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Preference of undergraduate students between teaching through smart board and black board - A cross sectional study

Priyanka Sivasubramanian[1] , Dr. Reshma Poothakulath Krishnan[2] , Dr. Sandhya Sundar[3]

[1]Undergraduate student Saveetha Dental College and Hospitals Saveetha Institution of Medical and Technical Sciences, and Hospitals Saveetha University, Chennai – 600077 Email:- 152001002.sdc@saveetha.com

[2]Senior Lecturer Department of Oral pathology, Saveetha Dental College and Hospitals
Saveetha Institute of Medical and and Technical Sciences, Saveetha University, Chennai – 600077 Email:- reshmapk.sdc@saveetha.com

[3]Senior Lecturer Department of Oral pathology, Saveetha Dental College and Hospitals Saveetha Institute of Medical and and Technical Sciences, Saveetha University, Chennai – 600077 Email:- sandhyasundar0402@gmail.com Ph. no: 8754499587

ABSTRACT:-

Background :-. It is known that blackboards have been used for educational purposes from ancient times, whereas smart boards are being used a lot recently and became popular and rapidly occupying classrooms and lecture halls. With the evolution of technology, students achieved competence and started showing interest in interactive learning.

Aim :- To assess the preference of undergraduate students between blackboard and smart board for teaching in classrooms.

Materials and methods :- The study was conducted among the students of various colleges in chennai. A structured, close-ended questionnaire consisting of 10 questions was prepared, and distributed through an online platform (Google forms). Data collected were tabulated and analysed through SPSS software (version 23).

Results :- The study included 100 participants. 77% of the respondents preferred the usage of smart boards over black boards.65% of the respondents had chosen a 'smart board' as the most interesting method of learning. 78% of the students opined that 'smart boards' optimised their learning time. 77% of participants viewed smart boards as the best teaching method in providing student interactions and conducting quizzes. 39% of males and 38% of females had preferred

smart boards as the method of faster learning (p-value= 0.399). 32% of females and 33% of males had accepted smartboard as the most interesting method of teaching students (p-value=0.352).

Conclusion :- The study has recorded the Smartboard as the most preferred mode and novel method of teaching by undergraduate students compared to the blackboard method. There should be a balance between embracing new methods of teaching and learning while upholding the timeless principles of education. The newer educational technology shall be a part of a comprehensive system of lifelong education.

KEYWORDS :- Smart boards, Blackboards, Novel method, interaction, classroom, teaching, innovative technique.

INTRODUCTION :-

The rapid development in information technology has revolutionised the practice of training and learning in the education system. Numerous studies reveal that the quality and quantity of e-learning systems such as 'black board' in the education curriculum has increased significantly over the years. Both students and teachers access the latest learning environment together to make effective interaction with one another by different ways of communication, podcasts, discussion boards and file sharing.(1,2)

In this study we come across the preference of students belonging to an esteemed institution, on the usage of blackboard.(3) A blackboard is a reusable writing surface on which texts or drawings are made using chalks.(4) Chalks are sticks of calcium sulphate. These black boards are made of small thin sheets of black or grey stones. The chalk marks can be easily wiped off with a duster or damp cloth.(5) A high grade black board made of good quality material is capable of lasting 10-20 years with intensive use. On the other hand , smart boards also called interactive white boards is a large interactive display board in the form of a white board.(6) They are used in a variety of settings including classrooms.(7) Including at the level of education, incorporate board rooms and work groups.(8) It can either be a standalone touch screen computer used independently to perform tasks and operations or a connectable apparatus used as a touchpad to control computers from a projector.(9) Using smart technology in the classroom are known to increase academic performance, improves student learning, enhances literacy, boosts attentiveness, and increases comprehension.(10) Teachers report that the number one benefit that they see in their classrooms that use Smart Boards is an increase in student discussion and engagement.(11) Since the smart board is able to create lessons that can't be duplicated on a regular whiteboard, it can be more effective at grasping your student's attention.(12)

From the survey analysis, it is evident that students who took part in the survey, of which majority prefer smart boards.(13) Although e-learning offers advantages for teachers, learners and institutions, it raises questions about the fundamental learning process.(14) Presently, many of these smart boards technologies tend to focus on the delivery of mechanism information, that is termed as digital myopia, rather than an innovative approach to learning.(15) It is also worth mentioning the advantages of smart boards.(16) It provides students with an enriched learning experience by projecting visual elements.(17) Visual learners are able to observe the whiteboard while tactile learners have the option to learn by touching the board.(18) The touch screen option allows teachers to run programs with the tap of their fingers. This makes it easy to navigate for both the teachers and the student.(19)

Cognitive research suggests that the addition of smart boards can actually create an improvement in the learning process if certain methods are employed.(20) By using auditory and visual methods of presenting information, students can grasp that information more quickly thereby fostering an enhanced learning process.(21) Yet it is not clear whether such an online learning environment enhances learning outcomes of the students or if it even meets the level of success of traditional classrooms and teaching methods.(22) Our team has extensive knowledge and research experience that has translated into high quality publications.(3), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17), (19), (20), (21), (22).

