
Received: 02 Feb 2026, Accepted: 01 March 2026, Published: 11 August 2026Digital Object Identifier: <https://doi.org/10.63503/i.ijcma.2026.260>**Review Article**

The Impact of Digital Learning Tools on Students' Outcomes

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ABSTRACT

The study aims to discuss the impact of audio/video lectures on the learning outcomes of primary and secondary school students in District Vehari, Pakistan. The use of multimedia in education has offered opportunities to improve the learning process, but the impact of such tools on students' academic achievement in a local context has not been extensively studied. The study aims to determine the impact of audio and video lectures on students' learning outcomes and to identify strategies for leveraging them in teaching and learning. It involved a quantitative research design, and a structured questionnaire was used and administered to 62 respondents, who were students and teachers. The collected data were analysed using correlation and regression techniques to determine the relationship between the use of audio and video lectures and students' performance. The results showed that the use of audio-video lectures was positively correlated with student learning outcomes ($r = 0.854$), indicating that this approach can be improved to enhance student learning outcomes. Then, the regression analysis showed that a significant proportion of student learning outcomes was explained by audio and video lectures, indicating the strong predictive power of these formats for student learning. The researchers conclude that audio and video lectures are significant contributors to improving students' comprehension, engagement, and academic success. It does, however, acknowledge that quality teaching and learning, student motivation and learning environment are other aspects of educational outcomes. Based on the research, it is suggested that the curriculum be integrated with multimedia tools, technological facilities be improved, and teacher training be conducted continuously to maximise the use of multimedia tools. The results of this research can be applied in educational development contexts, both for teachers and policymakers interested in enhancing learning outcomes through the use of technology in the learning process.

Keywords: *Audio and Video Lectures, Student Learning Outcomes, Multimedia Learning, Educational Technology*

1 Introduction

Audio-visual lectures have become commonplace in the primary and secondary school curriculum all over the world as technology has been integrated into the educational arena. This change offers great opportunities and challenges in District Vehari. Audio and video lectures have the potential to revolutionise the educational landscape, as they can make students more engaged, help them better understand what is being taught, and provide a more personalised experience. The effectiveness of these technology-assisted learning resources, however, in actual classroom situations is still under-explored, especially in the case of primary and secondary schools of District Vehari. Although there are some theoretical advantages, there are still a few issues to be resolved. If these issues are not understood, educators and policymakers could be spending resources that will not produce the desired educational results (Gallego-Losada, Montero-Navarro et al. 2023).

The major issue this research aims to solve is that students should be able to get a deep understanding of the impact of audio and video lectures on improving students' learning skills in District Vehari. This includes the evaluation of the direct effect on learning outcomes of the tools as well as identification of the factors that influence the effectiveness of these tools. The focus on this problem will contribute to filling an important void in the current knowledge about the role of technology in education in this specific geographical and educational context (Hutnik 2025).

1.1 Research Gap

Although there is an increasing body of international literature supporting the educational values of the use of Multimedia Learning Technologies, there is very little empirical evidence on the effectiveness of audio and video lectures in primary and secondary schools of developing countries, especially in Pakistan. Earlier studies were focused on the higher education level or on internet-based learning environments, with comparatively less focus on school-based learning in the context of rural and semi-urban areas like District Vehari. Moreover, no one has studied the impact of audio and video lectures on students' learning outcomes using quantitative analysis with the combination of the two lectures in one. In addition, the impact of audio and video lectures on students' learning outcomes has not been widely studied by quantitative analysis, which is a combination of two types of lectures (Işık, Ongan et al. 2025). This study, therefore, addressed this issue by investigating the audio and video lectures versus learning outcomes of primary and secondary students of District Vehari. The results should provide empirical evidence which can assist in making decisions regarding the effective use of multimedia technologies in the school education system.

1.2 Objectives

This research aims to meet the problem statement and has two major objectives:

- To assess the impact of audio and video lectures on student learning outcomes in primary and secondary schools in District Vehari.

