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The Influence of Teachers' and Students' Perceptions of Educational Technologies on Lesson Planning and Learning Performance

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The research sought to explore teachers' and students' viewpoints on the implementation of educational technologies in the Junior High Schools (JHS) in the Ejisu-Juaben Municipal District (EJMD) in Ghana. The researcher focused on fifteen (15) Junior High Schools in the district, 225 students and 74 teachers. The study employed a convenient sampling approach to select the participants based on proximity, and the willingness of the school, teacher and student to participate in the study. Two sets of questionnaires were designed, each for the teachers and students. The researcher adopted a two-way approach in the data collection process, thus using online and drop-and-pick-later methods. SPSS was used to run the data analysis. Firstly, the study established that there is a considerable influence of educational technologies on lesson planning, teaching and learning. Most teachers were fully convinced that educational technology integration would improve the overall quality of teaching and learning. The statistical analysis established a positive link between educational technologies and learning performance. In addition, the study discovered that a good lesson plan indirectly improves students' learning performance. The researcher recommended that extensive engagement forums between parents, teachers, school authorities and district educational board members are required to address the challenges of integrating educational technologies in teaching and learning. Also, teachers need support from schools or districts in terms of professional development and resources for integrating educational technology.

Keywords: educational technology, lesson plan, teaching, learning, junior high school

INTRODUCTION

The increasing integration of educational technologies in classrooms across the globe has profoundly reshaped how teaching and learning are conceptualized and enacted. In both developed and developing nations, these technologies have become catalysts for pedagogical innovation, enabling educators to redesign lesson plans, enhance instructional delivery, and improve student engagement (Hammer & Ufer, 2023). This digital shift has introduced new opportunities to tailor learning to diverse student needs

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and learning preferences. In Ghana, where the education system is undergoing significant reforms, integrating technology into Junior High School (JHS) classrooms holds considerable promise, yet it also presents practical and infrastructural challenges. At the core of effective teaching lies lesson planning, which is a critical pedagogical activity that structures instructional goals, resources, and methodologies in alignment with curricular expectations. In the Ghanaian educational context, particularly at the basic education level, lesson planning is not only mandated but also regarded as foundational for instructional effectiveness and learning success (Cigdem, 2017). Well-crafted lesson plans serve as cognitive roadmaps for teachers, guiding their daily instructional decisions, while also ensuring content is delivered in a coherent, engaging, and inclusive manner (Bergdahl et al., 2019). However, the actual implementation of lesson planning varies considerably, often hindered by limited resources, large class sizes, and disparities in teacher training and technological literacy.

Despite policy initiatives such as Ghana's ICT for Accelerated Development (ICT4AD), which seeks to modernize the education sector, research suggests that the integration of educational technologies remains uneven and underutilized (Alshehri, 2019). While tools such as interactive whiteboards, digital content platforms, and mobile learning applications have entered some classrooms, questions remain about their sustained impact on teaching practices and student learning outcomes. Empirical insights into how these tools are reshaping lesson planning and instructional delivery, especially from the perspectives of teachers and students, are still limited. This study addresses a critical gap in the literature by exploring how educational technologies are influencing lesson planning and instructional delivery in Junior High Schools within the EJMD of Ghana. It adopts a dual-perspective approach, thus examining both teachers' and students' experiences to understand how digital tools are being incorporated into lesson design as well as the challenges educators face, and the perceived outcomes on student learning. Drawing on evidence from global and local studies (Adedoyin & Soykan, 2020; Rapanta et al., 2020; Uwatt, 2019), the research emphasizes that successful technology integration depends not only on the availability of tools but also on pedagogical alignment, contextual relevance, and professional capacity.

Guided by three core objectives, the study investigates: (1) teachers' perceptions of the advantages and challenges of integrating educational technologies into lesson planning and instruction; (2) the impact of these technologies on student learning outcomes; and (3) how these tools influence lesson planning processes among educators in EJMD. These objectives are framed by key research questions that seek to elucidate the practical and pedagogical implications of educational technology use at the Junior High School level. The research focusing on the lived experiences of both teachers and students offers a grounded understanding of the transformative potential and practical constraints of educational technologies in basic education in Ghana. The findings aim to inform educators, policymakers, and stakeholders about effective strategies for technology integration, while also contributing to global discussions on improving instructional quality through digital innovation. Following this introduction is the literature review, study framework, research method, results, discussion of the findings and conclusion.

