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MEDIATING ROLE OF IMMERSIVE LEARNING TECHNOLOGY AS ESTIMATED BY PEDAGOGICAL PRACTICES AND TEACHERS' DIGITAL COMPETENCE: A CONCURRENT TRIANGULATION DESIGN

STELLA MARIE P. LIMOS
Central Mindanao Colleges, Kidapawan City, Philippines.
Corresponding email: stellamarie.limos@deped.gov.ph

ABSTRACT

This study aims to investigate the mediating role of immersive learning technology in the relationship between pedagogical practices and teachers' digital competence, employing a concurrent triangulation design. Through a comprehensive analysis combining qualitative and quantitative methods, the research delineates how immersive learning technology, pedagogical practices, and digital competence intersect to influence educational outcomes. The study's findings reveal a consistent high level of immersive learning technology, with an overall mean score of 4.33, demonstrating significant engagement with technology in enhancing student engagement, learning outcomes, and overall technological application. Similarly, pedagogical practices exhibited a high level of implementation, with an overall mean of 4.33 across instructional strategies, curriculum integration, and assessment methods, reflecting a commitment to effective teaching methodologies. Furthermore, teachers' digital competence also registered a high level, with an overall mean score of 4.31, indicating a robust proficiency in technological skills, professional development, and the innovative use of technology. Correlation analysis highlighted significant relationships between immersive learning technology and pedagogical practices, immersive learning technology and teachers' digital competence, and between pedagogical practices and teachers' digital competence, suggesting that these elements are interdependently enhancing educational practices. Regression analysis and Sobel tests further confirmed immersive learning technology's significant mediation between pedagogical practices and teachers' digital competence, underlining immersive learning technology's pivotal role in bridging effective pedagogy with digital proficiency. Thematic analysis from teachers' lived experiences revealed key themes such as the necessity of enhancing learning engagement, the integration of methodology and technology, educator skill development, and the challenges of technological implementation, all of which align with the quantitative findings, confirming, merging, and connecting the data. This study underscores the crucial interplay between ILT, pedagogical practices, and digital competence in shaping contemporary education, advocating for strategic integration to optimize teaching and learning experiences.

Keywords: *Immersive Learning Technology, Pedagogical Practices, Teachers' Digital Competence, Educational Outcomes, Concurrent Triangulation.*

INTRODUCTION

As the years progressed, the rapid advancement of technology in education has significantly highlighted the importance of immersive learning technologies as a crucial instrument. Alarmingly, studies indicate that about 60% of teachers consider themselves underprepared to effectively implement these technologies in their teaching practices. Nevertheless, integrating these technologies into educational systems faces considerable challenges. Differences in digital proficiency among teachers and the diverse range of teaching methods across educational institutions create a complex set of difficulties. These variances frequently lead to the underutilization or ineffectiveness of immersive technologies, consequently affecting the standard of educational delivery and student learning outcomes (Stanney et al. 2020).

Conforming to this, Proctor and Zandt (2021) investigated the impact of immersive technology on student engagement and learning outcomes. They found that students in classrooms where such technologies were integrated showed a 30% increase in engagement and a 25% improvement in test scores compared to traditional learning environments.

On the other hand, the role of immersive learning technologies as a mediator is paramount. When utilized aptly, they hold the promise of transforming educational experiences into more captivating, interactive, and personalized journeys. The synchronization of these technologies with robust educational strategies is essential, as it is this synergy that unlocks the full potential of digital advancements in education. Equally important is the enhancement of educators' digital proficiency, as it significantly influences the successful integration of technology in classroom settings (Gad et al. 2022).

Conversely, despite the acknowledged potential of immersive learning technologies, there is a discernible gap in research regarding their role as intermediaries between teaching methods and educators' digital competence. Prevailing academic literature tends to focus on technological or pedagogical dimensions in isolation, neglecting the interplay between these facets and their collective effect on the deployment and efficacy of ILT in educational environments (Dick 2021).

Therefore, this study seeks to address this gap by examining the intermediary role of immersive learning technologies amidst diverse pedagogical practices and varying levels of teacher digital competence. The objective is to unearth a detailed understanding of how these components interact and mutually influence one another. This endeavor aims to offer valuable insights for enhancing the application of immersive technologies in education, with the ultimate goal of providing actionable recommendations for educators and policy makers to improve technology-enhanced learning environments.

FRAMEWORK

The purpose of this research is to investigate the connection of the mediating variable between the independent and dependent variables. The variable immersive learning technology has three indicators which are technology utilization, student

engagement, and learning outcomes, while the indicators of the variable pedagogical practices has also three indicators which are instructional strategies, curriculum integration, and assessment methods. Also, the variable teachers' digital competence has three indicators which are technological proficiency, professional development, and innovative use of technology.

METHOD

Research Design

This research utilized the concurrent research design. This method simultaneously gathers qualitative and quantitative data and integrates the results in order to get a completer and more comprehensive grasp of the subject matter (Creswell, 2013). Verifying, cross-validating and confirming findings is the goal of this procedure. It is used to make up for the shortcomings of one approach by emphasizing the positive aspects of another (Creswell, 2013).

Researchers must concurrently gather and evaluate quantitative and qualitative data, but in distinct ways, to properly understand the topic of the study (Creswell, Plano Clark, et al., 2003). To make sense of the results, the investigator attempts to adapt and merge the two sets of data. Data on the same occurrence is collected, analyzed, and interpreted separately by the researcher, who then combines the disparate findings from the two approaches. Using convergent approach, performance was enhanced, and individual defects were corrected. Because of this, a more comprehensive and well-rounded knowledge of the topic was gained (Creswell & Clark, 2011). Descriptive and correlational techniques are two examples of quantitative methodologies.

The data would be gathered on the present status of the phenomena to accurately define variables or circumstances in a scenario using the descriptive design method (Shuttleworth, 2018).

Descriptive research tries to characterize the present state of a variable. ' A phenomenon is examined in detail in this paper. After gathering data, a researcher formulates a hypothesis. The hypothesis is tested via data analysis and synthesis. Selecting a precise unit of measurement is essential to a systematic approach to data collection (Kowalczyk, 2019). Immersive Learning Technology, Pedagogical Practices, and Teachers' Digital Competence are examined in this research.

There must be some correlation between the two or more variables or scores in order to do a correlation analysis (Creswell, 2002). A statistical technique known as correlation analysis is used to determine the relationship between two or more variables. This strategy uses data linking to find patterns in the data. Trends and patterns may be observed, but causality cannot be determined by this kind of investigation. Only look at correlations and distributions based on variables. It is not necessary to change variables to examine them (Waters, 2017).

The results of this investigation will demonstrate the impact of adaptive teaching and learning on students' technology integration are fostered by this design. Participant tales made up the qualitative component. Individual defects were accounted for by converging parallel. Because of this, a more comprehensive and well-rounded knowledge of the topic was gained (Creswell & Clark, 2011).