Thus the study aims to assess the outcomes of blackboard and smartboard teaching among the undergraduate student population.

MATERIALS AND METHODS :-

The cross sectional questionnaire survey was conducted with undergraduate students of a Private dental institution in Chennai. A pre-tested and validated questionnaire consisting of 10 close-ended questions was used to determine a student's preferred mode of teaching.The questionnaire was prepared and circulated online through google forms. .Owing to the nature of the study design and setting, a convenience sampling method was used, and the data was collected over a period of one month. All those who were willing to participate were included in the study. Those who were not willing and those who had a language barrier in answering the English version of the questionnaire were excluded from the study. Prior to the start of the study, ethical clearance was obtained from the institution's ethical committee of Saveetha University. This survey was conducted in a study population that represented a relatively well educated and well to do section of the community. Thus, it would be prudent to generalise and represent the common population masses.

Statistical analysis :- The responses from the Google sheet were transferred into Microsoft Excel and were then imported to SPSS software, (version 25). Descriptive statistics were done using frequency and percentage. Inferential statistics were done using the Pearson's Chi-square test. Interpretation was based on a p value less than 0.05, which was considered statistically significant.

RESULT :-

A total of 100 participants were included in the final analysis, out of which 51% were female and 49% were male. From the survey conducted we can come to an impression that most of the students who took part in the survey prefer smart board teaching compared to black board teaching.

When they were questioned about which method of teaching makes learning faster. 77% opted for smart board, 12% opted for black board, 11% opted for other methods **(Fig 1)**. Students have to be interested in learning in order to be better learners, hence they were asked 'which mode of teaching makes the learning experience more interesting, 65% of the respondents have chosen smart board, 23% of the respondents have chosen other means and the remaining 12% have chosen black board **(Fig 2)**. In relation with extra curricular activities, a question of 'which teaching method is preferred when conducting class activities like quiz' was asked. 77% of the students opted for smart board, 12% opted for black board and 11% opted for other methods **(Fig 3)**. It was also asked 'which method makes the best use of study time'. 78% of the students opted for smart board, 11% opted for black board and the remaining 11% opted for other methods **(Fig 4)**. To maintain a good relationship between the teachers and students, a question of 'which method of teaching improves the interaction between students and teachers' was asked. 77% of the respondents responded with smart board, 12% of the respondents with black board and 11% of the respondents with other methods **(Fig 5)**. 94% of students think it is necessary to use smart boards while teaching and the remaining 6% of students felt it is not necessary to use smart boards while teaching. 87% of students felt there is a meaningful difference between smart board and black board teaching whereas 13% of students felt there is no meaningful difference between smart board and black board teaching. 77% of students felt teaching from smart boards makes learning more enjoyable, 12% of students felt teaching from blackboards makes learning more enjoyable, 11% of students felt teaching using other methods makes learning more enjoyable.

From the above observation, it reflects that both male and female students feel that learning from smart bards is a faster way of learning compared to other means, however there is a slight increase in males compared to females in choosing smart board as a faster means of learning