LITERATURE REVIEW

Lesson Planning and Implementation

Lesson planning is a fundamental responsibility of teachers and plays a critical role in the instructional process. According to Woodward (2001), lesson planning must be undertaken promptly and systematically before the commencement of any instructional session. Teachers who prepare their lessons in advance are better equipped to engage meaningfully with students and facilitate a natural flow of interaction. Similarly, Neeraja (2003) underscores that the lesson plan serves as the cornerstone of effective teaching, providing a structured medium through which educators apply their pedagogical knowledge and skills in the classroom. Iqbal et al. (2021) emphasize the educator's responsibility to communicate their instructional experiences effectively through lesson planning. While lesson plans vary in structure depending on the intended audience and instructional context, their core purpose remains consistent: to enhance learning through deliberate organization and preparation. Although there is no universally agreed-upon definition, lesson planning is widely recognized as an essential pedagogical tool. Raynesa and Ida (2019) describe it as a teacher's means of demonstrating expertise, experience, and instructional competence. Ahmad et al. (2021) further define lesson planning as the act of organizing and structuring how a lesson will be delivered to a specific group of students, at a given time, and in a particular context. Over time, these plans evolve to reflect changes in learners' needs, classroom dynamics, and educational environments.

According to Singh (2008), lesson planning constitutes the "pre-active" phase of instruction, a preparatory stage that lays the groundwork for effective teaching. Nkang and Udo (2021) elaborate on this by defining a lesson plan as a comprehensive, time-bound instructional guide created by educators to manage content delivery, student engagement, and time allocation. Despite differences in format, lesson plans commonly include essential elements such as instructional objectives, teaching strategies, time frames, teacher and student roles, and assessment methods. These shared components reflect a consensus on the importance of planning in guiding and optimizing classroom instruction. In the African educational context, effective lesson planning has been linked to improved instructional quality and student outcomes. Stella (2012) argues that well-prepared lessons promote more effective teacher-student communication, which is critical for student engagement and understanding. In Kenya, Kafu (2003) highlights that comprehensive lesson planning enhances teacher confidence and facilitates the systematic selection and sequencing of relevant content to achieve curricular goals. Without proper planning, educational objectives may remain unattained, a challenge echoed across various national educational systems. Empirical studies (Raynesa & Ida, 2019; Neisari & Heidari, 2014) show that lesson planning enables teachers to explore pedagogical content knowledge in depth, align instruction with curricular benchmarks, and critically assess the presentation of subject matter. Kapur (2018) identifies poor lesson plan design and implementation as a major factor contributing to declining academic performance in primary and secondary schools. Although some critics argue that lesson planning consumes excessive time, this perspective fails to account for its pedagogical value. In fact, rigorous planning is central to effective instruction.

According to Ismail and Halima (2021), successful educators are typically those who prioritize time management and possess strong classroom management skills—traits that are cultivated through structured lesson planning.

The successful implementation of lesson plans requires a thoughtful and adaptive instructional approach. Teachers should begin by assessing students' prior knowledge and experiences, design tasks that align with instructional objectives, and facilitate opportunities for both guided and independent practice. Effective instruction also entails managing transitions, providing clear instructions, and summarizing key concepts at the end of each session. Stella (2012) emphasizes the importance of acknowledging learners' prior knowledge, attitudes, and beliefs, as these factors significantly influence new learning. To manage diverse classroom activities effectively, teachers must be familiar with a wide range of instructional strategies and how to facilitate them. Savage (2014) described classroom activities as coordinated, goal-directed behaviors, commonly including discussions, group work, presentations, independent study, and assessments. Managing these activities effectively requires sustaining a smooth "activity flow" through a combination of planning, observation, and timely intervention.

Classroom management is enhanced by a well-considered physical arrangement that supports the teacher's instructional objectives. While initial layouts should align with planned routines and procedures, they must remain flexible to adapt to changing student needs and learning styles. A safe, organized, and aesthetically appealing learning environment plays a critical role in supporting student engagement and academic success. In particular, the seating arrangement can significantly impact interaction levels and behavioral patterns. Research suggests that the physical design of classrooms influences both academic outcomes and learner behavior (Sammons et al., 1995; Simonsen et al., 2008). Teachers often arrange classrooms based on their pedagogical philosophies and desired learning outcomes. For instance, if classroom design inhibits teacher mobility, students may become more prone to disruptive behavior.

