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CATALYSTS OF CHANGE: EXPLORING THE TRANSFORMATIVE IMPACT OF TECHNOLOGY AND VISUAL AIDS LIKE PROJECTORS ON MODERN EDUCATION

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ABSTRACT

This study investigates the effectiveness of utilizing technology and visual aids, such as images, animated videos, projectors, and films, as motivational tools to enhance students' attention during the reading of literary texts. Conducted in educational institutions within District Chakwal Teh Lawa, data collection was carried out through a test both public and private school students. Employing primary data collection methods, the study included all girls' high school students from Tehsil Lawa, with 8th-grade students from Muhammadan public girls' high school selected as the sample from the population. The students were divided into two groups, control and experimental, based on their pre-test scores, utilizing convenience sampling. The control group received traditional instruction through lecture methods, while the experimental group underwent conceptual learning using the technology like visual aids and projectors. Data collection involved pre-tests and post-tests, and the analysis utilized statistical measures such as mean, S.D and t test the study utilized SPSS software for data analysis, with findings presented through pie, and bar graphs. Results indicate a predominantly positive perception among teachers and students regarding the benefits of incorporating visual aids in the learning process.

Key Words: Visual aids, educational resources, teacher training, student perspectives

INTRODUCTION

Education was important for everyone, as it was crucial for leading a good life. In education, teaching and learning were key. Teachers used different methods to help students learn actively. Over time, new techniques had been introduced in education, and teachers employed various tools to make learning effective. Visual aids, like projectors, grabbed students' interest and made it easier for teachers to explain ideas. Visual aids were tools used in classrooms to help students learn better. Burton said visual aids, like projectors, were objects or images that kick started learning. Kinder and James mentioned visual aids were devices that made learning more real, accurate, and active.

Visual aids, such as projectors, helped make lessons clearer and easier to understand. They included things students could see, like models, charts, pictures, and maps. Blackboards and chalk were commonly used too. Sometimes textbooks alone weren't enough, so teachers used visual aids to make learning more interesting. These tools were important because they helped students learn better.

Many researches showed that people learned mostly through their sense of sight. Only a small percentage of learning came from taste, touch, smell, or hearing. People remembered things better when they saw and heard them together. For example, they remembered 10% of what they read, 20% of what they heard, and 30% of what

they saw. But when they saw and heard something together, they remembered 50% of it. When they said something while doing it, they remembered even more—up to 90%. This demonstrated that using visual aids, modern technology, and interactive methods in teaching had a significant impact on learning.

Visual aids are tools used in classrooms to enhance teaching and learning. They include devices like models, charts, projectors, and maps, among others. Singh (2005) defines them as. "Any device which by sight and sound increase the individual s' practice, outside that attained through read labeled as an audio visual aids". Visual aids make learning easier and more engaging by providing a tangible representation of concepts. (Rather, 2004). Visual aids are effective tool that "invest the past with an air of actuality." They stimulate both visual and auditory senses, making lessons more interactive and memorable. When teachers use visual aids, students are more likely to participate as they actively engage with the material presented**.**

Conceptual Framework:

A conceptual framework serves as a structured network or "plane" connecting various models. Through conceptual framework analysis, one can systematically construct conceptual frameworks using grounded theory methodology. The research's conceptual framework can be described as follows:

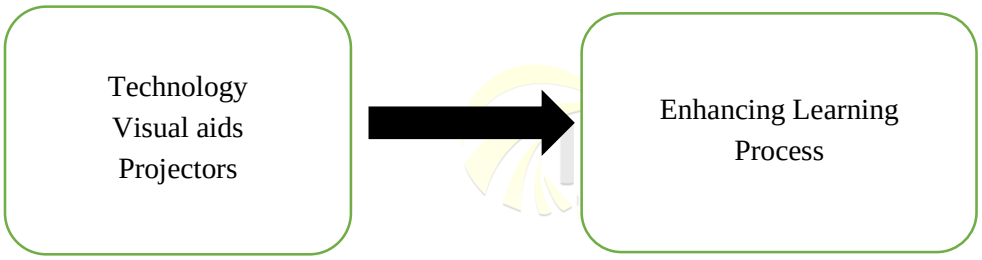


Figure-1 Conceptual framework of the research

In the conceptual framework, Technology include visual aids and projectors are depicted as the independent variable, while the enhancement of the learning process serves as the dependent variable.