whereas there is a slight increase in female in choosing black board and other means compared to males **(Fig 6)**. From the above observation, it reflects that both male and female students feel that learning from smart boards provides a more interesting experience in learning compared to other means, however there is a slight increase in males compared to females in choosing smart board more interesting way of learning whereas there is a slight increase in female in choosing black board and other means compared to males as a tool for a more interesting mode of learning. **(Fig 7)**.
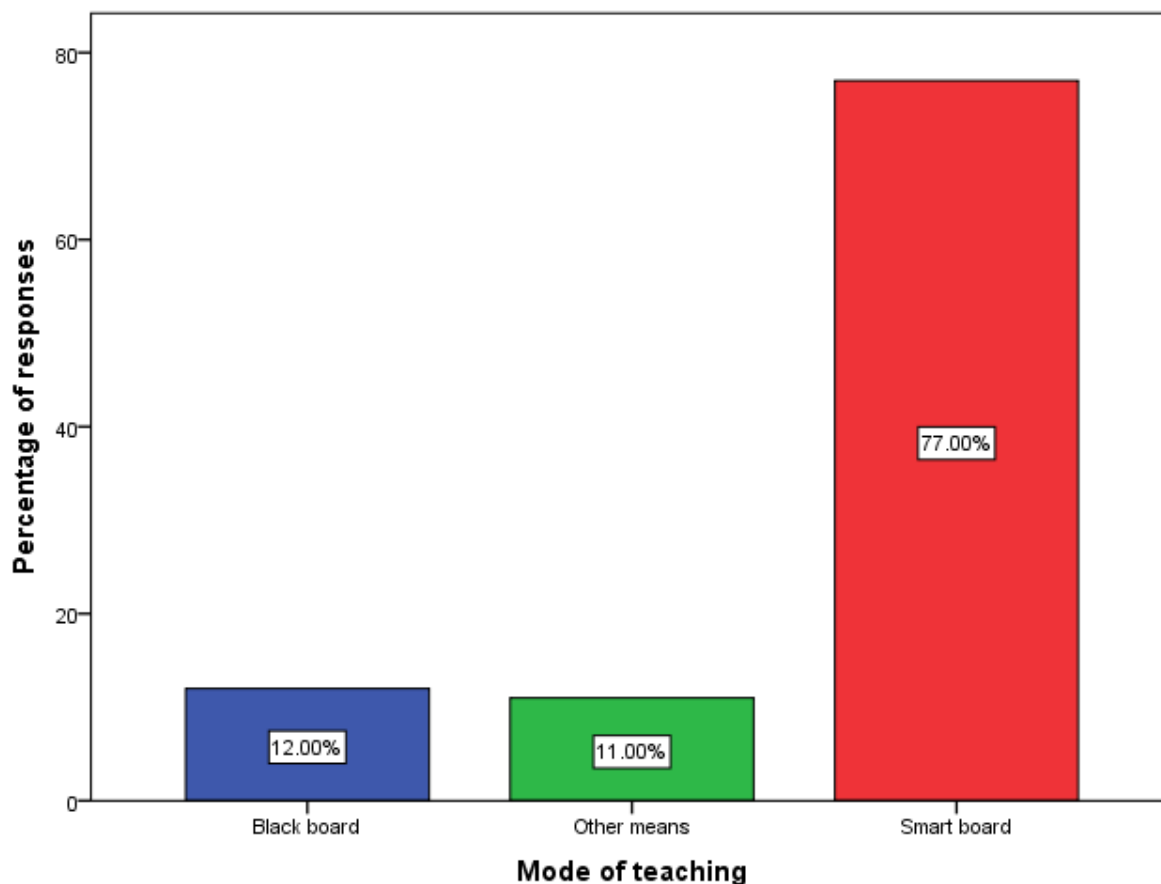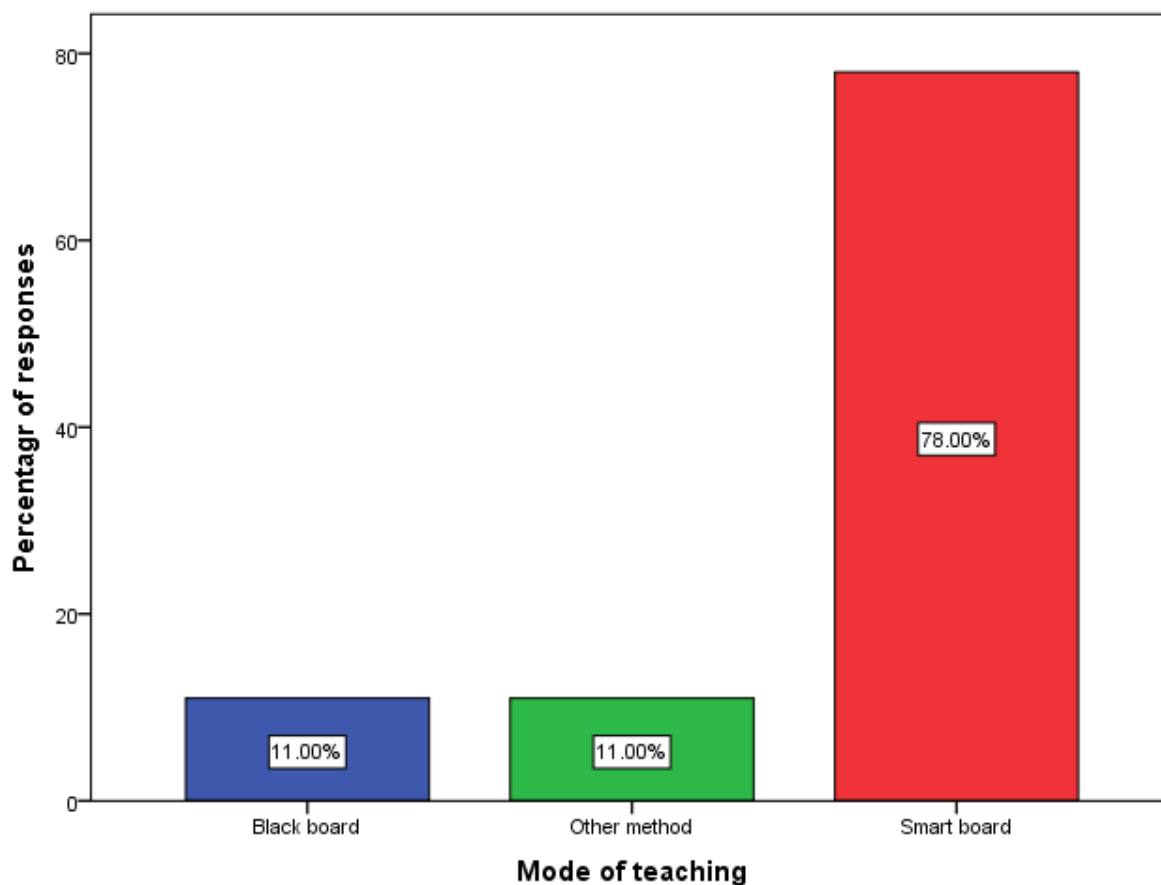