Technologies in Education

Educational establishments provided no flexibility in the way their programs were delivered, which forced students to accept the conventional and unchanging methods. Because of the introduction of educational technologies, educational institutions may now offer a variety of options and choices, which helps them stand out from the competition and draw in students by using creative and student-centered teaching methods. These options provide students with previously unheard-of flexibility and autonomy by allowing them to choose not only when but also where they can teach (Oliver, 2015). The importance of educational technologies in fostering growth has gained recognition as computers and the internet continue to change the economy and society. ICTs have had a significant influence on a number of sectors during the past two or three decades, including engineering, architecture, banking, tourism, travel, medicine, and business (Oliver, 2017). The movement from traditional to virtual platforms and the move from teacher to student-centered education are two significant changes. Additionally, ICTs have been successful in making higher education

accessible to everyone and in providing reasonably priced services, allowing people to gain the information, skills, and experience to contribute to the country's progress and their own prosperity (Brittin, 2005).

Undoubtedly, ICT has the potential to transform our lives in this new digital era, becoming an indispensable resource, commodity, and foundation for various activities, including technology, communication, health, and entertainment. ICT now plays a vital role in distance learning and research, revolutionizing the way we learn and discover new knowledge (Khan, 2020). Technological improvements have brought about considerable shifts in the education industry. Information and communication technology have become indispensable instruments for expanding educational opportunities, improving the quality of education, and making learning more interesting for both teachers and students (Tatiana, 2015). Text, audio, images, animation, and streaming video are just a few of the media formats that are included in e-learning. It also makes use of a variety of technologies and procedures, including CD-ROM, satellite TV, audio/video recordings, computer-based learning, and online platforms like local intranet/extranet, along with web-based learning (Pavel, 2015).

Educational Technologies on Lesson Planning and Learning Performance

Lesson planning studies have largely focused on teachers' perceptions with regard to educational technologies to enhance students' learning performance. For instance, Fajardo-Dack et al. (2024) concluded that teachers have acquired solid skills in the design and planning of teaching activities and materials that foster critical thinking, reflection, and active student participation in the classroom. Teachers often plan lessons and arrange classrooms based on their pedagogical philosophies and desired learning outcomes. This aligned with Raynesa and Ida's (2019) assertion that a lesson plan is a teacher's means of demonstrating expertise, experience, and instructional competence. While the central theme of the lesson planning focused on learners' achievements, students' views may not be accurately included.

However, most of the research that has already been done focuses only on the viewpoints of teachers, without also looking at how students perceive and experience technology-enhanced learning. Furthermore, junior high schools in sub-Saharan African contexts, especially Ghana, have received little empirical attention because the majority of related research has been carried out in developed or higher educational settings. This highlights a significant gap in the literature: there is little comparison data regarding how instructors and students view the impact of educational technologies on lesson planning and learning outcomes in JHS settings with limited resources. Through investigating both viewpoints concurrently in public JHSs in the Ejisu-Juaben Municipal District, the current study fills this gap.

Application of UTAUT Theories

Educational technologies have gained widespread adoption in Ghanaian schools due to institutional evolution and global trends. Many Junior High School (JHS) teachers incorporate various technologies into their lesson planning and classroom instruction. This study explores the role of educational technologies in teaching and learning through the lens of two key theoretical frameworks: Task-Technology Fit (TTF) and

the Unified Theory of Acceptance and Use of Technology (UTAUT). The TTF framework posits that technology is most effective when it aligns with the specific tasks it supports, thus enhancing performance and user acceptance (Alqahtani & Rajkhan, 2020). Research indicates that tailored technology usage can improve student outcomes by aligning with learners' abilities and tasks (Alyoussef, 2023). The TTF model is widely used to assess the impact of technology on performance and its compatibility with task characteristics (Alyoussef, 2023). In the JHS context, teachers and students leverage basic technologies such as smartphones and computers for various instructional tasks and online activities. This study applies TTF and UTAUT theories to argue that integrating technologies like laptops, learning management systems with accessible template lesson plans, collaborative learning platforms for JHS students, and classroom tutorials will enhance lesson preparation, teaching, and learning. Based on these assumptions, the study's hypothesis is as follows;

H1: Educational technologies have a positive influence on student learning performance among JHS students in EJMD.

H2: Lesson planning moderates the relationship between educational technologies and student learning performance among JHS students in EJMD.

H3: Lesson planning will positively affect student learning performance.