Problem Statement of the Research:

This research focuses on the importance of visual aids in teaching. Visual aids, like pictures or diagrams, help make learning easier and more enjoyable. When teachers use these aids, students can understand lessons better because they can see and interact with the information. For example, when teachers use models or illustrations, students try to understand what they are seeing and how it works. They compare it to what they already know and learn new things. However, many teachers don't use enough visual aids in their teaching, which can make it harder for students to learn and affect their grades.

Limitation of the Research:

The researcher needs to finish the research quickly because of limited time and resources, so they focus only on Muhammadan public girls' high school Teh Lawa.

Research Questions:

This study aims to find out:

1: How does using visual aids affect students' learning compared to when they are not used?

2: Are there differences in opinions and use of visual aids between teachers and students in Teh Lawa Dist Chakwal?

Significance of study:

Our research shows that using visual aids, like projectors, in teaching has several important benefits. Visual aids help students remember concepts better, reducing the tendency to forget. When students are inspired by visual aids, they tend to study more effectively. Projectors display accurate images and provide examples that support conceptual thinking, leading to clearer understanding. Additionally, visual aids create an engaging learning environment that keeps students interested. Projectors also give teachers more time and help make learning more permanent.

Objectives of the Research:

The purpose of this study were:

1:to find out that projectors help students in their learning process.

2: to explore that students are more engaged in class after using technology and projectors.

Research Design:

This quantitative research study examined the average scores of Topic Tests within the envision Math series. The research employed a quantitative approach, utilizing statistical analysis to examine numerical data. The study employed a one-group pretest-posttest design, aiming to identify student challenges through the implementation of a new technique. Initially, a pre-test (T1) was administered prior to introducing the projector-based teaching method. Subsequently, students underwent three sessions of instruction over two weeks, facilitated by the projectors, with the goal of bolstering their comprehension of scientific concepts and enhancing their speaking abilities. Following the teaching sessions, a post-test (T2) was administered to assess any improvements in learning outcomes. Analysis of the test results, conducted using SPSS, was utilized to determine the efficacy of the projector-based approach in augmenting students' learning abilities.

Population and Sample:

The study focused on 8th-grade students from Muhammadan public girls high school during the 2024/2025 academic year in Teh Lawa was chosen due to reports from teachers indicating low student engagement and learning abilities in science concepts. To enhance their learning skills and engagement, the researcher assured students that science concepts are not as daunting as perceived. Each class, comprising 30 students, was chosen randomly from the population of 62, ensuring equal representation. The selection criteria included moderate proficiency in utilizing technology-based projectors.

Class 8th	Sample
Section A	30 (Experimental group)
Section B	30(control group)

Data Collection Methodology:

The researcher utilized pre- and post-tests to collect data, administering them both before and after the treatment.

Pre-test:

Before implementing the projector technique for teaching, a pre-test was conducted to evaluate students' learning skills regarding Matter concepts. During this assessment, students were prompted to articulate their understanding of Matter concepts orally. Evaluation of students' speaking abilities was carried out jointly by the researcher and the science teacher.

Post-test:

Following the instructional sessions utilizing the projector technique, a post-test was administered to gauge students' learning abilities. This assessment, conducted after the teaching sessions, aimed to discern any notable advancements in students' comprehension of science concepts compared to their pre-test

performance. The assessment method involved an oral test.