Fig 1 :- The bar graph represents the response of which method of teaching makes learning faster. The x-axis represents the method of teaching and the y-axis represents the Percentage of responses. Red colour denotes the response 'smart board', blue colour denotes the response 'Black board' and Green colour denotes the response 'Other methods'. 77% opted for 'smart board' and preferred it as a faster learning method. 12% opted for 'black board' as a means of faster learning. 11% opted for 'other methods' to be used for faster learning.
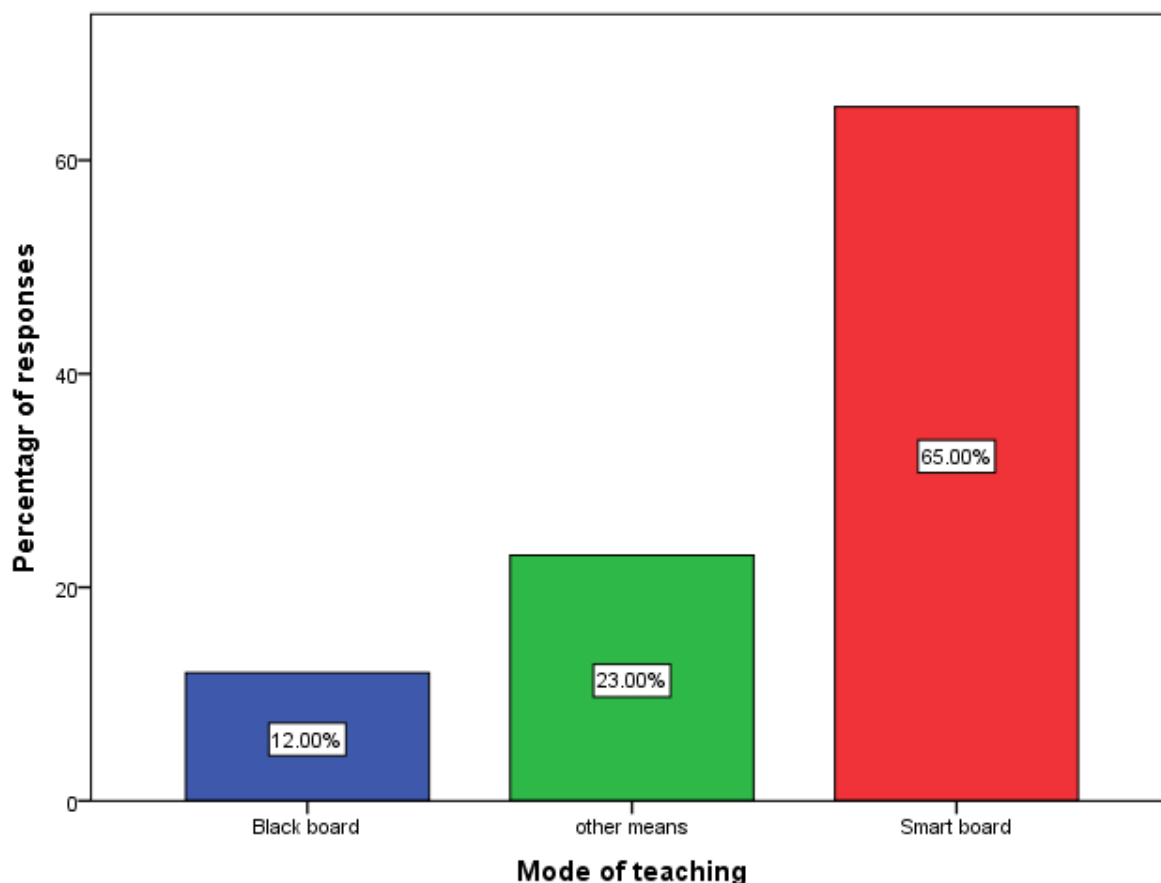
Fig 2 :- The bar graph represents the response to the question, 'which mode of teaching makes learning experience more interesting. The x-axis represents the mode of teaching and the y-axis represents the percentage of responses. Red colour denotes the response 'smart board', blue colour denotes the response 'Black board' and Green colour denotes the response 'Other methods'. 