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Impact of Digital Learning using Smartboards with Undergraduate Students in the Suburbs of Mumbai

Prof Abhijeet K. Mohite[1] and Dr. Deepak Raverkar[2]
Assistant Professor, Usha Pravin Gandhi College of Arts, Science and Commerce, Mumbai, Maharashtra[1]
Principal, Sundarrao More Arts, Commerce and Science College, Poladpur (Cholai), Poladpur, Raigad, Maharashtra[2]

Abstract: The research paper focuses on the impact of digital learning using smart boards for undergraduate students in the suburbs of Mumbai. While doing this research the students were being surveyed using online forms and were asked questions on their digital learning and impact of smartboard. A comparative study has been carried out to understand whether smartboards are really an effective tool as compared to whiteboards/blackboards. While doing this the sample population was considered for the survey and questions were asked to the random students who have encountered both types of mediums I.e., smartboards and blackboards/whiteboards. So, while using paired t test has been carried out as a statistical test to carry out the hypothesis testing. While doing this SPSS was used to carry out the analysis and it can be seen that the P value is <0.05 hence we have rejected the null hypothesis and accepted the alternate hypothesis. Hence from this study we can conclude that the smartboards are really impacting the teaching learning methodology and improving the learning of students in the classrooms.

Keywords: Smartboard, Digital Learning, Online Learning, Blackboard, Whiteboard, Smart learning

I. INTRODUCTION

Any type of learning that uses and benefits from technology is referred to as digital learning. The use of digital platforms, resources, systems, and apps by learners is therefore included in the definition of digital learning. This may entail using digital tools during in-person training sessions, taking online courses, doing research on Google, viewing movies online, etc.

Additionally, it enables students to have anytime, anywhere access to professionally created courses and training resources. Because of mobile learning, active learning, and gamification, digital learning courses are typically far more dynamic and captivating. Most firms came to the realisation that traditional training techniques, such seminars and in-person workshops, are no longer effective after the pandemic.

When your complete team was working in the same location at the same time prior to the pandemic, they used to be excellent. However, as work-from-home and hybrid arrangements grow in popularity, they can be challenging to put into practise, if at all conceivable. Not only is it challenging to gather them all at once, but also. The expense and practicality of pursuing it are additional issues.

Many enterprises all around the world are making a significant transition toward digital learning as a result of these changes. You won't need to spend tens of thousands of rupees on the venue, trainer, and other incidental expenditures associated with in-person training. With digital learning, you can better accommodate the individual learning preferences and styles of your students. Compared to more traditional training techniques, it is more affordable, modern, and effective.

Online learning and digital learning are frequently used interchangeably. especially given that the majority of modern digital learning occurs online. However, your students have access to a variety of other digital learning options as well. Digital learning is a broad term that encompasses all current learning methods. Digital learning is the general term for online learning. It simply applies to the kind of instruction your students can receive online.

As long as there is an internet connection, it may also be taken on other devices such phones and tablets in addition to web browsers, of course. Through mobile offline learning, simulated training, and augmented reality learning, digital learning can take place offline. To complete their corporate training, your learners don't necessarily need to be connected to the internet.(Escuadro, 2022)

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Smart boards not only help teachers teach better, but they also help students learn better. By presenting visual elements, it gives pupils a more enriched educational experience. Teachers are able to adapt various learning styles while using smart boards, making learning much simpler.

Teachers and students can execute programmes by tapping their fingers on the touch screen option.Smart boards are simple to operate and require very little upkeep. On the boards, only the user's finger or a special pen is used, which is also hassle-free, rather than dirty chalk or paints.For students, smart technology offers simple access to internet resources.

Teachers have access to a number of comprehensive databases that will help them enhance their lessons. Students have easy access to a number of tools that can assist them in finishing an assignment or performing analysis.The ability of smart boards to be sociable is possibly one of their greatest advantages.

A hands-on experience is one of the best ways to teach students since they learn more effectively when they are actively engaged. A tablet can be used by a student to write, sketch, or take notes on a smart board.If you want to "go green," this is your chance. Smart boards are beneficial for the environment and eliminate the need for paper. There won't be a requirement for photocopying and printing a class set of papers.

One of the numerous benefits of smart boards is the potential for technological convergence. To help with teaching support, teachers can link their monitors, video cameras, digital cameras, microscopes, and about anything else you can think of.(Ramakrishnan, 2021)

II. LITERATURE REVIEW

Esin Pektaş Karabekir's study is to evaluate the effectiveness of video modelling presented by smartboards, and to teach autistic children social responses in the form of gestures, verbal and imitative expressions showing happiness and anger. is to investigate methods in terms of maintenance and generalization for A multi-probe design was used for all participants in this study. Her three male subjects, from her 3-year-old to her 5-year-old diagnosed with autism, participated in the study. As a result, all three subjects were able to learn social responses in the form of gestures, verbal and facial expressions indicative of happiness and anger using video modelling presented via a smartboard. It was shown that it was able to adapt its learning to different environments, materials, and generalized people. In addition, maintenance sessions that took place four weeks after class and her sixth week, and her seventh month, showed that the subject retained the learned behaviour. Social validity results indicated that the children's mothers and teachers rated the study positively.(Akmanoğlu, 2018)