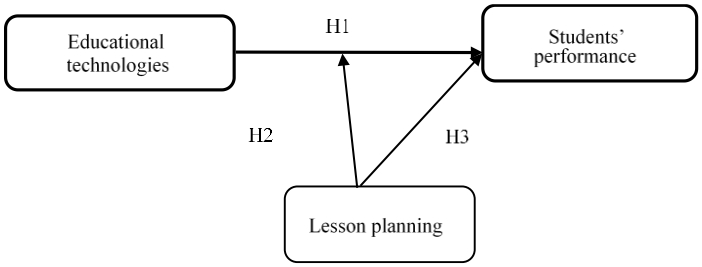

Figure 1
Study framework

METHOD

Participants

The participants of this study comprised Junior High School (JHS) students and teachers from the Ejisu-Juaben Municipal District (EJMD) in the Ashanti Region of Ghana. The research specifically targeted public JHS institutions within the municipality. According to the 2022 EJMD Budget Report, there are 29 public JHSs in the district, enrolling 3,375 male and 3,383 female students. A total of 15 public JHSs were purposively selected to participate in the study. From these schools, a sample of 299 participants (comprising 225 students and 74 teachers) was drawn. In order to ensure a balanced distribution across both urban and underserved community zones, the chosen schools were categorized according to their location within the municipality.

Due to the geographic spread of schools and logistical constraints, the study employed a convenience sampling technique, selecting participants based on their availability,

proximity to the researcher, and willingness to participate. Although this method was useful, it has a drawback in that the results might not accurately represent the opinions or traits of every teacher and student in the district, which would limit how broadly the findings can be applied. This non-probability method, while limited in representativeness, allowed for practical data collection within time and resource limitations. Two distinct survey instruments were designed: one for students and another for teachers. The student questionnaire consisted of sections on demographic characteristics, access to technological devices, and the perceived impact of educational technology on learning outcomes. The teacher questionnaire covered demographic data, teaching experience, access to instructional technology, and perceptions regarding the integration of technology in lesson planning and delivery.

Data Collection Procedure

Data were collected through a combination of paper-based and online questionnaires, enabling broad and flexible access to participants. Before the main survey, a pilot study was conducted with five reviewers comprising colleagues, a supervisor, and experienced teachers, to assess the clarity, feasibility, and relevance of the questionnaire items. Feedback was incorporated to refine the instruments for the final administration. Formal letters of consent were issued to the selected schools to gain access for data collection. The researcher also engaged with teachers and administrators to explain the study's purpose, ethical considerations, and data use. In line with ethical research standards, participation was entirely voluntary, and confidentiality was strictly maintained. To reach participants efficiently, the study employed a dual approach**.** First, five trained field enumerators distributed and retrieved hard-copy questionnaires using the drop-and-pick method, primarily during school hours. Second, an online version of the teacher questionnaire was administered via Google Forms and shared through educational social media platforms. The online survey was configured to ensure anonymity, prevent multiple submissions, and require complete responses. Data collection was conducted between April 1 to April 20, 2025, yielding 299 valid responses. All data were subsequently cleaned in Microsoft Excel and analyzed using SPSS (v25) and AMOS. The analysis included tests for reliability, validity, exploratory factor analysis (EFA), and inferential statistical procedures such as correlation and hierarchical regression.

FINDINGS

Teachers Biodata

The study involved 74 Junior High School teachers from the Ejisu-Juaben Municipal District (EJMD), comprising 48 males and 26 females. Participants' ages were distributed across five categories, with the majority falling within the 36–45 age range, followed by those aged 26–35, and a smaller number under 25 years. Regarding professional experience, 36 teachers reported 11–15 years of teaching experience, while 26 had 6–10 years, and 9 had between 1–5 years. Teachers were also asked to identify the digital tools they commonly use in lesson planning. The study focused on three key devices: desktop/laptop computers, tablets, and smartphones. The majority indicated that they regularly use computers for lesson preparation, reporting high reliability and utility in their instructional activities.

Students Biodata

The study involved 225 Junior High School students. Of these, 121 were male and 104 were female, indicating a slightly higher male representation. In terms of academic level, 107 students were in JHS 3, 70 in JHS 2, and 48 in JHS 1, with final-year students forming the majority of the sample. Regarding access to educational technology, 127 students reported having occasional access to a desktop or laptop computer, while 40 students indicated no access. Tablet ownership or access was notably limited, with 181 students lacking access entirely. Only a small number of 15 and 18 students, respectively, reported reliable or occasional access to tablets. Conversely, smartphone access was considerably more common. The majority of students indicated that their smartphones functioned well either all the time or occasionally, though 38 students reported no access to smartphones at home or school. In terms of internet connectivity, 180 students reported consistent access, 15 had limited access, and 25 experienced occasional access. Only five students reported having no internet access at all.