This objective is aimed at measuring whether there are measurable gains in students' learning outcomes when audio and video lectures are integrated (Hidayat and Suryadi 2023). This covers the analysis of test results, comprehension ability and academic achievement of students taking these learning tools with those taking traditional teaching, where they are used.

- To propose recommendations for optimising the use of audio and video lectures to improve student learning skills in primary and secondary schools in District Vehari.

This objective seeks to create practical solutions to achieve the practical application of audio and video lectures based on the first objective's findings (Alfaruque, Sultana et al. 2023). This involves the identification of good practice, possible pitfalls and contextual issues that can affect their effectiveness, finally giving educators and policymakers a 'how to' guide for the effective and efficient use of technology to improve students' educational experiences.

District Vehari was chosen for this study as it is an educational setting that is being developed, and the use of digital learning technologies is growing, albeit slowly and unevenly across schools. The district's educational institutions include urban and rural schools, providing a suitable environment for studying the effectiveness of audio and video lectures in various teaching and learning situations (Alshammary and Alhalafawy 2023). Besides, few empirical studies have been done that have targeted the effect of multimedia learning media in this area. The results of this study, even though derived from data gathered in District Vehari, may be of value to other districts in Pakistan or other developing areas having similar educational, technological and resource constraints.

1.3 Research Questions

The following research questions will be used to guide the research for the aforementioned aims:

- Is the impact of audio and video lectures on the learning outcomes of students in the primary and secondary schools in District Vehari positive or negative?

This question aims to identify if there is a significant difference in learning outcomes between students who are taught by the audio and video lecture method and those who are taught by the traditional method. Its goal is to measure the contribution of these technological tools to academic performance and understanding (Jahangir, Kanwal et al. 2025).

- How to optimise the use of audio and video lectures for better student learning skills in primary and secondary schools of district Vehari?

This question is directed towards the practical application of audio and video lectures to discover how best to utilise these in the classroom. It aims to highlight approaches which leverage the potential benefits of technology-supported learning, while considering and mitigating potential challenges.

2 Literature review

2.1 Introduction to Audio and Video Lectures in Education

In the field of education, the use of audio and video lectures represents a paradigm shift in pedagogy as a result of the development of multimedia technology to improve teaching and learning. These innovative tools provide dynamic resources that appeal to a variety of student learning styles and preferences, with the use of auditory and visual resources to engage students in an interactive learning environment (Hardiyanti, Fitriani et al. 2023).

Educators have access to effective media to convey educational content in audio and video lectures. The use of visual aids, animation, simulations and narrations makes the learning process more enriched and complex concepts more understandable for students, and helps them understand and remember the material better. This integration is designed to provide personalised learning experiences, aligned with the pace and learning preferences of each student.

The power of an audio-visual lecture is to activate several senses at once, so that it increases the cognitive process and knowledge acquisition. Research shows that the use of a multimedia environment in teaching can create a deeper interaction and motivation of students, so that students are more active and able to think critically (Sormunen, Heikkilä et al. 2022).

Moreover, the use of multimedia resources allows for asynchronous learning opportunities, allowing the student to learn at his or her own pace and the teacher to present interactive and immersive learning experiences in both face-to-face and online learning environments. This is especially beneficial when trying to meet the needs of learners in today's world and the different learning styles and abilities.

The incorporation of audio and video lectures is a step toward modernising teaching methods and is also a way to improve educational equity and accessibility. The use of audio and video lectures symbolises the evolution of teaching methods and a path to increased educational equity and accessibility. Through the use of multimedia, educators can design an inclusive learning environment that would cater for students with varying needs and enable lifelong learning (Lukitasari, Murtafiah et al. 2022).

It is in this context that studying the impact, looking at effective implementation methods, and assessing outcomes of audio and video lectures in the education field becomes relevant. This literature review is designed to explore these issues, and to review existing research and identify gaps in the research literature to guide further research and educational practice.