Respondents

In this survey, 300 students from Pikit North District, Schools Division of Cotabato was randomly selected as respondents. Simple random sampling would be used as the sampling approach. Each sample has an equal chance of being picked as part of the sampling procedure known as random sampling. A randomly selected sample is intended to provide a fair reflection of the entire population. Sampling mistake occurs when, for any reason, the sample does not accurately reflect the population. When collecting a sample, there are several options to choose from. Samples selected from the population will be the focus of our discussion here. Pre-drawn populations guarantee that every piece has an equal chance of being selected for a drawing. It's supposed to be a true reflection of a political party's image. Because each person in the population has an equal probability of being selected, it is seen as a rational strategy.

There was also 17 students who will be selected using a purposive sample approach. As a result, 10 instructors were interviewed in-depth, and seven teachers were questioned in a focus group.

Instruments

In the quantitative phase of the study, the researcher administered a standardized questionnaire to gather the essential data for analysis and interpretation. In addition, during the qualitative phase, the researcher created a questionnaire for interview guides. After being used to perform the investigation, the questionnaire was validated by the research committee.

Immersive Learning Technology. The first research problem would be sought to answer the level of Immersive Learning Technology in terms of Technology Utilization, Student Engagement, and Learning Outcomes. The researcher modified and adopted the survey questionnaire from the study of Mirata (2020).

Pedagogical Practices. The second research problem would determine the level of Pedagogical Practices in terms of Instructional Strategies, Curriculum Integration, and Assessment Methods. The researcher modified and adopted the survey questionnaire from the study of Trabelsi (2022).

Teachers' Digital Competence. The third research problem would seek to answer the level of Teachers' Digital Competence in terms of Technological Proficiency, Professional Development, and Innovative Use of Technology. The researcher modified and adopted the survey questionnaire developed by Prensky (2011).

RESULTS AND DISCUSSIONS

Immersive Learning Technology

Table 1 shows the level of immersive learning technology. The immersive learning technology contains three indicators namely technology utilization, student engagement, and learning outcomes. This variable obtained the overall mean score of 4.33 and standard deviation of 0.530 which reflects the consistency of the responses of the participants.

Among the five statements on the indicator Technology Utilization, the statement "I actively seek new immersive technologies to incorporate into my curriculum." got the

highest mean of 4.50 described as very high, while the statement “I regularly integrate immersive learning technologies into my teaching practices.” And “I feel confident in using immersive learning technologies to enhance student learning.” got the lowest mean 4.30 of described as high. The overall mean of the indicator Technology Utilization is 4.36 and is high.

This implies that teachers are enthusiastic about adopting new immersive technologies for their curricula, indicating a proactive approach toward educational innovation. However, the relatively lower means for regular integration and confidence in using such technologies suggest a need for more support or training to bridge this gap and enhance efficacy.

Moreover, the result of the study is supported by Paje et al., (2021). This study explores the extent to which science teachers integrate computer-based technology into their instruction. The research highlights a growing trend among science educators to incorporate digital tools to enhance teaching effectiveness and student engagement. However, it also identifies barriers such as lack of resources, insufficient training, and resistance to change that hinder optimal utilization. The study implies the need for targeted professional development programs and infrastructural support to improve teachers’ competence and confidence in using technology, thereby maximizing the benefits of technology in science education.

Among the five statements on the indicator student engagement, the statement “I tailor my use of immersive technologies to match the engagement levels of my students.” got the highest mean of 4.39 described as high, while the statement “I observe increased student engagement when using immersive learning technologies.” got the lowest mean 4.23 of described as high. The overall mean of the indicator student engagement is 4.33 and is high.

The result of the study implies that while teachers recognize the value of immersive technologies in enhancing student engagement, there's variability in their effectiveness. Tailoring technology use to individual student needs appears most effective, though overall, such technologies positively impact engagement. This suggests a nuanced approach to technology integration is beneficial.

Sviridova et al., (2023) delve into the impact of immersive technologies on academic success and motivation in higher education. The study underscores the significant potential of immersive technologies—such as virtual and augmented reality—to elevate student engagement and learning outcomes. By providing rich, interactive experiences that simulate real-world environments, these technologies foster a more engaging and motivating learning environment. The study suggests that the integration of immersive technologies not only enhances students' academic performance but also stimulates a higher level of interest and motivation towards learning. This implies that educational institutions could greatly benefit from incorporating immersive technologies into their curricula to support innovative teaching strategies and improve student engagement and success.

Among the five statements on the indicator Learning Outcomes, the statement “I have noticed an improvement in learning outcomes since incorporating immersive learning technologies.” got the highest mean of 4.39 described as high, while the statement “I find that immersive technologies help in achieving specific curriculum goals

more effectively." got the lowest mean of 4.25 described as high. The overall mean of the indicator Learning Outcomes is 4.31 and is high.

Thus, the findings of the study are supported by Ryan et al., (2022). Their study compiles evidence on the effectiveness of immersive technologies such as virtual reality (VR) and augmented reality (AR) in enhancing learning outcomes among health care students.

Table 1
Level of Immersive Learning Technology

Indicators	Mean	Std. Deviation	Interpretation
A. Technology Utilization			
1. I regularly integrate immersive learning technologies into my teaching practices.	4.30	.495	High
2. I feel confident in using immersive learning technologies to enhance student learning.	4.30	.507	High
3. I actively seek new immersive technologies to incorporate into my curriculum.	4.50	.545	Very High
4. I utilize immersive learning technologies to support diverse learning styles in my classroom.	4.35	.492	High
5. I consistently evaluate and update the technology I use to ensure it meets current educational needs.	4.35	.532	High
Category Mean	**4.36**	**.514**	**High**
B. Student Engagement			
1. I observe increased student engagement when using immersive learning technologies.	4.23	.487	High
2. I believe immersive learning technologies help in catering to individual student interests.	4.35	.532	High
3. I use immersive learning technologies to create more interactive and participatory learning experiences.	4.30	.507	High
4. I find that students show greater enthusiasm for lessons involving immersive technology.	4.38	.575	High

5. I tailor my use of immersive technologies to match the engagement levels of my students.	4.39	.560	High
Category Mean	**4.33**	**.532**	**High**
C. Learning Outcomes			
1. I have noticed an improvement in learning outcomes since incorporating immersive learning technologies.	4.39	.547	High
2. I use immersive technologies to provide real-world contexts for abstract concepts.	4.28	.569	High
3. I believe immersive learning technologies aid in deeper understanding and retention of course material.	4.34	.560	High
4. I regularly assess the impact of immersive learning technologies on student learning outcomes.	4.27	.517	High
5. I find that immersive technologies help in achieving specific curriculum goals more effectively.	4.25	.530	High
Category Mean	**4.31**	**.545**	**High**
Overall Mean	**4.33**	**.530**	**High**

Pedagogical Practices

Table 2 shows the High Level of Pedagogical Practices. The variable Pedagogical Practices contains three indicators namely Instructional Strategies, Curriculum Integration, and Assessment Methods obtained the overall mean score of 4.33 and standard deviation of .554 which reflected the consistency of the responses of the participants.