65% of the respondents have chosen a 'smart board' to be more interesting than other methods, 23% of the respondents have chosen 'other means' to be more interesting for learning and the remaining 12% have chosen 'black board' to be the most interesting way to carry out learning.
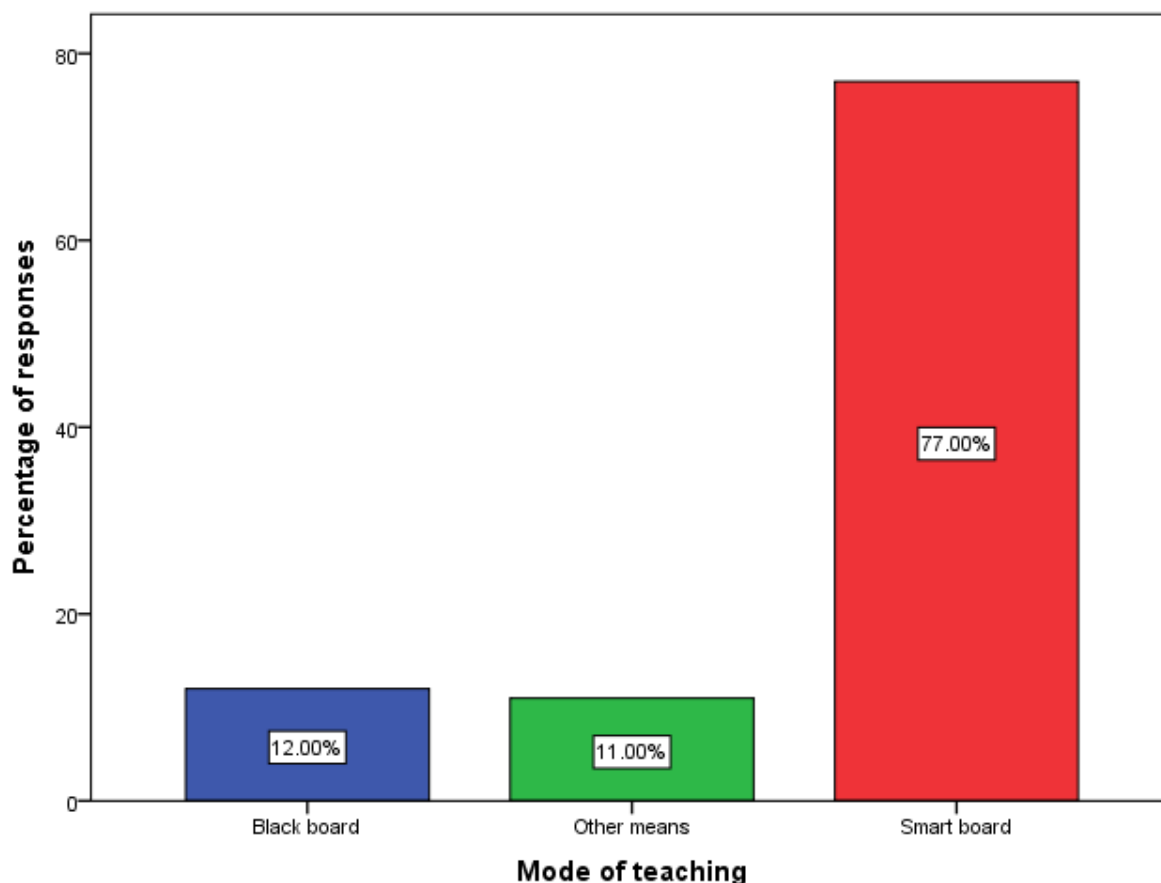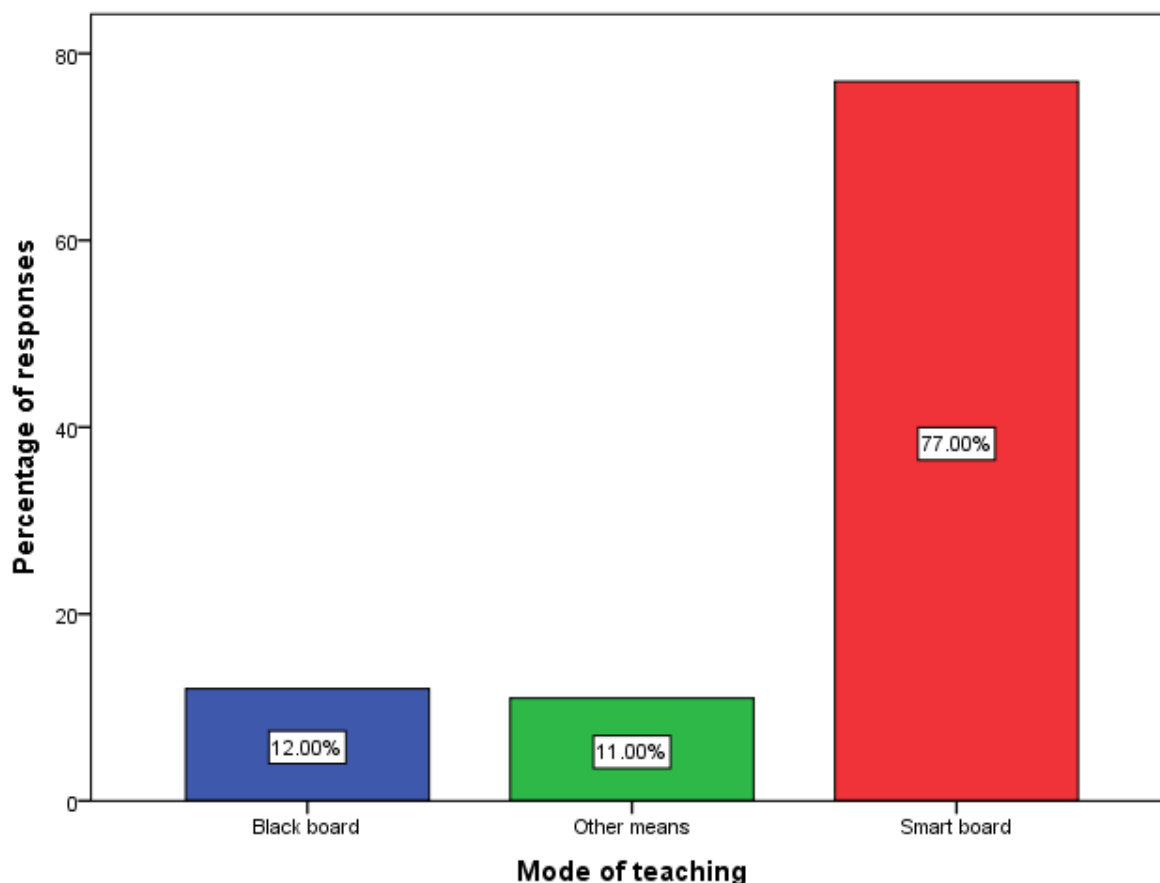
Fig 3 :- The bar graph represents the response to the question, 'which teaching method is preferred when conducting class activities like quiz'. The x-axis represents the method which is preferred for conducting class activities and the y-axis represents the percentage of responses. Red colour denotes the response 'smart board', blue colour denotes the response 'Black board' and Green colour denotes the response 'Other methods'. 77% of the students opted for a 'smart board' to be used while carrying our class activities, 12% opted for 'black board' to be used during class activities. 11% opted for 'other methods' for using during class activities.