Benefits of Integrating Educational Technologies in **Junior High Schools**

The study investigated teachers' perceptions of the benefits and challenges associated with integrating educational technology into lesson planning and instruction at the Junior High School level. Descriptive statistics, including mean and standard deviation, were used to summarize key variables, with adjustments made for outliers to ensure accurate central tendency measures. A five-point Likert scale guided the analysis, where scores below 2 indicated disagreements, 2.10–2.99 suggested neutrality, and 3.0 or above reflected agreement. As summarized in Table 1, teachers broadly affirmed the positive role of educational technology. Notably, respondents strongly agreed that its integration enhances the overall quality of teaching and learning (M = 4.42). Additionally, teachers agreed (M = 3.66) that digital tools facilitate the development of critical 21st-century competencies, such as problem-solving and critical thinking. These findings underscore a prevailing consensus among educators on the pedagogical value of technology-enhanced instruction.

Table 1
Benefits of integrating educational technologies in lesson planning and teaching and learning

Description	Min	Max	Mean	Std. Dev
Integrating educational technologies enhances student engagement in the classroom.	2.00	5.00	4.04	0.75
I perceive that educational technology integration would motivate students to learn	3.00	5.00	4.11	0.65
Educational technology integration would make it easier to tailor lessons to individual student needs	2.00	5.00	4.16	0.62
I believe educational technology will help students to develop 21st-century skills (e.g., critical thinking, and problem-solving).	2.00	5.00	3.66	0.82
I am fully convinced that educational technology integration will improve the overall quality of teaching and learning.	2.00	5.00	4.42	0.62

Challenges of Integrating Educational Technologies in **Junior High Schools**

Table 2 presents the key challenges teachers face when integrating educational technologies into lesson planning and instruction. Overall, the responses reflect moderate agreement with common barriers, with mean values ranging from 2.79 to 3.50. The most frequently cited challenge was the perception that institutional support—through professional development and resources—is available (M = 3.50, SD = 0.91), suggesting some recognition of systemic efforts to ease the integration process. However, teachers also expressed concerns that technology use increases their workload (M = 3.19) and that technical glitches often disrupt lessons (M = 3.20), highlighting the persistent tension between opportunity and effort. Difficulty in resolving technical problems (M = 2.88) and selecting suitable tools (M = 2.79) further emphasizes the practical limitations educators encounter. These findings suggest that while support structures are improving, implementation challenges remain a significant deterrent.

Table 2
Challenges of integrating educational technologies in lesson planning and teaching and learning

Description	Min	Max	Mean	Std. Dev
Technical issues and glitches often disrupt my lessons when using educational technology.	2.00	5.00	3.20	.81
Finding and adopting the appropriate educational technology tools for teaching and learning will be a challenge	2.00	4.00	2.79	.76
I feel that integrating technology into teaching and lesson planning adds to my workload.	1.00	5.00	3.19	.99
I find it difficult to resolve technical issues when they arise during a lesson with educational technologies.	2.00	4.00	2.88	.86
I receive support from my school or district in terms of professional development and resources for integrating educational technology.	2.00	5.00	3.50	.91

Hypothesis Analysis

Before examining the direct and indirect impacts of educational technologies on student learning outcomes through lesson planning, the researcher conducted exploratory factor analysis (EFA), reliability tests, and correlation assessments to verify the validity and suitability of the constructs. EFA was used to evaluate correlations among variables and prepare them for in-depth analysis, ensuring scale reliability, distinctiveness of constructs (discriminant validity), and alignment of each construct with a single concept (convergent validity). The Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity assessed data suitability, where a KMO value below 0.50 was considered unacceptable. In factor analysis, maximum likelihood extraction was chosen for its effectiveness in maximizing factor differences, while Direct Oblimin was used for rotation because it allows for correlations between items. If initial results did not align with the hypothesized model, the number of factors was adjusted to match the model's structure.

Educational Technologies

Table 3 summarizes the factor analysis results for students' access to educational technologies. The Kaiser-Meyer-Olkin (KMO) value of 0.671 and a significant Bartlett's Test of Sphericity (χ^2 = 253.9, df = 6) indicate sampling adequacy and suitability for factor analysis. One dominant factor emerged, explaining 56.37% of the total variance, with strong loadings observed for access to school computer facilities (.868) and smartphone use during school hours (.863). The overall scale demonstrated good internal consistency (α = 0.76), suggesting that access to digital tools is a cohesive construct.

Table 3
Educational Technologies

Items	Factor Lo:	Extraction
I access learning materials with my smartphone during school hours	.863	.745
I access learning materials with a computer/laptop during school hours	.671	.565
There are computer facilities to help search for information in the school	.578	.335
During classroom learning, there are available radio, TV and projectors to aid teaching	.868	.753
There is a digital learning platform (online) to supplement classroom studies	.580	.506

Note: Kaiser-Meyer-Olkin Measure of Sampling Adequacy; α = 0.76; % of Variance Validity= 56.374; X^2 = 253.9, df = 6.