Among the five statements on the indicator Instructional Strategies, the statement “I use immersive technologies to provide differentiated instruction tailored to individual learning needs.” got the highest mean of 4.40 described as high, while the statement “I adapt my teaching methods to leverage the benefits of immersive learning technologies.” got the lowest mean 4.29 of described as high. The overall mean of the indicator Instructional Strategies is 4.35 and is high.

The findings of the study imply that teachers recognize the value of immersive technologies in enhancing instructional strategies, particularly for differentiated instruction. The high overall mean suggests a positive view of these technologies in education, though there's room for improvement in adapting teaching methods more broadly to leverage their benefits fully.

Furthermore, the findings of the study is supported by Ayub A. & Khan S. (2023) explore the implementation of suggested pedagogical practices. Their study focuses on how immersive learning technologies have been integrated into these educational

programs to improve learning outcomes. By examining various pedagogical strategies, the study highlights the effectiveness of immersive technologies in engaging students more deeply with the curriculum and enhancing their learning experiences. The findings suggest that when educators effectively implement these technologies in line with recommended pedagogical practices, students exhibit improved comprehension and retention of material. This study implies the significant potential of immersive learning technologies to revolutionize educational practices and outcomes, provided there is a thoughtful alignment with pedagogical objectives.

Among the five statements on the indicator Curriculum Integration, the statement “I align the use of immersive technologies with the overall learning objectives of my course.” got the highest mean of 4.34 described as high, while the statement “I collaborate with colleagues to incorporate immersive technologies into our curriculum planning.” got the lowest mean of 4.21 described as high. The overall mean of the indicator Curriculum Integration is 4.28 and is high.

The result of the study implies that teachers are effectively aligning immersive technologies with course learning objectives, highlighting a strategic approach to tech integration. However, the lower mean for collaboration on curriculum planning suggests opportunities for improvement in interdisciplinary efforts, indicating potential for enhanced outcomes through collective planning and implementation of immersive technologies.

The findings of the study are supported by Thorburn and Collins(2023) which investigate the impact of an integrated curriculum model on teachers' pedagogical practices. This study examines how the adoption of an integrated curriculum influences the teaching methodologies and effectiveness of educators within the context of physical education. The findings reveal that integrating the curriculum not only enhances teachers' pedagogical strategies but also promotes a more holistic understanding of the subject matter among students. The study implies that an integrated curriculum model facilitates a more interconnected and relevant learning experience, encouraging educators to adopt innovative teaching methods that transcend traditional subject boundaries. This approach supports the development of comprehensive educational practices that better prepare students for the complexities of real-world challenges.

Among the five statements of the indicator Assessment Methods, the statement “I use technology to provide immediate and personalized feedback to students.” got the highest mean score of 4.41 and described as high. Meanwhile, statement “I believe immersive technology-based assessments provide a more accurate reflection of student understanding.” obtained the same lowest mean score of 4.31 which described as high. The overall mean of the indicator curriculum planning is 4.35 and is high.

The findings imply that while teachers highly value the use of technology for immediate, personalized feedback, there's a slightly lesser consensus on the accuracy of immersive technology-based assessments in reflecting student understanding. Despite this, the overall high mean indicates a strong appreciation for technology's role in assessment methods, suggesting a positive outlook on integrating technology into evaluation processes.

The implication of the study is supported by Masuku, Jili, & Sabela (2021). Their study delve into the dual role of assessment as both a pedagogical strategy and a

measurement tool in higher education. Their study emphasizes the significance of integrating assessment practices that not only measure learning outcomes but also actively contribute to the deep learning process. By analyzing various assessment methodologies, the research highlights how innovative assessment practices, possibly including technology-based methods, can foster a more engaging and effective learning environment. The findings suggest that when assessments are thoughtfully designed to be an integral part of the learning journey, they can significantly enhance students' understanding and retention of knowledge.

Table 2
Level of Pedagogical Practices

Indicators	Mean	Std. Deviation	Interpretation
A. Instructional Strategies			
1. I integrate immersive learning technologies as a key component of my instructional strategy.	4.33	.573	High
2. I adapt my teaching methods to leverage the benefits of immersive learning technologies.	4.29	.554	High
3. I use immersive technologies to provide differentiated instruction tailored to individual learning needs.	4.40	.524	High
4. I find immersive learning technologies effective in facilitating collaborative learning.	4.39	.534	High
5. I incorporate immersive technologies to make abstract or complex concepts more tangible for students.	4.36	.577	High
Category Mean	**4.35**	**.552**	**High**
B. Curriculum Integration			
1. I have successfully integrated immersive learning technologies into the existing curriculum.	4.33	.567	High
2. I collaborate with colleagues to incorporate immersive technologies into our curriculum planning.	4.21	.569	High
3. I align the use of immersive technologies with the overall learning objectives of my course.	4.34	.560	High

4. I ensure that the integration of technology does not overshadow the fundamental curriculum content.	4.26	.567	High
5. I continuously seek ways to embed immersive technologies seamlessly into various subject areas.	4.25	.540	High
Category Mean	**4.28**	**.561**	**High**
C. Assessment Methods			
1. I use immersive learning technologies to create innovative and effective assessment methods.	4.33	.538	High
2. I find that assessments using immersive technologies are more engaging for students.	4.32	.564	High
3. I believe immersive technology-based assessments provide a more accurate reflection of student understanding.	4.31	.555	High
4. I use technology to provide immediate and personalized feedback to students.	4.41	.526	High
5. I ensure that my assessment strategies with technology are fair and cater to all learning styles.	4.36	.558	High
Category Mean	**4.35**	**.548**	**High**
Overall Mean	**4.33**	**.554**	**High Level of Pedagogical Practices**

Teachers' Digital Competence

Table 3 shows the high level of Teachers' Digital Competence. The variable Teachers' Digital Competence contains three indicators namely Technological Proficiency, Professional Development, and Innovative Use of Technology obtained the overall mean score of 4.31 and standard deviation of .547 which reflected the consistency of the responses of the participants.

Among the five statements on the indicator Technological Proficiency, the statement "I am confident in my ability to select appropriate technologies to meet specific learning objectives." got the highest mean of 4.34 described as high, while the statement "I am comfortable troubleshooting basic technical issues related to immersive learning technologies." got the same lowest mean of 4.23 of described as high. The overall mean of the indicator Technological Proficiency is 4.30 and is high.

The statements of the participants imply that educators feel confident in selecting technologies that align with learning objectives, showcasing their strategic understanding of technology's role in education. However, the slightly lower confidence

in troubleshooting suggests a need for further skill development in managing technology, emphasizing the importance of technical proficiency alongside pedagogical knowledge for effective technology integration.