Fig 4 :- The bar graph represents the response to the question, 'which method makes the best use of study time'. The x-axis represents the method that makes the best use of study time and the y-axis represents the percentage of responses. Red colour denotes the response 'smart board', blue colour denotes the response 'Black board' and Green colour denotes the response 'Other methods'. 78% of the students opted for 'smart board' and feel that it makes the best use of their study time. 11% feel 'black board' makes the best use of their study time and the remaining 11% opted for 'other methods' as a mode for making best use of their study time.
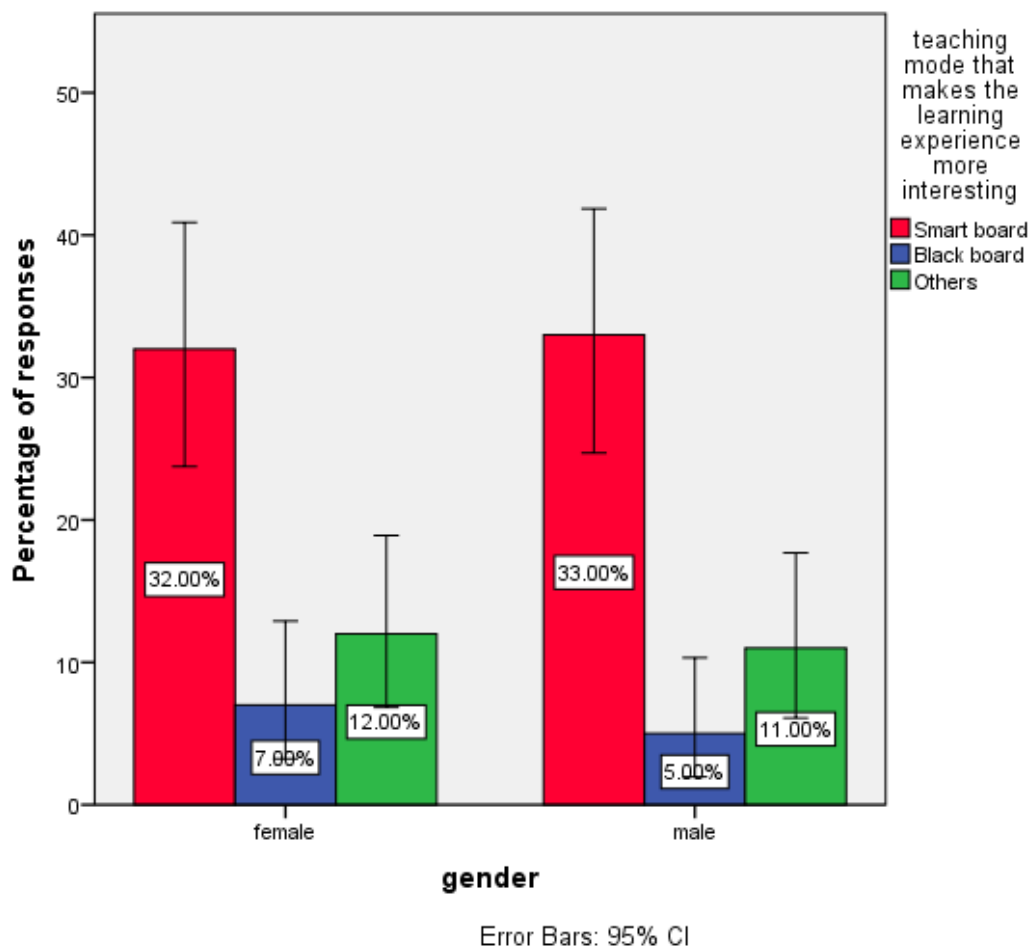
Fig 5 :- The bar graph represents the response to the question, 'which method of teaching improves the interaction between students and teachers'. The x-axis represents the method that improves the interaction between students and teachers and the y-axis represents the percentage of responses. Red colour denotes the response 'smart board', blue colour denotes the response 'Black board' and Green colour denotes the response 'Other methods'. 77% of the respondents responded with 'smart board' and feel it improves the interaction between students and teachers. 12% of the respondents responded with 'black board' and feel it improves the interaction between students and teachers. 11% of the respondents responded with 'other methods' and feel it improves the interaction between students and teachers.