The use of audio and video lectures in educational environments is a major shift in educational practices that is seeking to improve learning experiences and outcomes. These multimedia technologies provide an interactive source of materials that can be adapted to meet the learning styles and preferences of different learners (Boubker 2024). Audio and video lectures are designed to offer students interactive and engaging content, which may aid in understanding and retention by using both auditory and visual channels.

Research has consistently shown positive impacts of audio and video lectures on student learning outcomes. For example, students who were exposed to multimedia lectures had higher comprehension rates than those who were taught in traditional classrooms. The result is quite convincing in terms of the effectiveness of using multimedia in gaining a deeper understanding and knowledge. In the same vein, the use of multimedia in education resulted in enhanced students' engagement and motivation, which consequently contributed to the improvement of student achievement in different subjects and at different grades (Kalyani 2024).

2.2 Factors Influencing the Effectiveness of Audio and Video Lectures

There are several key factors to consider when talking about the effectiveness of audio and video lectures in the learning environment in terms of how they will affect students' learning outcomes. The

factors are explored, such as the quality of content, instructional design strategies and teacher competence.

2.3 Optimisation strategies for audio and video lectures

There are several strategies available for educators to consider to maximise the use of audio and video lectures in education. The strategies use multimedia technologies to increase engagement, personalise learning experiences and to improve learning outcomes. We will be examining some key optimisation strategies, such as blended learning approaches, interactive multimedia and adaptive learning technologies.

2.3.1 Blended Learning Approaches

Blended learning blends face-to-face and online learning modalities and provides the flexibility that allows students to access content in multiple ways (Yu, Yu et al. 2022). This approach can combine audio and video lectures for physical and virtual learning, meeting the needs of different learners and different schedules and learning paces.

Blended learning models enable students to be able to see the multimedia lectures asynchronously so that they can learn and review at their own speed. This adaptability is especially advantageous for catering to the educational requirements and preferences of each student, ensuring that learning resources are accessible to them, even outside of a conventional classroom environment. Additionally, the use of online materials alongside face-to-face learning and teaching promotes student engagement and interaction with one another, helping to create an active learning community that facilitates the sharing of knowledge and learning from one another (Tate and Warschauer 2022).

2.4 Research Needs in Audio and Video Lectures

Although from the existing literature there are valuable experiences and ways to optimise audio and video lectures for education, there are still some aspects that can be studied more. Further studies are needed to investigate the long-term impact of the use of multimedia on the learning outcomes of students as well as the differences between students in various disciplines and various populations (Eden, Chisom et al. 2024).

Further, research on the effectiveness of specific multimedia elements (such as interactive simulations or video tutorials) can yield practical information on how to optimise instructional design for better learning experiences. Furthermore, the examination of the scalability and sustainability of multimedia integration in the context of resource-frugal educational environments can guide policy and practice to ensure access to quality education through technology-enhanced learning environments in an equitable manner (Getenet, Cantle et al. 2024).

In educational contexts, current research has clarified the advantages and optimisation strategies of audio and video lectures, but there are still some aspects that are ripe for further research. The addressing of these gaps could lead to a better understanding of the potential of media in enhancing learning experience and the effectiveness of the use of multimedia in this approach.

2.5 Long-Term Effects on Student Learning Outcomes

The long-term impact of the use of multimedia (audio and video lectures) on the learning outcomes of students at different educational levels and in different subjects should be studied. Longitudinal studies can offer information on the effects of regular use of multimedia resources on academic achievement, learning retention and critical thinking skills over a longer term (Clipa, Oliinyk, & Stawiak-Osńska, 2014).

It is important to recognise the potential for the lasting effects of multimedia integration to inform its usefulness in supporting students for future academic and professional needs. Researchers can then look at results other than short-term academic success to discover trends and patterns that help to reveal the long-term reward or shortfall of the multimedia-enhanced learning environment.