The implication of the study is supported by Hero (2020) which investigates the influence of principals' technology leadership on teachers' technological proficiency. This study highlights the pivotal role of school leaders in fostering an environment that supports the development of teachers' technological skills. By examining the practices and attitudes of principals towards technology integration, the research underscores how leadership can either facilitate or hinder teachers' ability to adopt and effectively use technology in the classroom. The findings suggest that strong technology leadership is crucial for enhancing teachers' confidence and proficiency with digital tools, which in turn, can significantly impact the quality of education. This study implies that the development of teachers' technological proficiency is not solely dependent on their individual efforts but is greatly influenced by the support and vision of their leaders, emphasizing the need for a collaborative approach to technology integration in schools.

Among the five statements on the indicator Professional Development, the statement “I actively participate in professional development opportunities related to immersive learning technology.” And “I contribute to professional discussions about the use of immersive learning technologies in education.” got the same highest mean of 4.37 which described as high, while the statement “I seek out collaboration with peers to improve my use of immersive technologies in teaching.” got the lowest mean of 4.29 and described as high. The overall mean of the indicator Professional Development is 4.34 and is high.

The results indicate that educators are highly engaged in professional development activities and discussions regarding immersive learning technologies, reflecting a proactive approach to enhancing their teaching practices. However, the slightly lower mean for seeking peer collaboration suggests a potential area for growth, emphasizing the importance of collaborative learning experiences in fostering technological integration and pedagogical improvement.

Similarly, the implication of the study is supported by Zhang W (2022) which explores the impact of technology-based education on teacher professional development. The study provides insight into how integrating technology into EFL teaching not only enhances language learning outcomes but also significantly contributes to the professional growth of teachers. By embracing digital tools and resources, teachers develop new instructional strategies and improve their pedagogical skills, which are crucial for effective language teaching. The study suggests that technology-based education serves as a catalyst for continuous professional development, encouraging teachers to adopt innovative practices and remain responsive to the evolving educational landscape. This study implies that sustained professional development in technology use is essential for teachers to effectively meet the demands of modern EFL classrooms and improve student learning experiences.

Among the five statements on the indicator Innovative Use of Technology, the statement “I experiment with new and innovative ways to incorporate technology into my teaching.” got the highest mean of 4.36 described as high, while the statement “I consider the ethical implications of the immersive technologies I choose to use in

education." got the lowest mean of 4.21 described as high. The overall mean of the indicator Innovative Use of Technology is 4.28 and is high.

This means that educators are actively seeking and embracing innovative approaches to integrate technology into their teaching, indicating a strong commitment to enhancing educational practices through digital means. However, the relative lower emphasis on the ethical considerations of technology use suggests an area for further development, highlighting the need for a balanced approach that includes ethical deliberation in the adoption of new technologies.

The study of Buabeng-Andoh C. (2022) examines the innovative use of computer technologies by teachers in selected Ghanaian schools. This study investigates how educators integrate computer technologies into their classrooms to enhance teaching and learning. The findings reveal that teachers are increasingly incorporating digital tools to create more interactive and engaging learning environments. However, the study also identifies challenges, such as limited access to resources and insufficient training, which hinder the full potential of technology use in education. The study implies that while there is a growing trend towards innovative technology use among teachers, overcoming infrastructural and training barriers is crucial for maximizing the educational benefits of these digital tools.

Table 3
Level of Teachers' Digital Competence

Indicators	Mean	Std. Deviation	Interpretation
A. Technological Proficiency			
1. I am proficient in using various immersive learning technologies relevant to my teaching area.	4.26	.536	High
2. I regularly update my skills in immersive learning technology to stay current.	4.33	.533	High
3. I am comfortable troubleshooting basic technical issues related to immersive learning technologies.	4.23	.535	High
4. I actively seek opportunities to enhance my technological skills.	4.32	.510	High
5. I am confident in my ability to select appropriate technologies to meet specific learning objectives.	4.34	.548	High
Category Mean	**4.30**	**.532**	**High**
B. Professional Development			
1. I actively participate in professional development opportunities related to immersive learning technology.	4.37	.566	High

2. I seek out collaboration with peers to improve my use of immersive technologies in teaching.	4.29	.589	High
3. I contribute to professional discussions about the use of immersive learning technologies in education.	4.37	.560	High
4. I continually reflect on my use of technology and seek ways to improve.	4.33	.512	High
5. I encourage and support colleagues in their use of immersive learning technologies.	4.35	.537	High
Category Mean	**4.34**	**.553**	**High**
C. Innovative Use of Technology			
1. I experiment with new and innovative ways to incorporate technology into my teaching.	4.36	.558	High
2. I believe in taking creative risks with technology to enhance learning.	4.30	.564	High
3. I am always on the lookout for pioneering immersive technologies to apply in my classroom.	4.30	.539	High
4. I share my experiences and innovative practices with immersive technology with my peers.	4.22	.559	High
5. I consider the ethical implications of the immersive technologies I choose to use in education.	4.21	.567	High
Category Mean	**4.28**	**.557**	**High**
Overall Mean	**4.31**	**.547**	**High**

Relationship between the Variables

Table 4 presents the results of correlational analysis of the variables between Immersive Learning Technology and Pedagogical Practices, Immersive Learning Technology and Teachers' Digital Competence, and Pedagogical Practices and Teachers' Digital Competence. The result indicates that these variables have a significant relationship with each other.

Particularly, the reported results demonstrate that the correlation between Pedagogical Practices and Immersive Learning Technology yielded a p value of.000, which is less than the 0.05 level of confidence, indicating that a correlation can be inferred between the two variables is high. With a moderate degree of correlation (r=.447), the null hypothesis "There is no significant relationship between Pedagogical Practices and Immersive Learning Technology." is consequently rejected.

The implication of the study is supported by Buragohain et al., (2024) which delve into the influence of immersive learning technologies on teacher effectiveness. This comprehensive analysis assesses how immersive technologies, such as virtual reality (VR) and augmented reality (AR), affect pedagogical practices and subsequently teacher performance. The study suggests that such technologies not only aid in better comprehension and retention of information among students but also empower teachers by expanding their pedagogical repertoire. This implies that the integration of immersive learning technologies has the potential to revolutionize educational practices, making them more effective and dynamic. The study underscores the need for ongoing professional development and support for educators to fully leverage these technologies in enhancing teaching effectiveness.

Moreover, it was revealed the result of correlation analysis that the reported results demonstrated that the correlation between Immersive Learning Technology and Teachers' Digital Competence yielded a p value of.000 which is less than the 0.05 level of confidence, indicating that a correlation can be inferred between the two variables is high. Thus, the null hypothesis which states that "There is no significant relationship between Immersive Learning Technology and Teachers' Digital Competence" is therefore rejected with a high degree of correlation (r=.478).

The findings of the study is supported by Kee et al., (2023) investigates the effects of immersive technology on hybrid learning in design education. Their study demonstrates that virtual and augmented reality significantly improve student engagement and comprehension in a hybrid learning environment. It highlights the crucial role of teachers' digital competence in effectively integrating these technologies into teaching practices. The findings suggest that enhancing teachers' skills in using immersive technologies directly improves educational quality, emphasizing the need for professional development in digital competencies.