Error Bars: 95% CI
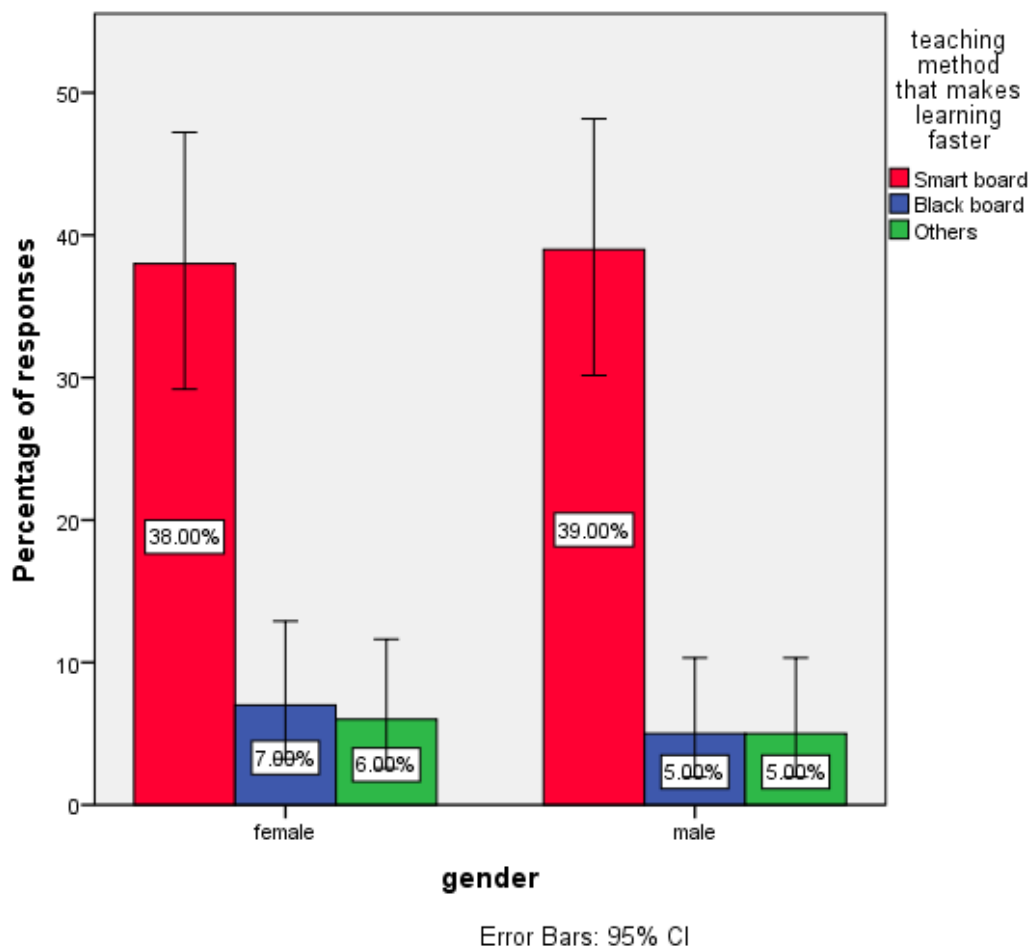
Fig 6 :- The bar graph shows the association between gender and their perceived teaching method that makes learning faster. The x-axis represents the gender of the participants and the y-axis represents the percentage of participants. The Red colour denotes 'smart board', blue colour denotes 'black board' and green colour denotes 'other methods'. 39% of males and 38% of females had preferred smart boards as the method of faster learning. 5% of males and 7% of females had chosen the blackboard method as the fastest learning method. Remaining 5% of males and 6% of females have preferred other methods for fast learning. The differences of opinion between the groups were insignificant (Chi square, p-value was 0.399).