Instruments:

In this research, a test instrument was employed to gather information from participant. The use of language tests to evaluate the comprehension of scientific concepts by learners has received substantial backing in academic literature. In this particular study, individuals exposed to different teaching methodologies were subjected to the same test: the experimental group was taught using multimedia methods, while the control group received traditional instruction. Subsequently, the test outcomes of both groups were collected and analyzed to determine whether the implementation of projector-based methods had a beneficial impact on their science learning.

According to Brown (2004:3), a test serves as a means to evaluate an individual's knowledge, ability, or performance within a specific domain. In this study, the researcher utilized a test both before and after implementing the Projector Technique to evaluate students' comprehension of science concepts. The pretest assessed their understanding prior to the introduction of the technique, while the posttest measured their learning outcomes following the treatment.

Procedure of Collecting Data:

During the experimental process, a science subject was taught to two classes by the same teacher, using the same textbook, PTB. In the experimental group, multimedia courseware was employed extensively, comprising text, sound, graphics, pictures, photographs, animations, and video clips. Each media element served its unique purpose in conveying messages and eliciting learner responses. Conversely, the control group received traditional classroom instruction, relying mainly on teaching materials like textbooks, cards, and pictures, accompanied by verbal explanations and occasional use of tape recorders.

Both groups were tasked with delivering three-minute oral presentations before the class, with the experimental group using PowerPoint format. Subjects from both groups independently gathered, selected, and analyzed information to prepare for their presentations. The PowerPoint presentations created by the experimental group were enriched with captivating visuals such as photos, artwork, and at times, incorporated music and videos, enhancing the expressiveness and enjoyment of the presentations.

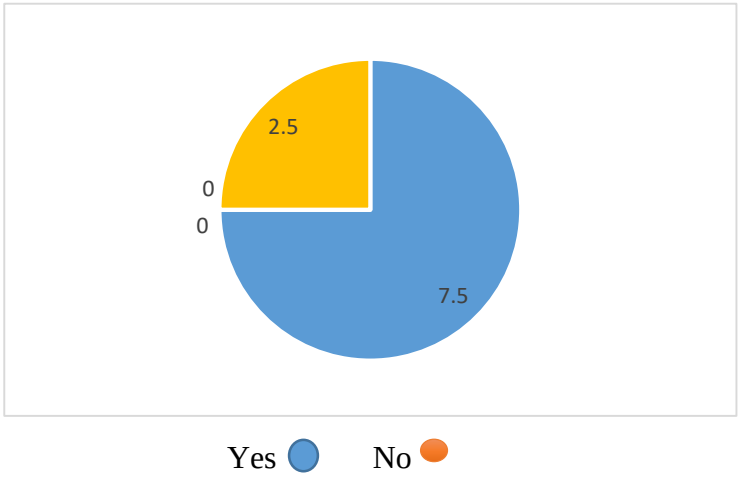
At the culmination of the experimental term, both groups underwent the same final examination to assess conceptual proficiency, learning aptitude, and responsiveness. Following the examination, the researcher meticulously collected the test papers for analysis.

Data Analysis:

The collected data is evaluated through the percentage distribution and is represented in the pie and line charts/graphs.

Motivation:

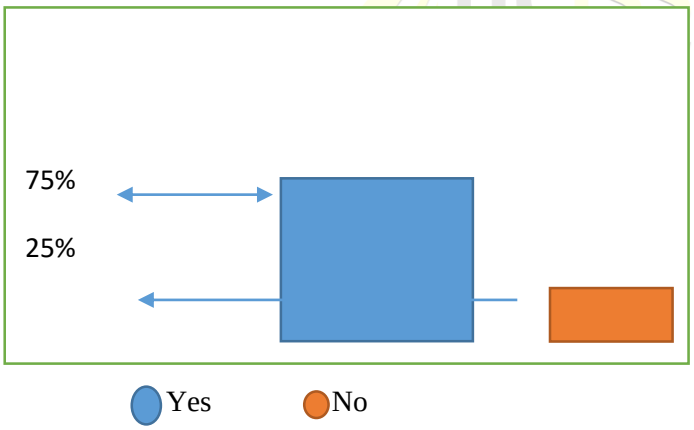
Visual aids and projectors helping in the motivation of teachers and students in Tehsil Lawa. The percentage distribution is given as:



According to the data analysis, 75% of students and teachers in schools, colleges, and Universities in Teh Lawa agree that visual aids enhance motivation. However, 2.5% of students and teachers hold a differing opinion on this matter.