Furthermore, from the result presented, it shows that the correlation between Pedagogical Practices and Teachers' Digital Competence revealed a p value of .000 which is less than the value of 0.05 level of confidence which indicates that there is a relationship that can be drawn from the two variables indicated. Thus, the null hypothesis which states that "There is no significant relationship between Pedagogical Practices and Teachers' Digital Competence" is therefore rejected with a moderate degree of correlation (r=.392).

The results of the study are supported by Orakova et al., (2024) which delve into the nexus between teachers' pedagogical and technological competence and their level of digital literacy in their study published in the Journal of Curriculum Studies Research. The findings suggest a significant correlation where higher levels of pedagogical and technological competence are associated with elevated digital literacy among teachers. This relationship underscores the importance of integrating digital tools into teaching practices not just as a supplementary element but as a core component of educators' professional development. The study implies that fostering a robust foundation in both pedagogical strategies and technological fluency is crucial for teachers to navigate the digital demands of contemporary education effectively, thereby enhancing their ability to deliver more dynamic and engaging learning experiences.

Table 4
Relationship between the Variables

VARIABLES	R	p-value	Remarks
Immersive Learning Technology and Pedagogical Practices	.447**	.000	Significant
Immersive Learning Technology and Teachers' Digital Competence	.478**	.000	Significant
Pedagogical Practices and Teachers' Digital Competence	.392**	.000	Significant

*Significant at .05 level

Predictors of Teachers' Digital Competence

Table 5 revealed the results of regression analysis that immersive learning technology and pedagogical practices has significant influence on teachers' digital competence as reinforced by the magnitude with their respective p-value which is all less than 0.05. It was revealed that immersive learning technology ($r=.498$, $p<0.05$) is the best predictor of teachers' digital competence. Thus, it was revealed that in every increase of a single unit in immersive learning technology, an increase of .498 in teachers' digital competence can be expected.

Moreover, Althubyani (2024) supports the study as he conducts a comprehensive study exploring the digital competence of teachers and its influencing factors. The study highlights immersive learning technologies as a key predictor of digital competence, demonstrating that teachers who utilize these technologies show enhanced ability to integrate digital tools into their teaching. The findings underline the importance of immersive technologies in not only enriching educational practices but also in advancing teachers' digital skills. It suggests that engagement with such technologies is crucial for developing the digital competence required in today's educational environment, emphasizing the need for opportunities that allow teachers to explore and adopt these emerging technologies.

Moreover, teachers' pedagogical practices ($r= .156$, $p< 0.05$) is also the predictor of teachers' digital competence. Thus, it was revealed that in every increase of a single unit in teachers' pedagogical practices, an increase of .468 in teachers' digital competence can be expected.

The findings of the study are supported by Guillén-Gámez et al., (2022). They analyze predictors of teachers' digital competence. The study reveals that engaging in innovative pedagogical practices directly correlates with higher digital competence among teachers, enhancing their ability to offer effective online guidance. This research emphasizes the significant impact of pedagogical strategies on developing digital skills, suggesting that pedagogical innovation is crucial for teachers' digital adeptness. It posits that enhancing pedagogical skills is a pivotal approach to bolstering digital competence, crucial for the effectiveness of modern educational practices and online instruction.

Furthermore, the model explains that 24.7 % of the variance between the immersive learning technology and pedagogical practices on teachers' digital competence. This shows that the remaining 75.3% of the variance of the variables can be attributed to other factors aside from the recognized variables.

Table 5
Influence of Pedagogical Practices and Immersive Learning Technology on Teachers' Digital Competence

Variables	Unstandardized Coefficients		Standardized Coefficient	T	p-value	Remarks
	B	Std. Error	Beta			
(Constant)	1.508	.299		5.044	.000	
Immersive Learning Technology	.498	.062	.429	7.992	.000	Significant
Pedagogical Practices	.156	.058	.143	2.671	.004	Significant

Note: R=.497[a], R-square=.247, F=48.799, P>.05

Mediating Effect of Immersive Learning Technology between Pedagogical Practices and Teachers' Digital Competence

Table 6 shows the use of Med graph involving Sobel Test provides analysis on the significance of mediation effect. Hence, it can determine whether the mediation is full or partial. As can be gleaned in figure, the direct effect of immersive learning technology on pedagogical practices is decreased from beta of .478 to .151 when mediator variable was placed in the relationship model. Since the direct effect of immersive learning technology between pedagogical practices is no longer significant, it would imply a partial mediation.

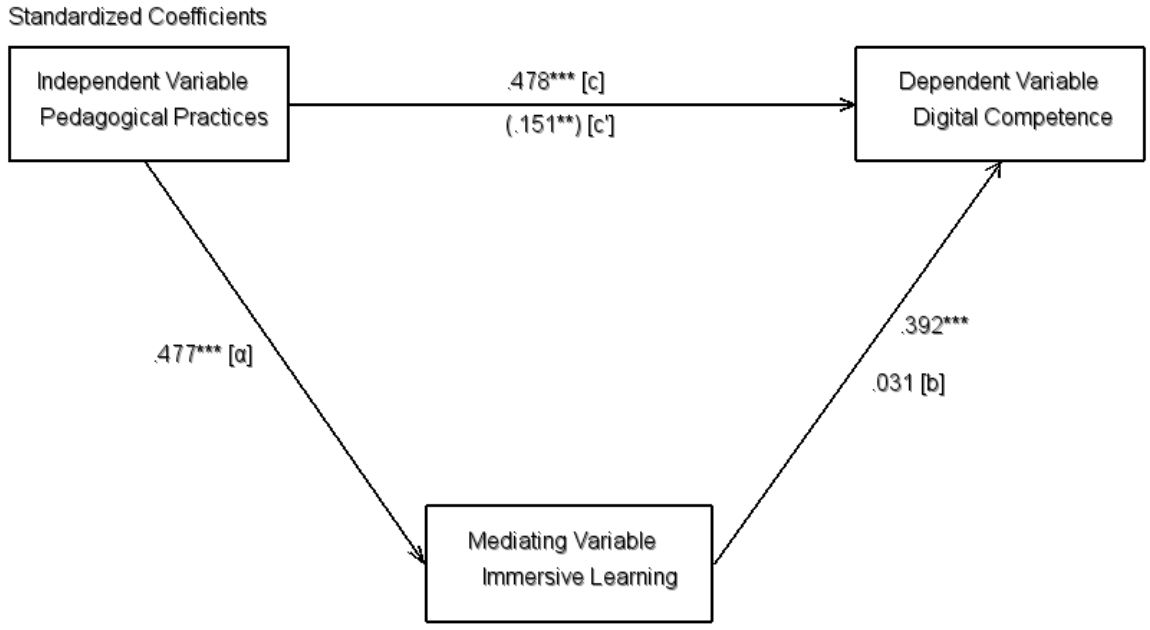
Meanwhile, the Sobel's test denotes that there is a significant mediation that take place in the model (2.373264, p=0.017632). Since it is partial mediation, it could totally claim that immersive learning technology is the reason how pedagogical practices can influence teachers' digital competence. This indicates that immersive learning technology is a contributory factor on how pedagogical practices affects teachers' digital competencies.