Error Bars: 95% CI

Fig 7 :- The bar graph shows the association between gender and response to the question of teaching mode that makes the learning experience more interesting. The x-axis represents the gender of the participants and the y-axis represents the percentage of participants. Red colour denotes the response 'smart board', blue colour denotes the response 'Black board' and Green colour denotes the response 'Other methods'.32% of females and 33% of males preferred smartboard method as the best method for making learning experience interesting. 12% of females and 11% of males viewed blackboard teaching as an interesting method of learning. Whereas 7% of females and 5% of male had other methods in preference for creating interest in learning. The differences of opinions between the groups were insignificant (Chi square, p-value was 0.352).

DISCUSSION :-

From the above observation, it reflects that both male and female students feel that learning from smart boards provides a more interesting experience in learning compared to other means, however there is a slight increase in males compared to females in choosing smart board more interesting way of learning whereas there is a slight increase in female in choosing black board and other means compared to males as a tool for a more interesting mode of learning.(16)

From the recent ongoing situation, the global pandemic has taken a massive hit on all the sectors of the economy. Even though the times have been challenging for education systems around the world, it has been possible for tutoring students to adapt and carry out studies from home due to smart technology.(17) With difficulties and disruptions everywhere, several concerned authorities and bureaucrats support the need for reimagining and reinventing the education system. Hence, comes the smart classroom systems to continue the smooth functioning of education.(18)

The development of smart classroom systems by schools is transforming and replacing the traditional education system.(19) The sudden switch is not only limited to private schools but even government schools have begun to utilise a smart mode of teaching. Though the crisis is continuing and devastating , it is making our schools and colleges technologically advanced.(20) It is also obvious that students, teachers and professors have had to make major adjustments as learning has always been in classrooms offline. It is not only developing and moving forward but also altering the way education is provided in India.(21)

With the current pandemic, private schools had already gotten onto the e-learning, smart classrooms and some even making tabs or iPads mandatory for education. Now, considering the lock-down situation, one cannot imagine pursuing education without technology.(10) A key aspect of coping with Covid-19 is to ensure that the learning and education process to the future generation remains a continuous process virtually.Both smart boards and black boards are used in various colleges and schools. However this study helps us to figure out what the student's preference and which could be a better mode of teaching for students. This would enable schools and colleges to carry out necessary action for the benefit of students.(13)

From the questionnaire answered by 100 students, over 50% of the students have opted for smart board usage over blackboard. However, both black boards and smart boards come along with their own set of advantages and disadvantages. One of the advantages of using smart board technology is that users can record any application seamlessly onto these boards.(23) Users are also able to save speeches, their own voices and are able to listen to them again. In addition to attachment of video files which would play on all types of computers and can be created by users.(24) In a research conducted by Joy F Xin and his colleagues (25), it was observed that usage of smart boards have been highly beneficial and considered in educating students with special needs like Autism. On the other hand, this cross sectional study involved in determining the choice of

students who are able to select their preference between the modes of teaching. Which also happens to be smart boards as the preferred choice of learning for the majority of the participants.

The use of smart boards changes the disability of disabled children by potentially increasing their attention, motivation to improve their learning process and also helps them to engage in classroom activities, thus being a huge advantage for students with learning disability.(26) But the cost of establishment of black boards is much more affordable than smart boards. Also, the use of black boards depends upon the teacher's adaptation and use. Certain teachers like to stick to the traditional way of teaching using blackboards rather than adapting to the technology advancement. The use of smart boards requires some area of expertise in operating them to provide and impose some knowledge to the students.(27)

The study is advantageous in certain ways since it tends to provide us a view on student's preferred way of being taught in schools and colleges. The results obtained from this study can be used to shape the notion and decision making of school authorities regarding the mode of education that they are planning to provide their students. However, some of the drawbacks of the study can include the sample size of the study. Since the survey was conducted within a limited number of students, the results obtained cannot be generalised on a larger scale. The results can vary in different population sizes, different regions and can be found differently depending upon the exposure of students. The future scope of this study involves making education a better experience for the students and enabling them to be involved in the decision making in the mode of teaching in schools and colleges, since it will allow them to select their choice and make them better learners. Hence if the teachers are well trained and given the opportunities to familiarise with the upcoming technologies in the future associated with providing an easy and time consuming way of teaching and imbedding their knowledge to the students, it can prevent the teachers and students from facing any difficulties.(28)

CONCLUSION :-

From the research, it can be realised and concluded that students prefer smart boards over black boards for learning . However, both have their pros and cons. Smart board possess lot of power consumption and can be complex to use whilst black board consumes lot of time and cannot be incorporated with animation, images and audio-visuals. Teachers play an important role in generating knowledge to the students, therefore a teacher should be aware to deliver the correct information whether it is through a smart board or blackboard without misguiding the student. It is

also possible to generate better results from students if they are left to their own choice to select the mode of teaching since, this way teaching would be more efficient and approachable to them.

CONFLICT OF INTEREST :-

All the authors declare that there was no conflict of interest in the present study.

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