Clarification:

According to the data analysis, 75% of both students and teachers are in agreement regarding the effectiveness of visual aids in clarifying research content. However, a quarter, or 25%, expressed disagreement with this statement. Below is a bar graph illustrating the percentage distribution.



Save the Time:

The visual aids help in the saving of teachers and students time in preparing of lessons.

Table No 1

The Significant Difference Between Pretest Scores of Students' Engagement, Understanding and Learning Ability in Experimental and Control.

Groups	Section	No of students	Mean	S.D	t	P value
Traditional Teaching	A	30	18.83	5.07	46.67	>0.00
Projector Method	B	30	21	4.93		

Df= 29 t at .05 = 2.045

The Control Class exhibited a more marginal improvement, with their average and S.D pre-test score of 18.83 and 21 rising only slightly to 5.07 and 4.93. The table above compares the mean pre-test scores of academic achievement between projector-based teaching and traditional teaching methods. The results indicate a insignificant difference between the mean pre-test score for projector-based teaching, which is 18.31, and the mean pre-test score for traditional teaching, which is 20. The t-value (t = -46.67) is higher than the p-value at the 0.05 significance level.

Table No 2

The Significant Difference Between Posttest Scores of Students' Engagement, Understanding and Learning Ability in Experimental and Control.

Group	Section	No of students	Pretest mean	S.D	t	P value
Traditional Method	A	30	19.7	15.5	5.53	0.00006
Projector Method	B	30	31.1	16		

Df= 29 t at .05 = 2.045

According to the data presented in the tables No 2 students in the Experimental Class showed significant improvement in their understanding skills The table above presents the average post-test scores for two different teaching methods: projector-based teaching and traditional teaching. The data indicates a significant difference in the mean post-test scores, with the projector-based teaching group scoring an average of 31.1, compared to the traditional teaching group's average of 19.7. The t-value of 5.53 exceeds the p-value at the 0.05 significance level, leading to the rejection of the null hypothesis (Ho). This indicates a significant difference between the two groups.

Table No 3

Significance of Difference between Mean Pretest and Posttest Scores for the Projector Teaching Group.

Groups	NO	Mean	S.D	t	P value
Pre Test	30	21	4.93	5.53	>0.00006
Post Test	30	31.1	16		

Df= 29 t at .05 = 2.045

The table above presents the mean pre-test and post-test academic achievement scores for the group that were taught projector method. The data indicates a significant improvement, with the mean pre-test score at 21 and the mean post-test score at 31.1 out of 30. This is supported by the paired sample t-value (t=5.53), which is higher than the p-value at the 0.05 significance level. This finding suggests that the group using projector-based teaching significantly increase in their academic achievement.

Table No 4

Significance of Difference between Mean Pretest and Posttest Scores for the Traditional Teaching Group.

Group	No	Mean	S.D	t	P value
Pre Test	30	18.83	5.07	2.13	>0.04
Post Test	30	19.7	15.5		

Df= 29 t at .05 = 2.045

The table above presents the pre-test and post-test academic achievement scores for the traditional teaching group. The results indicate a significant difference between the mean pre-test score (18.83) and the mean post-test score (19.7 out of 30). This significance is supported by the paired sample t-value (t=2.13), which is greater than the p-value at the 0.05 level.

Discussion:

The investigation assessed the importance of testing by employing Mean , S.D and t test other statistical methods to evaluate students' learning capabilities. The results of the Mean test indicated no significant disparity between the post-test scores of the experimental and control classes, suggesting comparable learning abilities in both groups.