On the other hand, the effect size (β=.064) measure how much of the effect of pedagogical practices (IV) on teachers digital competence (DV) can be attributed to the indirect path (IV to MV to DV). The total effect (β=.478) is the summation of both direct effect and indirect effect. The direct effect (β=.429) is the size of correlation between pedagogical practices (IV) and teachers' digital competence (DV) with immersive learning technology (MV) included in the regression.

The indirect to total ratio index reveal an R-square of .454. This means that about 45.4 percent of the total effect of IV on the DV goes through MV, and zero percent of the total effect is either direct or mediated by other variables not included in the model.

Table 6
Type of Mediation Used

Type of Mediation	Significant	
Sobel z-value	2.373264	p = 0.017632
95% Symmetrical Confidence Interval		
	Lower	.04096
	Higher	.42953
Unstandardized indirect effect		
	a*b	.23525
	se	.09912
Effective Size Measures		
Standardized Coefficients		R2 Measures (Variance)
Total:	.478	.243
Direct:	.429	0000
Indirect:	.064	.243
Indirect to Total ratio:	.133	0000



NOTE: The numerical values in the parentheses are beta weights taken from the second regression and the other values are zero order correlations.

QUALITATIVE STRAND

This part obtained the results from the qualitative data in analyzing the mediating role of immersive learning technology as estimated by pedagogical practices and teachers' digital competence.

Essential themes that Emerged from Lived Experiences of Teachers' Pertaining to Immersive Learning Technology as Estimated by Pedagogical Practices and Teachers' Digital Competence

Enhancing Learning Engagement. This theme focuses on leveraging immersive learning technologies to captivate learners, making education more interactive and effective. By simulating real-world scenarios and promoting active participation, these technologies significantly increase learner engagement and knowledge retention, transforming traditional educational approaches into more dynamic, immersive experiences. Thus, the significant remarks of the participants revealed below:

> *Immersive learning technology is one way of improving learners' learning experience; it can improve knowledge retention. Providing students immersive and unique educational experiences plays a great role (IDI_P1).*
>
> *Immersive learning provides learners with an environment which is highly interactive both virtually and physically. This helps in replicating possible scenarios and in teaching specific techniques or skills to the students (IDI_P4).*
>
> *Immersive learning in relevant and realistic settings can have a huge impact on the psyche of a learner.*
> *Immersive learning can grab learner's attention and activate learning action better than other learning methodologies like classroom learning (FGD_P3).*

As confirmed by participants 1 and 4 emphasizes the effectiveness of immersive learning technology in enhancing the educational experience for learners. It suggests that using immersive technology not only improves how students retain information but also plays a crucial role in providing them with unique and engaging learning opportunities. Immersive learning, by making experiences more direct and engaging, is seen as a powerful tool to deepen understanding and knowledge retention.

Also, during the Focus Group Discussions (FGD) participants 3 statement points out that immersive learning with traditional classroom learning methodologies, asserting that immersive learning is superior in capturing the attention of learners and prompting them to actively participate in the learning process. The mention of "relevant and realistic settings" underscores the importance of context and realism in immersive learning, suggesting that such environments significantly impact a learner's engagement and motivation by providing experiences that feel genuine and directly applicable to real-life situations.

The theme implies that enhancing learning engagement through immersive technologies significantly transforms educational experiences. By facilitating active participation and situational learning, students achieve higher retention rates and deeper understanding. Educators must integrate immersive methods thoughtfully, considering access and training needs, to maximize benefits and address the diverse learning preferences of students.

Moreover, it is confirmed in the study of Barbour, M. K., & Reeves, T. C. (2021) that the core premise of immersive learning is the creation of a learning environment that mimics real-life scenarios, thereby providing learners with hands-on, experiential learning opportunities. These environments are characterized by their ability to engage learners physically and virtually, offering an interactive experience that transcends traditional classroom boundaries. The immersive nature of these technologies enables learners to explore complex concepts and practice skills in safe, controlled settings, thereby enhancing their understanding and retention of material.

The ideas are supported by Bergin, D. A. (2020), he revealed that immersive learning environments significantly increase learner engagement. This is attributed to the sensory-rich experiences provided by these technologies, which capture learners' attention more effectively than conventional teaching methods. The interactive and realistic aspects of immersive learning stimulate curiosity and motivate learners to actively participate in the learning process. This heightened engagement is crucial for deep learning, as it encourages learners to invest more effort and attention in their educational activities.

Also, **Methodology and Technology Integration** was the theme emerged that emphasizes the strategic fusion of immersive learning technologies with educational methodologies to enhance teaching and learning. It focuses on adopting virtual and augmented realities to simulate real-life scenarios, thereby providing a more effective, experiential learning environment that aligns with pedagogical goals. The significant statements of the participants revealed below:

> *Immersive Learning is an experiential training methodology that uses Virtual Reality to simulate real-world scenarios and train employees in a safe and engaging immersive training environment (IDI_P2).*
>
> *Immersive learning is the process of learning with the usage of a simulated or artificial environment. The environment enables the learners to completely get immersed in the learning and in a way that feels like experiencing an actual learning environment (IDI_P3).*
>
> *Immersive learning technology is how we employ and integrate technology in our teaching in order to improve our teaching effectively, achieve our goals in teaching learners (FGD_P7).*

The statements from participants IDI_P2 and IDI_P3 outlines immersive learning as a hands-on, practical training approach utilizing Virtual Reality (VR) technology to recreate realistic scenarios for employee training. It emphasizes creating a safe and captivating training environment that allows employees to engage deeply with the

learning material, simulating real-world experiences without the associated risks. This method is particularly valued for its ability to offer practical skills and situational awareness in a controlled, immersive setting, enhancing the effectiveness of the training process.

Additionally, the various statements of the participants 7 imply that reflects on the strategic use of immersive learning technology in education, focusing on how technology is integrated into teaching practices to improve outcomes and achieve educational goals. It implies a deliberate and thoughtful application of immersive technologies to enhance traditional teaching methods, making learning more effective and aligned with the learning objectives. The emphasis is on the practical application of technology to enrich the educational experience, suggesting a move towards more innovative, interactive, and technologically integrated approaches to teaching and learning.

This implies that integrating immersive learning methodologies and technologies in education necessitates thoughtful planning and resource allocation. It promises enhanced engagement and realism in learning experiences, requiring educators to adapt to new teaching paradigms. Success hinges on technical support, professional development, and aligning technology with pedagogical objectives to realize its full potential.

The ideas are supported by Berger, H. (2021) that Immersive learning technologies offer a novel approach to education, allowing learners to engage with content in a highly interactive, simulated environment. These technologies are not merely tools but are part of an integrated approach that blends traditional pedagogical strategies with innovative technological solutions. The aim is to provide learners with experiences that are not possible in a conventional classroom setting, such as simulating complex real-world scenarios or historical events in a fully immersive 3D environment.