Learning Performance

Table 4 summarizes students' perceptions of learning outcomes associated with the use of educational technologies. Factor analysis revealed strong loadings ranging from 0.664 to 0.832, indicating good internal consistency among the items. The cumulative variance explained was 57.91%, with a Kaiser-Meyer-Olkin (KMO) value of 0.595, suggesting moderate sampling adequacy. The scale demonstrated acceptable reliability (α = 0.79), and the Chi-square test of sphericity was significant (X^2 = 277.94), confirming the suitability of the data for factor analysis. These results suggest that students viewed educational technologies as enhancing engagement, comprehension, and real-world digital preparedness.

Table 4
Learning Outcome

Items	Factor Loading	Extraction
I am satisfied with the educational technologies used in teaching and learning	.664	.442
Using educational technologies will enhance my understanding of the course exercise and content	.826	.692
It will be more interesting to learn in class when educational technologies are integrated	.682	.601
I believe that using educational technologies will prepare us well to use technologies in our daily lives	.703	.520
I would recommend the continued use of educational technologies in future classes	.708	.501

Note: % Variance validity = 57.907; KMO = .595, X^2= 277.937; α = 0.79

Lesson planning

Table 5 summarizes the factor analysis results for the lesson planning construct. All four items demonstrated strong factor loadings ranging from .784 to .918, indicating high internal consistency and convergent validity. The total variance explained was 72.65%, reflecting the robustness of the construct. The Kaiser-Meyer-Olkin (KMO) value of .766 and a significant Bartlett's Test of Sphericity ($\chi^2 = 532.118$) confirmed sampling adequacy and the suitability of the data for factor analysis. The construct showed excellent reliability with a Cronbach's alpha of .84. These results confirm that the items collectively represent a coherent and reliable measure of effective lesson planning practices.

Table 5
Lesson planning

Items	Factor Loading	Extraction
My lesson plans are clear and well-organized.	.795	.633
My lesson objectives are clear and aligned with learning outcomes.	.903	.815
I incorporate a variety of educational technologies in my lesson plans.	.814	.801
I consider students' prior knowledge and abilities when planning lessons.	.918	.844
I provide adequate resources and materials for the lessons.	.784	.615

Note: % Variance validity = 72.649; KMO = .766, X^2= 532.118; α = 0.84

Relationship between Educational Technologies, Lesson Planning, and Learning Performance

Table 6 presents the mean scores and Pearson correlation coefficients among the key study variables. The results show moderate mean values for educational technologies (M = 2.69), lesson planning (M = 2.27), and learning performance (M = 2.13), suggesting a general neutrality or slight agreement among respondents regarding the presence and effectiveness of these constructs. Importantly, significant positive correlations were found between educational technologies and lesson planning (r = .509, p < .01), and between educational technologies and learning performance (r = .432, p < .01). Additionally, lesson planning strongly correlated with learning performance (r = .664, p < .01). These findings support the study's hypothesis that the integration of educational technologies positively influences both lesson planning and student learning outcomes.

Table 6
Mean and correlational matrix

Variables	Mean	1	2	3
Educational technologies	2.69	1		
Lesson planning	2.27	.509**	1	
Learning performance	2.13	.432**	.664**	1

p < .01 (**).

To test the hypothesis that educational technology positively impacts students' learning performance, a multiple regression analysis was conducted. As shown in Table 7, the

model explained a substantial proportion of the variance in learning performance (R^2 = 0.681; Adjusted R^2 = 0.613), with a standard error of 3.59.

Table 7
Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.664a	.681	.613	3.59061

Note: a. Predictors: (Constant), Educational Technologies (Edutech)

This indicates that educational technology accounted for approximately 68.1% of the variation in students' academic performance. The model's significance was supported by the ANOVA results (F1, 149) = 69.36, $p < .001$), confirming that the regression model reliably predicts learning outcomes. The coefficients in Table 8 further support the hypothesis. The unstandardized coefficient for educational technology was positive and statistically significant (B = 0.342, t = 8.33, $p < .001$), indicating a strong positive relationship between the use of educational technology and improved student performance. These findings provide robust evidence that increased integration of educational technologies is positively associated with students' learning outcomes in Junior High Schools.