Upon analyzing these findings in conjunction with existing research, the researcher concludes that integrating projectors is an effective approach to enhance science education. The study indicates that utilizing technology and projectors notably enhances learning outcomes among 8th-grade students at Muhammadan Public Girls High School. Fisher and colleagues (2014) examined the shift towards technology integration in classrooms and the evolving role of teachers. Rather than simply imparting knowledge, teachers now served as facilitators, guiding students through their learning process and actively participating alongside them. Students were encouraged to critically evaluate the content they encountered and to utilize technology for self-assessment. This transformative approach aimed to empower learners to not only consume information but also to create and contribute to it, thereby fostering a more active and engaged learning environment (p. 11). Visual aids encouraged bodily movement and might have enhanced control, as noted by Jain (2004). The renowned Chinese proverb "one sighted is worth a hundred words" underscored the power of visual learning. Indeed, our intellects absorbed knowledge effectively through visual stimuli. Another adage suggested that while hearing led to forgetting and seeing led to remembering, active participation led to true understanding (Agun et al; 1977). Examples of learning resources included visual aids, audio aids, real objects, and many others. Visual aids were designated materials that might have been locally made or commercially produced. They came in the form of, for illustration, wall charts, exemplified pictures, symbolic materials, and other two-dimensional items. There were also audiovisual aids. These were teaching machines like televisions, radios, and all kinds of projectors with sound attributes. Thus, integrating visual aids into the teaching-learning process fostered effectiveness, as emphasized by Kishore (2003), who highlighted their role in stimulating critical thinking. Mohanty (2001) similarly underscored the manifold benefits of visual aids in education. Visual aids afforded educators the opportunity to deliver more polished and consistent presentations, thereby enhancing their professionalism. The teaching profession offered boundless avenues to enrich students' academic experiences. While some educational concepts were readily grasped, others demanded creative strategies to ensure comprehension. Leveraging visual aids in teaching not only enriched lesson plans but also provided students with diverse avenues to engage with subject matter (Kunari, 2006). These aids served as tools to convey knowledge through auditory and visual stimuli, rendering information more tangible and facilitating active and immersive learning experiences.

Conclusion:

Here are the conclusions drawn from the research:

The study highlights that incorporating visual aids into teaching methods stimulates critical

thinking and enhances the learning atmosphere within classrooms.

Skillful utilization of visual aids helps break the monotony often associated with traditional learning settings.

Students' comprehension and engagement improve significantly when they encounter successful and enjoyable visual learning experiences in class.

Visual aid sessions are deemed valuable and pertinent by students when they directly align with course materials.

The research not only sheds light on students' perspectives regarding the use of visual aids but also underscores the importance of considering teachers' viewpoints, experiences, and successes and failures in utilizing visual aids effectively.

5.3: Recommendations:

Recommendations for Enhancing Visual Aid Utilization in Education

Teachers should prioritize seeking and considering student opinions on the effectiveness of visual aids in understanding concepts. Schools, colleges, and universities should facilitate platforms to gather and share student feedback on visual aids to enhance learning systems. Continuous professional development is crucial, with refresher courses, workshops, and conferences to equip teachers with improved skills in using visual aids for diverse student needs. Periodic training sessions should focus on recent advancements in teaching resources, particularly for high schools in Lawa . Collaboration with the Ministry of Education and external entities, such as NGOs and private sectors, can help update and supplement outdated educational materials. Establishing professional communities for teachers to regularly assess their teaching methods and leveraging instructional technology in alignment with school syllabuses is essential. High school teachers should be encouraged to explore modern teaching resources beyond textbooks, including audio-visual aids and computers, with government support. Emphasizing the importance of teachers as role models, fostering positive teacher-student relationships is key to a conducive learning environment. Exploring innovative technologies like virtual reality and augmented reality can enhance visual learning experiences. Research should be conducted to evaluate the impact of multimedia content on student engagement and learning outcomes. Additionally, mentorship programs can pair experienced teachers with newer educators to share best practices in effectively utilizing visual aids.

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