Further, Boling, E., & Smith, K. M. (2021) study supported that the importance of technology integration in fostering personalized learning. Immersive technologies can be adapted to suit individual learning styles and paces, offering customized pathways through educational content. This personalization is crucial for accommodating diverse learner needs and maximizing educational outcomes for all students.

Furthermore, the theme that emerges from these practices is **Educator Skill Development**. The "Educator Skill Development" theme underscores the necessity for teachers to acquire and refine digital and pedagogical competencies to effectively integrate immersive learning technologies into teaching. It emphasizes ongoing professional training and support, enabling educators to utilize advanced tools and methodologies that enhance the learning experience for students. The significant statements of the participants revealed below:

> *To effectively employ immersive learning technologies, teachers need to develop specific digital competence like technical competence or technological competence (IDI_P3).*
>
> *The successful integration of immersive learning technologies largely depends on the school's capacity to train educators in how to operate these devices and integrate them into teaching (FGD_P4).*

The statements as revealed by participants 3 statements concluded that highlights the importance of educators developing specialized digital skills to effectively use immersive learning technologies in their teaching. It suggests that beyond general digital literacy, teachers need a deeper level of technical knowledge and competence. This includes understanding how to operate immersive technology tools such as virtual reality (VR), augmented reality (AR), and mixed reality (MR) systems, as well as integrating these technologies into educational content in a way that enhances learning outcomes.

Furthermore, during the Focus Group Discussions (FGD), the statements of the participants 4 confirmed that the essential role of educational institutions in supporting the successful implementation of immersive learning technologies. It indicates that the integration of such technologies into the curriculum is not solely dependent on the availability of devices and software but significantly relies on the institution's commitment to providing comprehensive training for educators.

This implies that the necessity for educator skill development in immersive learning technologies implies a significant shift towards more digitally competent teaching staff. Success hinges on comprehensive training programs that enhance technical and pedagogical skills, ensuring educators can effectively integrate these technologies into curricula, thereby enriching the student learning experience.

Similarly, the statements corroborated the ideas of Chang, C. C., & Hwang, G. J. (2021) that Educator skill development in the context of immersive learning technologies encompasses a broad spectrum of competencies, including technical skills related to the operation of these technologies, pedagogical skills for integrating technology into teaching strategies, and digital literacy skills to navigate the evolving digital education landscape. This comprehensive skill set is crucial for educators to create engaging, effective, and meaningful learning experiences for students.

Additionally, Clark, D. B., & Nelson, B. C. (2020) study, while immersive learning technologies have the potential to enhance student engagement and learning outcomes significantly, their success largely depends on the ability of educators to effectively design, implement, and facilitate these experiences. This necessitates ongoing professional development opportunities that are tailored to the specific demands of immersive technology integration. Such training should not only address the operational aspects of these technologies but also pedagogical strategies that leverage their unique capabilities to enhance learning.

However, the theme **Technological Implementation Challenges** which focuses on the obstacles faced when integrating immersive learning technologies into educational settings. These include issues like high costs, technical complexities, insufficient infrastructure, and the need for substantial educator training. Overcoming these challenges is crucial for harnessing the full potential of technology to enhance learning experiences. The significant statements of the participants revealed below:

> *Technologies can be complex and require advanced technical skills to develop and maintain. Technical issues such as hardware malfunctions or connectivity problems can also disrupt the learning experience (IDI_P8).*

> *One of the challenges that I encountered in aligning immersive learning technology with pedagogical goals and digital competencies in the infrastructure ensuring that your network devices and software are up to the task of delivering immersive experiences might be difficult to do (IDI_P10).*
>
> *Poor internet connection, lack of budget for internet connectivity and lack of knowledge about computer technology/literacy are some challenges that I have encountered on the implementation of immersive learning (FGD_P2).*
>
> *The challenges that I encounter is that if there are some applications that we need to use to deliver some of my lessons and I am not familiar using it, I encounter difficulties in using such application (FGD_P3).*

The statements as revealed by participants 8 and 10 statements concluded that the inherent complexities associated with integrating technology into learning environments. It highlights that not only do these technologies require advanced skills to develop and maintain, but they also come with their set of operational challenges, such as hardware malfunctions and connectivity issues. These technical difficulties can significantly hinder the learning process by causing disruptions and distractions, underscoring the need for robust technical support and infrastructure to ensure a smooth educational experience.

Furthermore, during the Focus Group Discussions (FGD), the statements of the participants 2 and 3 confirmed that practical challenges encountered in implementing immersive learning, emphasizing issues like poor internet connectivity, budget constraints for internet infrastructure, and a general lack of computer technology literacy. These factors represent significant barriers to the effective use of immersive learning technologies, as they limit access to digital resources and hinder the ability of educators and learners to engage fully with the technology.

This implies that Technological implementation challenges in education underscore the need for robust infrastructure, comprehensive training, and sustainable funding models. Addressing these barriers is essential for harnessing the potential of immersive technologies to enhance learning experiences, requiring strategic planning, collaboration, and continuous support for educators and students to navigate these obstacles effectively.

Correspondingly, the statements are supported by Dalgarno, B., & Lee, M. J. W. (2022). The complexity of immersive learning technologies such as virtual reality (VR), augmented reality (AR), and mixed reality (MR) necessitates advanced technical skills for development, maintenance, and effective utilization. Educators and IT staff must possess a deep understanding of these technologies to troubleshoot issues, develop engaging content, and maintain the hardware and software required for immersive learning environments. This presents a significant challenge for institutions lacking in-house expertise or resources to invest in professional development.

Additionally, the ideas of Guzdial, M., & Tew, A. E. (2022) confirmed that hardware malfunctions and connectivity problems are common issues that disrupt the

learning experience. The reliability of technology is paramount in maintaining a conducive learning environment. Interruptions due to technical failures can detract from the learning objectives and reduce the efficacy of immersive learning experiences. This highlights the importance of having robust IT support and infrastructure in place to minimize downtime and ensure a smooth operation of technology-enabled learning activities.

Although, **Enhancing Engagement & Retention** was another theme emerged which focuses on utilizing immersive learning technologies to deepen learner involvement and improve memory recall. By creating interactive, realistic learning scenarios, these technologies foster a more engaging educational experience, leading to higher engagement levels and better retention of information, ultimately enriching the learning process. Thus, the significant responses of the participants revealed below:

> *Immersive Learning experiences capture learner's attention and increase engagement in the teaching-learning process (IDI_P4).*
>
> *These technologies' interactive and realistic nature stimulates curiosity and promotes active participation in the studying process (IDI_P5).*
>
> *Technologies enable learners to collaborate and engage with peers and teachers (FGD_P7).*
>
> *One of the biggest challenges is keeping learners engaged and motivated. Immersive technology provides an immersive and interactive learning experience that is more engaging than traditional methods. Technologies can improve information retention and recall. For example, if a learner who learned using VR remembered information better than those who learned through traditional methods (FGD_P9).*

The significant remarks of the participants 4 and 5 revealed that immersive learning experiences, through their engaging and interactive nature, are effective in capturing the attention of learners. By directly involving students in the learning process, these experiences significantly enhance engagement, making the educational journey more compelling and interactive than traditional learning environments. The emphasis is on the unique ability of immersive technologies to captivate learners, fostering a deeper connection with the material being taught.