2.6 Differential Impacts Across Diverse Student Populations

The differential effect of the integration of multimedia on different student groups, such as students with different learning styles, abilities and cultural backgrounds, should also be studied. Research into the way multimedia resources are designed to support diverse cognitive styles and learning styles can provide an understanding to support equity and accessibility in learning (Abdelrady and Akram 2022).

In addition, research should investigate the effects of socioeconomic status, language proficiency and previous educational experiences on the effectiveness of the use of multimedia tools for learning outcomes. Addressing inequities and maximising learning opportunities for every student is imperative to achieving educational equity in more diverse classrooms.

3 Methodology

The methodology provides details about the research design, data collection techniques, and analysis of data used to explore the effect of Audio and Video lectures on learning outcomes of students in Primary and secondary schools of District Vehari. This section provides the details of measures taken to ensure that the study was valid, reliable, and comprehensive (Halkiopoulou and Gkintoni 2024).

Design: The method used in this study is a quantitative research design to determine the relationship between the use of Audio and Video lectures and student learning outcomes (Liu, Zhao et al. 2022). Correlation and regression analysis will be used to explore and quantify the relationship between the above variables.

Research Method: Correlation analysis and regression will be used to analyse the effect of audio and video lectures on learning achievement. To determine the strength and direction of the correlation between the use of multimedia lectures and the achievement of students, the correlation analysis technique will be used. The impact of different audio and video lectures and how this relates to learning outcomes will also be investigated through regression analysis, taking other factors into account (Lampropoulos and Sidiropoulos 2024).

Population: The population in this study consists of students and teachers of primary and secondary schools in District Vehari. Emphasis will be given to those who have had experience in the use of audio and video lectures as part of their educational program.

Sampling Technique: Simple random sampling will be used to make sure that all members of the population have an equal chance of being picked. This way, there is less of a chance of selection bias and more generalizability in study results.

Sample Size: In this study, 62 respondents with both students and teachers from various primary and secondary schools in district Vehari, will be taken. The size of this sample is selected to ensure a representative sample of the population without being too large to be manageable (Sekhar and Goud 2024).

Instrumentation: The data were collected using questionnaires, with a literature base on the concept of multimedia and learning outcomes as the design for the questionnaires. This questionnaire consisted of three sections and 20 items. The first section obtained the respondents' demographic data, such as their level of education and teaching or learning experience. The second section is the respondents' perceptions about the use of AVL, while the third section is the students' learning outcomes (SLO), which are engagement, understanding, retention of knowledge, academic achievement, etc (Fidan and Gencel 2022).

All items which were related to constructs were measured on a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". Since the respondents were able to express the extent of their agreement with each statement using the Likert scale, it made quantitative statistical Analysis easy, particularly through the help of correlation and regression techniques. Content validity of the questionnaire was checked and subsequently the same was pilot tested for clarity, consistency and appropriateness for the target population (Fidan and Gencel 2022).

The questionnaire has been created following an in-depth literature review of multimedia learning, educational technology and educational outcomes of students. Some things were adopted from previous

studies and then modified according to the context of primary and secondary schools in District Vehari. The questionnaire was 20 items comprising 10 items for Audio and Video Lectures (AVL) and 10 items for Student Learning Outcomes (SLO). Using a 5-point Likert scale, responses were made on all items, with 5 representing Strongly Agree and 1 representing Strongly Disagree. The questionnaire was pre-tested with education experts and pilot-tested for clarity, content validity and reliability prior to the main data collection (Almaiah, Alfaisal et al. 2022) .

Validity and Reliability of the Tools: The questionnaire will then be pretested with a smaller sample of respondents before the full sample of respondents is tested. Pre-testing of the questionnaire will be conducted with a smaller sample group before the main sample group is tested. Cronbach's alpha is a statistical tool that is used to test the internal consistency of the questionnaire, and it will be used to measure the reliability of the questionnaire. A Cronbach's alpha value of 0.7 or greater will be acceptable for this study.