This study contributed to our understanding of the factors that act as predictors of technology choice and use by science teachers, particularly how choice and use are realized among teachers in different science disciplines. Notable descriptive statistics were explored and a multi-level cross-classification of how demographics, school background, pedagogical approach, and professional development (PD) influence teacher tool availability We tested the explanatory model via ordered logit analysis (Goldstein 1995). The results show that science teachers use hardware rather than software. Specifically, this includes educational tools (SMART boards, clickers, etc.) and experimental tools (sample ware). Differences in teacher resource use were primarily due to differences in resources rather than differences in teacher characteristics. Teachers who taught physics, taught on-demand, or had more of her PD in the tool were more likely to use the tool. These findings influence how we conceptualize the selection and use of technologies entering the pipeline of science education. Which tools are becoming sustainable in science education and how technological acceptance differs across scientific disciplines.(Noemi Waight, OCTOBER 2014)

III. RESEARCH METHODOLOGY

Objectives of the research:

1. To identify whether there is an interaction of students with the professor when the professor uses smartboard instead of whiteboard or blackboard
2. To study whether students enjoy collaboration when tasks are given on smartboard as compared with blackboards or whiteboards
3. To check if there is participation in quiz by students when taken on smartboards as compared to whiteboards/blackboards

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4. To study if smartboards help in delivering lectures better as compared to whiteboard/blackboard
5. To identify understanding of students when taught on smartboards as compared on whiteboards/blackboards

3.1 Hypothesis Testing

To identify whether there is an interaction of students with the professor when the professor uses smartboard instead of whiteboard or blackboard

- H_0– There is no significant difference in interaction of students with the professor when the professor uses smartboard instead of whiteboard or blackboard
- H_a– There is significant difference in interaction of students with the professor when the professor uses smartboard instead of whiteboard or blackboard

To study whether students enjoy collaboration when tasks are given on smartboard as compared with blackboards or whiteboards

- H_0–There is no significant difference in students enjoy collaboration when tasks are given on smartboard as compared with blackboards or whiteboards
- H_a– There is significant difference in students enjoy collaboration when tasks are given on smartboard as compared with blackboards or whiteboards
- To check if there is participation in quiz by students when taken on smartboards as compared to whiteboards/blackboards
- H_0– There is no significant difference inparticipation in quiz by students when taken on smartboards as compared to whiteboards/blackboards
- H_a– There is significant difference inparticipation in quiz by students when taken on smartboards as compared to whiteboards/blackboards

To study if smartboards help in delivering lectures better as compared to whiteboard/blackboard

- H_0– There is no significant differencein delivering lectures better as compared to whiteboard/blackboard
- H_a– There is no significant difference in delivering lectures better as compared to whiteboard/blackboard
- To identify understanding of students when taught on smartboards as compared on whiteboards/blackboards
- H_0– There is no significant difference in understanding of students when taught on smartboards as compared on whiteboards/blackboards
- H_a– There is significant difference in understanding of students when taught on smartboards as compared on whiteboards/blackboards

3.2 Sampling

The survey was conducted among the various courses run across in Usha Pravin Gandhi College of Arts, Science and Commerce. SVKM has 26 institutes under its brand and one of them being this college. It was recently that smart boards were implemented across all of the 26 institutes replacing the traditional white boards. There are approximately 1800 students currently studying in the campus. to understand their general attitude towards the new implementation of smart boards this survey was carried out. A sampling formula was used to calculate the desired sample for which the questions would be asked.

The formula used is

$$ss = \frac{Z^2(p)(1-p)}{c^2}$$

Where:

Z = Z value (e.g., 1.96 for 95% confidence level)

p = percentage picking a choice, expressed as decimal (.5 used for sample size needed)

c = confidence interval, expressed as decimal

(e.g., .04 = ±4) (Sample Size Formulas for our Sample Size Calculator, n.d.)

Based on the population size of 1800 students, at 99% level of confidence and a confidence interval of 9, the sample population what was 389 students.

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3.3 Data Analysis

Based on the objectives provided a survey questionnaire was circulated among 389 students. The following data shows descriptive analysis of the age, gender, class and course the students were studying in.

Statistics

		Age	Gender	Class	Course
N	Valid	387	389	389	389
	Missing	2	0	0	0
Mean		19.71	.52	2.12	2.15
Median		19.00	1.00	2.00	1.00
Mode		19	0	2	1
Sum		7629	202	825	835

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17	19	4.9	4.9	4.9
	18	119	30.6	30.7	35.7
	19	170	43.7	43.9	79.6
	20	65	16.7	16.8	96.4
	21	10	2.6	2.6	99.0
	23	1	.3	.3	99.2
	25	1	.3	.3	99.5
	188	2	.5	.5	100.0
	Total	387	99.5	100.0	
Missing	System	2	.5		
Total		389	100.0		

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	193	49.6	49.6	49.6
	Male	190	48.8	48.8	98.5
	Non-Binary	6	1.5	1.5	100.0
	Total	389	100.0	100.0	