Table 8
Coefficients of the variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	*Std. Error*	*Beta*		
(Constant)	6.982	1.088		6.419	.000
Edutech	0.342	0.041	0.564	8.328	.000

Note: Dependent Variable: *Learning Performance (Learn_perf)*

Moderating Role of Lesson Planning in the Relationship between Educational Technology and Learning Outcomes

Table 9 summarizes the results of a hierarchical regression analysis assessing whether lesson planning moderates the relationship between educational technology use and student learning outcomes. In Step 1, the control variables (gender and class level) accounted for a minimal variance (R^2 = .038) and were not significant predictors overall. In Step 2, the inclusion of educational technology significantly improved the model (ΔR^2 = .220, $p < .01$), indicating a strong positive effect on learning outcomes (β = .538, $p < .01$). In Step 3, the interaction term (Educational Technology × Lesson Plan) was significant (β = .663, $p < .01$), demonstrating a substantial moderation effect. The final model explained 48.7% of the variance (R^2 = .487), confirming that effective lesson planning strengthens the positive impact of educational technology. These findings support the hypothesis that lesson planning moderates the relationship between educational technology integration and student learning outcomes.

Table 9
Table Hierarchical regression analysis for moderation by lesson plan

Variables	Lesson plan		
	Step 1	*Step2*	*Step 3*
Control variables			
Gender	-.301	-.273	.001
Class level	.849**	.613	.314
Main variables			
Educational technology		.538**	.294**
Edutech*lesson plan			.663**
R	.196[a]	.528[b]	.712[c]
R^2	038	.258	.487
F	2.098	13.424**	26.4**
ΔR^2	.038	34.729**	227**

NB: *p < 0.05; **p < 0.01

Before testing the moderating effect, preliminary analyses were conducted following Preacher and Hayes' (2008) procedure. Direct effects were assessed first, followed by a bootstrapping analysis to test the significance of the indirect effect of educational technology on student performance. The bootstrapped estimate of the indirect effect was 0.663, with a 95% bias-corrected confidence interval of 0.472 to 0.854, indicating statistical significance as the interval excluded zero. This supports Hypothesis 2. Subsequently, the moderation analysis (Step 3, Table 9) confirmed that lesson planning significantly strengthened the relationship between educational technology and learning outcomes (β = 0.663, $p < 0.05$). The final model explained 48.7% of the variance in student performance, with the interaction term accounting for an additional 22.7%. These results provide robust support for Hypothesis 2, as illustrated in Figure 2, where educational technology positively influenced learning outcomes across both high- and low-quality lesson planning contexts.

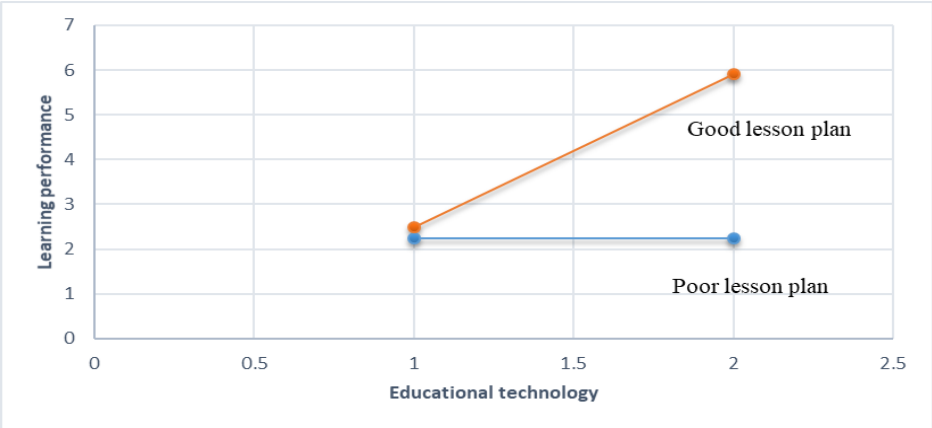

Figure 2
Good and poor lesson plan

DISCUSSION

This study explored the advantages and challenges of incorporating educational technologies into lesson planning within Junior High Schools (JHS) in the EJMD. Data were collected from both students and teachers using purposive and convenience sampling. While there were demographic disparities in gender, class level, and teaching experience, these factors were statistically controlled to ensure analytical rigor. Findings revealed that desktops, laptops, tablets, and smartphones were the most commonly used technologies among teachers. A majority reported consistent access and functionality of these devices during instructional delivery. Students similarly indicated access to digital tools at home or school, with internet connectivity posing minimal technical barriers. However, the cost of internet access remained a significant limitation— echoing findings by UNESCO, UNICEF, and the World Bank (2022), as well as earlier work by Volchenkova (2016) and Day et al. (2020), who documented economic disparities limiting access to broadband and digital resources among disadvantaged students.