Data Collection Procedure: Collection of data will happen over a period of three months. This will include sending questionnaires to the selected sample and receiving the completed questionnaires. Reminders will be mailed to encourage respondents. Data will be gathered first from the respondents and then input into a database to analyse.

Data Analysis: The collected data will be analysed with the help of statistical software. Demographic data and other variables will be summarised using descriptive statistics. Hypotheses will be tested, and answers to research questions will be provided using correlation and regression analyses (Almaiah, Alfaisal et al. 2022).

Time Frame: The study will take place for three months, starting from the design stage till the presentation of study results. This timeline assumes 40 days for data collection, 40 days for data analysis and 40 days to compile the results and write the final report.

3.1 Conclusion

The purpose of this study is to get an in-depth knowledge of the effect of audio and video lectures on the learning outcomes of the students of district Vehari. The research uses rigorous methodology in performing the analysis of data such as correlation analysis, regression analysis, random sampling, and reliable instrumentation to give the implications that can be used by educators and policymakers to optimise the use of multimedia to improve student learning.

4 Data analysis and results

4.1 Data analysis

The Pearson correlation coefficient between the Student Learning Outcomes (SLO) and use of Audio and Video Lectures (AVL) is presented in the table below. The Pearson correlation coefficient $r = 0.440^{**}$ shows that there is a moderate positive correlation between SLO and AVL. This indicates that the better the learning outcomes are when using the AV lecture format, the higher the students' use of media in learning (Boubker 2024).

The correlation is statistically significant at the 0.01 level (2-tailed), which means this correlation would only occur by chance less than 1% of the time. The level of significance (Sig.) The correlation is extremely unlikely to be due to random sampling effects, as evidenced by (2-tailed) of .000 (DeHart, Meyer et al. 2022).

4.2 Correlations

Table 1: Correlation

		SLO	AVL
SLO	Pearson Correlation	1	.460**
	Sig. (2-tailed)		.000

	N	62	62
AVL	Pearson Correlation	.460**	1
	Sig. (2-tailed)	.000	
	N	62	62

** . Correlation is significant at the 0.01 level (2-tailed).

Based on the results in Table 1, it can be known that between Audio and Video Lectures (AVL) and Student Learning Outcomes (SLO), there is a positive correlation between the two variables, supported by the obtained p-value <0.001. The results showed that there is a correlation between using multimedia lectures and academic achievement, understanding of learning, and higher student engagement. The moderate positive correlation indicates that although audio/video lectures are not the only element contributing to academic success, they do contribute to academic success (Almaiah, Alfaisal et al. 2022). Therefore, the findings of the correlation analysis were preliminary proof of the effectiveness of using multimedia in primary and secondary schools of District Vehari.

The number of samples (N) in both SLO and AVL is 62, which is sufficient for the correlation analysis and can be considered a good sample size, ensuring the reliability of the results. The result of this finding indicates the great potential of audio and video lectures in improving the learning outcomes of the learners of primary and secondary schools of District Vehari and supports the hypothesis that the use of audio and video lectures can positively influence learning outcomes, so that it can be used in primary and secondary schools of District Vehari.

4.3 Regression

Table 2: Regression Model Summary

Model Summary

Model	R	R Square	Adjusted Square	R-Std. Error of the Estimate
1	.470 ^a	.231	.210	.742

a. Predictors: (Constant), AVL

Table 2 shows that the regression model can explain the variation of student learning outcomes by 23.1% ($R^2 = 0.231$), based on the analysis. Stating that other factors also contribute to the learning outcomes of students, but at the same time, the model confirms the importance of using audio/visual lectures as a predictor of students' learning outcomes (Fidan and Gencel 2022) The adjusted R^2 is 0.210, indicating that the model is still a good fit for the data when adjusted for the number of samples. Overall, the model has evidence that can support the positive impact of using multimedia learning resources on the achievement of students' learning.