Class

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	First Year	54	13.9	13.9	13.9
	Second Year	234	60.2	60.2	74.0
	Third Year	101	26.0	26.0	100.0
	Total	389	100.0	100.0	

Course

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BMS	204	52.4	52.4	52.4
	BMM	24	6.2	6.2	58.6
	BSC IT	62	15.9	15.9	74.6
	BA FTNMP	98	25.2	25.2	99.7
	MA	1	.3	.3	100.0
	Total	389	100.0	100.0	

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Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	I interact with the professor when he uses the [Smartboard]	4.21	317	.737	.041
	I interact with the professor when he uses the [Blackboard/Whiteboard]	3.61	317	.910	.051
Pair 2	I enjoy collaborating with others when tasks are given on [Smartboard]	4.28	389	.788	.040
	I enjoy collaborating with others when tasks are given on [Blackboard/Whiteboard]	3.39	389	.956	.048
Pair 3	I participate in quizzes when conducted via [Smartboard]	4.29	389	.746	.038
	I participate in quizzes when conducted via [Blackboard/Whiteboard]	3.42	389	.977	.050
Pair 4	My professor is able to deliver lectures better when he uses a [Smartboard]	4.37	389	.783	.040
	My professor is able to deliver lectures better when he uses a [Blackboard/Whiteboard]	3.45	389	.969	.049
Pair 5	The topics are better understood when taught on [Smartboard]	4.43	389	.709	.036
	The topics are better understood when taught on [Blackboard/Whiteboard]	3.39	389	1.000	.051

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	I interact with the professor when he uses the [Smartboard] & I interact with the professor when he uses the [Blackboard/Whiteboard]	317	.145	.010
Pair 2	I enjoy collaborating with others when tasks are given on [Smartboard] & I enjoy collaborating with others when tasks are given on [Blackboard/Whiteboard]	389	.017	.736
Pair 3	I participate in quizzes when conducted via [Smartboard] & I participate in quizzes when conducted via [Blackboard/Whiteboard]	389	.120	.017
Pair 4	My professor is able to deliver lectures better when he uses a [Smartboard] & My professor is able to deliver lectures better when he uses a [Blackboard/Whiteboard]	389	.017	.733
Pair 5	The topics are better understood when taught on [Smartboard] & The topics are better understood when taught on [Blackboard/Whiteboard]	389	-.023	.648

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Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	I interact with the professor when he uses the [Smartboard] - I interact with the professor when he uses the [Blackboard/Whiteboard]	.606	1.085	.061	.486	.726	9.943	316	.000
Pair 2	I enjoy collaborating with others when tasks are given on [Smartboard] - I enjoy collaborating with others when tasks are given on [Blackboard/Whiteboard]	.892	1.228	.062	.770	1.014	14.323	388	.000
Pair 3	I participate in quizzes when conducted via [Smartboard] - I participate in quizzes when conducted via [Blackboard/Whiteboard]	.869	1.156	.059	.754	.984	14.827	388	.000
Pair 4	My professor is able to deliver lectures better when he uses a [Smartboard] - My professor is able to deliver lectures better when he uses a [Blackboard/Whiteboard]	.915	1.235	.063	.792	1.038	14.610	388	.000
Pair 5	The topics are better understood when taught on [Smartboard] - The topics are better understood when taught on [Blackboard/Whiteboard]	1.044	1.240	.063	.920	1.167	16.605	388	.000

As from the paired T test was conducted to identify whether there is a significant difference in the responses of students for smartboards as compared to whiteboards or blackboards. As from the above table you can see that for all the pairs the significance value <0.05.

Conclusion: Based on the analysis carried out using paired T test the hypothesis, the P value for the same are <0.05 hence we can conclude the following

Since the P value is <0.05 we reject H_0 and accept the alternate hypothesis that H_a– There is significant difference in interaction of students with the professor when the professor uses smartboard instead of whiteboard or blackboard

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For the 2nd we reject the null hypothesis $H_0$and accept H_a– There is significant difference in students enjoy collaboration when tasks are given on smartboard as compared with blackboards or whiteboards

For the 3rd we reject the null hypothesis H_0 and accept H_a– There is significant difference inparticipation in quiz by students when taken on smartboards as compared to whiteboards/blackboards

For the 4th we reject $H_0$and accept H_a– There is no significant difference in delivering lectures better as compared to whiteboard/blackboard

For the 5th we reject H_0– and accept H_a– There is significant difference in understanding of students when taught on smartboards as compared on whiteboards/blackboards

Hence we conclude that smartboards are an effective tool as compared to blackboards and white boards. Smartboards help in improving student interaction in class as compared to whiteboards and blackboards. With the implementation of smartboards there is an increase in collaboration of activities that students do in class which was not dominantly seen while faculties used whiteboards or blackboards. Smartboards has also increased participation among students who join quizzes on the smartboard as compare to whiteboards and blackboards. And finally there is an increase in the understanding of the subject by the students and this has been possible only because of smartboards and not blackboards and whiteboards.

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