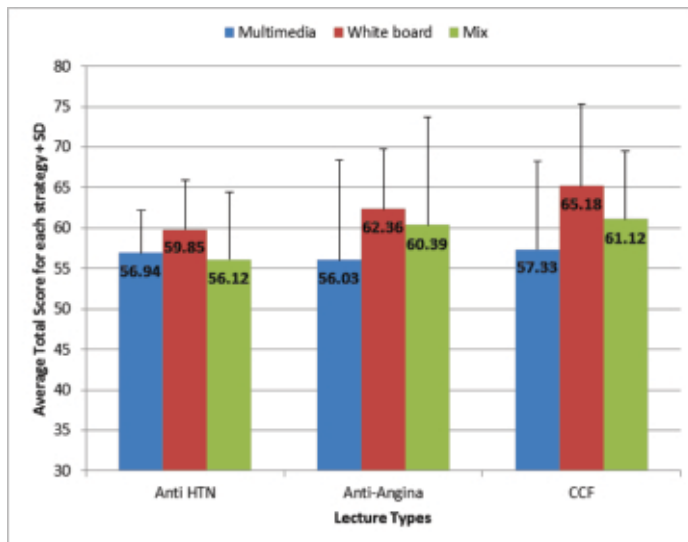


Fig.2: Mean levels of total scores for three strategies by the lectures delivered.

Discussion

The results of this quantitative, cross-sectional study showed that students were most satisfied on whiteboard as compared to the teaching on PPT and with mixed strategy. Whiteboard was considered best for clarity and understandability, stimulation of interest, ability of taking notes, ability to copy diagrams, information received, solution of problems, flow of thoughts, proper summary, recalling of important points, and better student teacher interaction. In this regard most of the students showed response of strongly agreed category.

Several research studies found whiteboard to be superior mode of teaching, even in this android era. The results of given study were similar to those by Baruah & Patel (2014) which shows that 90% students found the traditional board & talk method to be more effective. According to their study, board method can be super added with PPT having less of written material and more of diagrams, animations, charts and videos. According to their students, time for interactive sessions is abolished in PPT use alone.^{12,13,14}

Results of given study also showed that 48.5% of the students were in favor of the fact that lectures on whiteboard were clearer and more understandable. It is because; students can follow the instructor smoothly step by step during the lecture. Whiteboard was found to enhance the enjoyment and interest level of students as well. Almost all of the students in this study preferred to use white board either alone or as a part of mix strategy. According to some students, the whiteboard was easy to work with and that it helped to catch their attention.

46.3% of the participants said that it is easy to make notes via whiteboard. 51.5% students said that it was much feasible to understand the subject through whiteboard alone. In this study 45.5% students found the whiteboard lecture, well informative as compared to 35.5% and 30.3% for PPT and mix strategy respectively. 39% participants found the whiteboard method to be effective as flow of thoughts and concepts. According to them, lecture was properly and timely summarized with the help of white board. Also the ability to recall the important points after class is very high as compared to other two methods. The student teacher interaction was also found to be much better in case of white board teaching than PPT alone and mix strategy. This is in accordance with Mahalaxmi (2015), that whiteboard teaching still remains the most preferred teaching aid by students. According to her 60.43% of students preferred whiteboard lecture when compared to PPT teaching method (39.56%). According to her results, in whiteboard teaching, the students show active participation and are able to cope with the teaching speed.¹⁵ This mode of teaching triggers an interest in students and enables to hold the attention in the class. In her study, majority of students disliked PPT as teaching method. The main reason quoted by students for this was dark room during the lecture. Due to this environment, students may get bored or feel sleepy. Students may also feel difficult to keep up to the speed of the teacher, making it difficult to copy diagrams or writing notes.^{16,17}

In contrast to these findings there are other studies which are in favor of PPT. A survey including 62 students of MBBS in Jaipur India showed that 65% of students preferred PPT lecture over other methods. Our results are contradictory to the Study of Mishra et al (2015); which showed that PPT lecture was more attractive (56.66%) as compared to board & talk (43.19%).² But they have observed that most of the students (89.45%) were in favor of improving the class room lectures with concomitant use of PPT plus board and talk method. This might be due to the fact that students are more attentive when a diagram is drawn on board and explained on PPT. Animations and pictures with abundant written material on PPT may lead to poor understanding. Rani et al (2015) found that 66.9% were in favor of PPT followed by the traditional board & talk.¹⁸ They have pointed out that in PPT; the ability to integrate pictures, text & images was of great advantage. The major reasons to dislike PPT are power failure, difficulty in notes taking and time spent in its setting. Student's concerns about the PPT were: teachers read the slides rapidly, do not

prepare the slides, students felt themselves busy in writing down the notes. They also found that students could retain 15% less information when the lecture was conducted on PPT as compared to white board lectures. However as far as organization of the lecture was concerned; our results showed that 61.6% of the students agreed that it was more organized in PPT than whiteboard and mix technique. It was because of the fact that it was prepared and already written. Whereas, on whiteboard teacher can forget the proper sequence and organization of the topic.

According to some researchers students show greater positive response and efficaciousness in PPT lectures. It is claimed that lecture on PPT is more organized. This perception of organization influenced the student's self-efficacy beliefs. Understanding and organization via PPT is better for test preparation. Its entertaining potential is also considered to be more as compared to whiteboard.^{19,20}

Question was asked about the stimulation produced by all the three technique; 32.2% students said that interest in lecture was more stimulated by whiteboard, followed by mix strategy (27.3%). Only 18% students found the PPT, innovative enough to stimulate the interest. The whiteboard and mix strategy were able to emphasize and stress the important points. Here the response of students was similar to each other. Only 30% students found the PPT to stress important points of all lectures. In our study, various suggestions and recommendations were given by the students like inclusion of interactive lectures by the teachers, proper training of clinical pharmacology and case scenarios.²¹ These findings are consistent with the studies conducted by Manjunath et al (2015). Feedbacks from the students can definitely help the teachers to improve their PPT.²²

Learning with audiovisual aids seems to have a great impact on the students. Generally, students liked the board and talk. Whiteboard can said to be more students centered, while PPT is more teacher centered. The main reasons for fondness of chalkboard could be that it enables the student to have enough time to write notes and it has more flexibility, spontaneity and non-linearity.

Conclusions

This study showed students' perception about various teaching tools. They considered whiteboard much better as compared to multimedia alone or with concomitant use of board and multimedia, for various aspects of teaching and learning. So the total reliance on PPT is questionable.

Conflict of Interest *None*

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Authors Contribution

SM: Conceptualization of Project

TM: Data Collection

ZSQ: Literature Search

TZ: Statistical Analysis

AI: Drafting, Revision

FC: Writing of Manuscript