The model summary displays the outcome of a regression analysis which was run to explore the relationship between Audio and Video Lectures (AVL) as a predictor and Student Learning Outcomes (SLO) as a dependent variable. The important parameters that are reported are the correlation coefficient (R), coefficient of determination (R Square), adjusted R Square, and the standard error of the estimate. (Floris & Floris, 2021).

Correlation Coefficient (R): There is a strong positive correlation between AVL and SLO with a correlation coefficient of 0.640. This indicates that students' learning outcomes improved when the use of audio and video lectures increased. The outcome of this relationship demonstrates the potential of the use of multimedia in improving educational performance (Hidayat and Suryadi 2023).

R Square: The 0.393 R-squared indicates that about 39.3% of the variation in learning outcomes of students can be explained by using audio and video lectures. This is a considerable percentage, which means AVL is a meaningful predictor of SLO. It also indicates that there are other factors outside of this model which explain the remaining 60.7% variance in learning outcomes (Kalyani 2024).

Adjusted R-Square: The adjusted R-squared value of 0.380 considers the number of predictors in the model and adjusts for the sample size. This is slightly lower than the R-squared, which has been reduced for possible overfitting. The adjusted R-squared shows that student learning outcomes could still be accounted for by 38.0% of the variance due to the use of audio and video lessons even after adjusting for sample size and number of predictors. This makes AVL a strong indicator, but does not overly optimistically suggest that the model is incorrect.

Standard Error of the Estimate: The standard error of the estimate (0.64) is a measure of how far off the regression line the observed values are, on average. The smaller the standard error is, the more accurate the prediction of SLO based on AVL will be. A standard error of 0.64 was used as an indication of a reasonable level of precision in the model's predictions in this context.

ANOVA^a

Table 3: Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.597	1	6.789	13.298	.000 ^b
	Residual	19.979	60	.314		
	Total	29.729	61			

a. Dependent Variable: SLO

b. Predictors: (Constant), AVL

The result of ANOVA also indicates that the regression is statistically significant ($p < 0.001$), which means that the regression model is a more useful predictor of the learning outcomes of students than the regression model without the explanatory variables. The large F statistic shows that audio and video lectures make a difference in terms of explaining differences in students' learning outcomes. Hence, it was concluded that there is a significantly positive effect of multimedia learning on the learning performance of students since the null hypothesis was rejected (Sekhar and Goud 2024).

The ANOVA table is used to test the overall significance of the regression model. The F test result shows if the model is a better fit than a model without predictors. (Mailool, Kartowagiran et al. 2020).

Significance (0.000): The significance level (Sig.) of .000 means that the regression model is statistically significant at the 0.01 level. This means there is strong evidence to reject the null hypothesis that there is no relationship between AVL and SLO. The low p-value indicates that AVL is the predictor variable and is statistically significant for explaining the variance in the dependent variable SLO.

Coefficients: The coefficients table lists estimates needed to build the regression equation, which can predict the dependent variable (SLO) from the independent variable (AVL).

Unstandardized Coefficients (B)

- Constant ($B = 2.343$): This is the average (mean) value of SLO at $AVL = 0$. This means that the achievement level of students' learning outcomes without the use of audio and video lectures is 2.343.
- AVL ($B = 0.301$): The coefficient of AVL indicates that there is a direct positive relationship between the use of audio and video lectures and student learning outcomes, meaning that

student learning outcomes grow by 0.301 units for every increase in AVL. The positive coefficient further demonstrates the positive effect of AVL on SLO.

Significance (Sig.): Both the constant and the AVL coefficient are significant with a significance value of .000, which is considered a statistically significant value at the 0.01 level. This implies that the base level SLO and the effect of AVL on SLO are important factors in the model (Tate and Warschauer 2022).