The study found strong empirical support for the positive impact of educational technologies on students' learning outcomes. Teachers overwhelmingly agreed that technology integration enhances instructional quality and supports the acquisition of essential 21st-century skills such as critical thinking and problem-solving. These findings are consistent with Aristovnik et al. (2020), who noted the evolving demands and mixed perceptions surrounding digital learning environments for both teachers and students. Furthermore, the results align with prior research by Tatiana (2015), which highlighted the adaptability and inclusiveness of technology-enhanced learning platforms. These platforms enable personalized instruction that caters to diverse learning needs, promoting flexibility, interactivity, and student engagement in digitally mediated classrooms. With regard to lesson planning, the study uncovered notable challenges. Teachers frequently experienced disruptions from technical issues and emphasized the need for ongoing institutional support, particularly in professional development and resource provision. These findings corroborate existing literature (e.g., Pavel, 2015; Khan, 2020), which suggests that technology integration in education extends beyond access to devices. Effective use requires pedagogical adaptation, technical competence, and a supportive infrastructure. As Ansari et al. (2024) observed, lack of professional training remains a primary barrier to educational technology adoption. Compatibility, usability, and system reliability also emerged as critical concerns. In line with Venkatesh et al.'s (2003) Unified Theory of Acceptance and Use of Technology (UTAUT), the study identified facilitating conditions—such as institutional support and device interoperability—as essential for effective adoption. Regression analysis further affirmed a positive relationship between educational technology and student performance. Importantly, the moderation analysis showed that lesson planning enhanced this effect. Specifically, the interaction between educational technology and lesson planning explained an additional 22.7% of the variance in learning outcomes, underscoring the role of high-quality lesson planning in maximizing the benefits of technology integration. These findings provide empirical support for Hypotheses 2 and 3, confirming that both technological tools and pedagogical strategies jointly contribute to improved student achievement in the digital learning era.

CONCLUSION

This study explored the influence of educational technologies on lesson planning, instructional delivery, and student learning outcomes among Junior High Schools (JHS) in the Ejisu-Juaben Municipal District (EJMD). The findings provide robust empirical evidence supporting the positive role of educational technology in enhancing both teaching quality and students' academic experiences. Despite infrastructural challenges—such as limited internet access, high data costs, and insufficient training—the integration of educational technology remains a catalyst for improved educational outcomes. The analysis confirmed that lesson planning significantly moderates the impact of educational technology on student performance. Teachers who strategically align technological tools with pedagogical objectives tend to experience greater improvements in student engagement and achievement. These findings are consistent with the UTAUT model, emphasizing the importance of facilitating conditions and perceived usefulness in determining the successful adoption of technology in education. Ultimately, this study affirms that educational technologies, when embedded within effective instructional planning, can transform traditional classroom practices and support 21st-century learning competencies.

This research contributes to the growing body of literature on technology integration at the basic education level, an area often underrepresented in existing studies that typically focus on higher education. The confirmation of UTAUT's facilitating conditions and the moderating role of lesson planning enriches the theoretical discourse on technology adoption in resource-constrained educational contexts. For educators and school administrators, this study highlights the necessity of intentional and well-structured lesson planning when integrating digital tools into teaching. Training programs should not only focus on digital literacy but also emphasize pedagogical strategies for effectively aligning educational technology with curriculum goals.

Educational policymakers should consider reducing barriers to access by negotiating affordable data packages with telecom providers and expanding broadband coverage in underserved areas. Additionally, investments in professional development and infrastructure are essential to ensure sustainable and equitable use of technology in classrooms. The findings suggest an urgent need for policy reforms that prioritize inclusive, technology-enhanced education for all learners, including students with disabilities. Collaboration between government agencies, tech providers, and curriculum developers can lead to the design of adaptive platforms that cater to diverse learning needs.

The study has limitations despite the valuable insights it produced. The study only looked at fifteen junior high schools in the Ejisu-Juaben Municipal District, which limits the findings' applicability to other Ghanaian districts or areas. Convenience sampling may have caused selection bias because participation was determined by willingness and proximity rather than by chance. Furthermore, the study only used teacher and student self-reported questionnaire data, which could be skewed by social desirability bias or personal opinions.

Future studies should adopt a mixed-methods approach to capture richer, context-specific insights into how technology influences teaching practices and student learning. Larger sample sizes and longitudinal designs could further validate and expand upon the present findings. Researchers are encouraged to explore the role of contextual factors such as school leadership, community involvement, and socio-economic disparities in shaping technology integration outcomes.

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