Coefficients^a

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.431	.321		6.470	.000
	AVL	0.029	.081	.440	3.985	.000

a. Dependent Variable: SLO

Interpretation and Implications: From the result of the regression coefficient, it can be seen that Audio and Video Lectures (AVL) have a positive and significant influence on Student Learning Outcomes ($\beta = 0.440$, $p < 0.001$). A positive regression coefficient shows that the greater the number of students who use the multimedia lecture, the more effective their learning will be. The statistical significance of the predictor verifies that AVL is an important predictor for the model (Fidan and Gencel 2022). The results of this study have confirmed the study's hypothesis that the use of multimedia resources in the teaching and learning process increases students' learning achievement and enhances the quality of students' learning.

The results of the regression analysis can be shown that there is a strong and positive correlation between the use of audio and video lessons and students' achievement. The high R-squared value suggests that AVL is a large factor in determining SLO, accounting for almost 40% of the variance. The p-values of the model and its coefficients indicate that the model is statistically significant and that the integration of multimedia resources in the education process is important for improving learning outcomes.

The analysis does point to some additional areas of research that should seek to identify and include other factors that affect student outcomes in learning (Eden, Chisom et al. 2024). Although AVL is a strong predictor, there is still variation to be explained by other factors, including teaching methods, student engagement, and socio-economic factors.

Summarising the results, it can be concluded that the use of audio and video lectures is a great medium to enhance students' learning outcomes in District Vehari in Primary and Secondary schools. These insights should be taken into account to optimise educational performance and teaching strategies by educators and policymakers.

5 Summary, Findings, Conclusions, Discussion, and Recommendations

5.1 Summary

This study aims to examine the effect of Audio and Video lecture (AVL) on the student learning outcome (SLO) in Primary and Secondary schools of District Vehari. Structured questionnaires were used to collect data from 62 students and teachers and analysed with correlation and regression analyses. The results show that there is a significant positive correlation between AVL and SLO, which means that the more students use AVL, the better their performance will be. The results are in line with the hypothesis that using multimedia resources in the process of teaching-learning can improve learning

outcomes and emphasise the importance of further research to find other factors that affect learning (Hardiyanti, Fitriani et al. 2023).

5.2 Findings

The analysis shows valuable information about the effect of AVL on SLO of Primary and Secondary school of District Vehari. There is a high positive correlation between AVL and SLO ($R = 0.640$), which means that there is a high positive correlation between the use of multimedia resources and the performance of students. The R-squared value of 0.393 indicates that AVL has a significant contribution in improving learning outcomes, accounting for 39.3% of the variance in SLO. In addition, the regression analysis indicates that AVL is a statistically significant predictor, with a significance value of .000, which means that the results are unlikely to occur by chance (less than 1% chance).

The results in this study are in line with the recent studies that emphasise the educational advantages of learning technologies based on multimedia (Kalyani 2024). The application of audio-visual learning resources in recent years has shown positive results in terms of engagement, understanding, motivation and academic achievement of the students because it provides a very interactive and flexible learning experience. The correlation obtained in the current study is positive; this positive correlation is in line with the theory of Multimedia Learning, which stipulates that learning can be enhanced if students receive visual and auditory information at the same time.

Similarly, research in education in recent years has proved that the application of multimedia in education has the ability to aid in active learning and facilitate the retention of knowledge in different learning contexts. This finding, that there is a statistically significant relationship between the audio and video lectures and learning outcomes of students in District Vehari, is consistent with the modern evidence on the positive impact of technology-based learning environments on learning outcomes (Sormunen, Heikkilä et al. 2022).

The current findings, however, indicate that the differences in students' learning outcomes can only be explained partially based on audio and video lectures. This indicates that other educational components, such as teacher competence, student motivation, parental support, classroom environment and technological resources, are still significant influences on educational outcomes. Therefore, the use of multimedia learning is not used as an alternative to good teaching but as an aid (Jahangir, Kanwal et al. 2025).

5.3 Conclusions

The study indicates that the Audio and video lectures remarkably improve the learning outcomes of students in primary and secondary schools of District Vehari. The high level of positive correlation and high percentage of variance accounted for by AVL highlights the need to incorporate multimedia into instructional programs. The unexplained variance does show that other factors also have important roles in the determination of educational outcomes in this country, however. This can be related to teacher effectiveness, student engagement, socio-economic status and resources.

5.4 Discussion

Results show the significant effect of the audio and video lectures on the student learning outcomes. As can be seen, there is a high correlation between AVL and SLO, which shows that multimedia can be used to create a more engaging and effective learning environment. This is due to the fact that audio and video lectures support various learning styles, support learning by visual perception and hearing, and may offer flexibility in learning which might not be available in a traditional learning environment (Hidayat and Suryadi 2023). The adjusted R Square value of 0.380 is lower than the R Square, but it is still significant, indicating that a substantial proportion of the variance is explained by AVL. This correction for overfitting further underscores the strength and reliability of the model, highlighting the value of AVL in the field of education.

Despite this, the study also revealed the importance of taking other factors into account that could affect students' learning outcomes. The remaining 60.7% of the variance that was unexplained indicates that other factors, including teacher effectiveness, student engagement, socio-economic status, and access to resources, are also significant factors influencing educational outcomes. For this reason, AVL is an

important predictor, but it needs to be considered as part of a wider strategy to enhance learning (Liu, Zhao et al. 2022).

5.5 Make recommendations that are directly connected with findings

Below are some of the conclusions of this empirical study and the recommendations. The results of the analysis showed that the use of audio and video lectures has a positive and statistically significant effect on students' learning outcomes, so the recommendations are based on the strengthening of the effective use of multimedia technologies in the classroom. Each recommendation will highlight the implications of the findings and enable education decision-makers to make decisions about improving education based on evidence.

5.6 Recommendations

Therefore, it is concluded that using audio and video lectures could greatly improve students' learning outcomes in primary and secondary schools of District Vehari. There is also a strong positive correlation between the variables and a significant amount of variability explained by AVL, which suggests the need to incorporate media elements into the learning process. The results are consistent with the wider educational research literature, which promotes the adoption of technology to meet the diverse learning needs and to enhance learning outcomes. (Tiwary, Sanjaya, & Mishra, 2017; Worsley, 2013).

From these findings, a number of suggestions on how to use audio and video lectures more effectively in educational contexts are suggested:

AVL integration in curricula: AVL integration should be given a high priority in schools, as it benefits from using multimedia learning. This can be done by providing teacher training on using these tools and how to integrate them into teaching lesson plans.

Investment in Technological Infrastructure: Schools should ensure that they have the appropriate technology infrastructure to enable AVL to be effective, such as quality audio-visual equipment and a reliable Internet connection. All students will have equal access to multimedia resources, thus making them available to benefit all students (Hutnik 2025, Işık, Ogan et al. 2025, Jahangir, Kanwal et al. 2025).

Continuous Professional Development: Teachers should be provided with regular professional development on the latest developments in education and best practices in the use of AVL. This will enable them to use these tools effectively within their teaching and plan for any challenges.

Student Feedback Mechanisms: Implement mechanisms for student feedback on the use of AVL can be used to gain insights into its effectiveness and improvement areas. Frequent feedback can be used to improve techniques and also ensure that all learners are benefiting from the use of the various media resources.

Further research is needed to gain additional insights into factors that could impact student learning outcomes and the relationships between those factors and AVL. This will give a more holistic picture of the educational situation and help with more focused interventions.

The study points out that the use of audio and video lectures has a very positive effect on the learning outcomes of students in District Vehari. Through these strategies, teachers and administrators can leverage the use of multimedia tools to maximise the impact of teaching and learning and promote student achievement.

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