Also, the ideas were confirmed by the participants 7 and 9 during the Focus Group Discussions (FGD) that the challenge of maintaining learner engagement and motivation is addressed, with immersive technologies presented as a solution. By offering immersive and interactive experiences that surpass traditional learning methods, these technologies are shown to significantly enhance learner engagement and motivation.

The statement implies that Enhancing engagement and retention through immersive learning technologies implies a significant shift towards interactive and realistic educational experiences. These technologies foster deeper learner involvement and superior memory recall, necessitating educators to adapt and innovate in teaching

strategies. Successfully integrating these tools can transform educational outcomes, making learning more effective and enjoyable.

Similarly, the ideas are corroborated to the findings of Hwang, G. J., & Wu, P. H. (2021), Immersive learning experiences are characterized by their ability to captivate learners' attention through immersive simulations, fostering an environment where students are not mere passive recipients of information but active participants in their learning journeys. Studies have shown that this increased level of engagement not only makes learning more enjoyable but also enhances students' ability to recall information over time. This is attributed to the experiential nature of immersive learning, where learners can visualize complex concepts and practice skills in a context that mirrors real-life scenarios.

Furthermore, the implications of the study are supported by Johnson, L. (2021) that the interactive and realistic nature of these technologies plays a crucial role in stimulating students' curiosity. By providing an exploratory learning space, immersive technologies encourage learners to investigate and interact with the material in depth, promoting a deeper understanding of the subject matter. This active participation is instrumental in the learning process, as it facilitates the construction of knowledge through experiences, thereby enhancing both engagement and retention.

Notably, the theme **Educator Training & Readiness** highlights the importance of equipping teachers with the necessary skills and knowledge to effectively incorporate immersive learning technologies into their teaching practices. It emphasizes professional development, familiarity with digital tools, and pedagogical strategies to ensure educators are prepared to enhance the learning experience with technology. Thus, the significant remarks of the participants revealed below:

> *The successful integration of immersive learning technologies largely depends on school capacity to train educators in how to operate these devices and integrate them into teaching (IDI_P4).*
>
> *The successful integration of immersive learning technologies largely depends on school capacity to train educators in how to operate these devices and integrate them into teaching (FGD_P7).*

The participants 4 statements point out that the success of incorporating immersive learning technologies into educational settings is heavily reliant on the ability of schools to provide comprehensive training for educators. This training encompasses not just the operational aspects of using these devices but also how to effectively integrate them into pedagogical practices.

Further, the ideas were confirmed by the participants 7 during the Focus Group Discussions (FGD) that the emphasis is on the institutional responsibility to equip teachers with the skills and knowledge needed to leverage these technologies to enhance the learning experience, indicating that the school's commitment to professional development is key to the effective use of immersive learning tools in teaching.

This implies that underscores the critical role of professional development in the effective use of immersive learning technologies. It implies that without sufficient

training, educators may struggle to harness these tools' full potential, impacting the quality of education and the achievement of learning objectives.

The implications are supported by Koehler, M. J., & Mishra, P. (2020). They gave lighted to the gap in digital competence among educators as a primary barrier to the integration of immersive technologies in education. Many teachers express a keen interest in employing these tools but face challenges due to a lack of familiarity and confidence in their ability to integrate them into their teaching practices. This gap underscores the need for targeted professional development initiatives that address both the technological and pedagogical aspects of immersive learning.

However, Kozma, R. B. (2021) also confirmed that Professional development programs focusing on immersive learning technologies are shown to increase teachers' confidence and competence in using these tools. Such programs typically cover a range of topics, including the operation of specific technologies, design of immersive learning experiences, and strategies for integrating these experiences into the curriculum. By participating in these training opportunities, educators can gain the necessary skills to create engaging and interactive learning environments that capitalize on the benefits of immersive technology.

Correspondingly, another theme emerged was **Strategic Technology Integration**. The "Strategic Technology Integration" theme emphasizes the thoughtful incorporation of digital tools into educational practices, ensuring technology aligns with pedagogical goals. It involves planning, support, and evaluation to enhance learning outcomes, requiring educators to skillfully blend technology with curriculum content to create engaging and effective learning environments. Thus, the remarks of the participants revealed below:

> *Enhancing engagement and retention to providing realistic simulations and allowing for remote and flexible learning. Immersive learning technology offers a range of advantages that can transform the way we approach education and training (IDI_P1).*
>
> *By embracing these technologies, we can create a more engaging, effective, and efficient learning experience for learners across the globe (IDI_P4).*
>
> *The integration of information technology will help to further accelerate education and take it to places that it has never been before (FGD_P4).*

From the statements of the participants, participants 1, and 4 that the benefits of immersive learning technology in enhancing student engagement and retention. It points to the ability of such technologies to provide realistic simulations and facilitate remote and flexible learning opportunities. The emphasis is on the transformative potential of immersive technologies to redefine traditional educational and training approaches, making learning experiences more engaging and effective through the use of simulations that mirror real-world scenarios.

In addition, during the interview for Focus Group Discussions, participants 4 pointed out that the role of information technology integration in advancing education. It suggests that incorporating digital tools and platforms into educational practices will not

only enhance current teaching and learning processes but also expand the reach and possibilities of education to unprecedented levels. The emphasis is on the acceleration of educational progress through technology, implying that such integration can unlock new possibilities for teaching and learning, making education more accessible and innovative.

This implies that Strategic technology integration emphasizes thoughtfully incorporating digital tools to enhance learning, necessitating a balance between technological opportunities and pedagogical goals. It involves continuous educator development, infrastructure investment, and evaluating educational outcomes, ensuring technology serves as a catalyst for innovation and accessibility in education, rather than a mere add-on.

The implications are supported by Liu, T. Y., Lin, Y. C., Tsai, M. J., & Paas, F. (2021). A foundational aspect of strategic technology integration is the alignment of technological tools with pedagogical objectives. The literature highlights the importance of ensuring that the adoption of any new technology is driven by clear educational goals rather than being technology-led. This approach ensures that digital tools are used to enhance learning experiences in meaningful ways, supporting curriculum objectives and addressing the specific needs of learners. Studies have shown that when technology integration is thoughtfully aligned with pedagogical aims, it can significantly improve student engagement, motivation, and learning outcomes.

Also, Looi, C. K. (2021) supported the idea that strategic technology integration facilitates personalized learning experiences tailored to individual student needs. Digital tools such as adaptive learning platforms, educational apps, and online resources enable educators to differentiate instruction, provide targeted support, and offer opportunities for self-directed learning. This personalized approach to instruction promotes student autonomy and fosters a deeper sense of ownership over the learning process.

Additionally, another theme emerged was **Addressing Implementation Challenges**. Addressing Implementation Challenges focuses on overcoming obstacles encountered during the integration of new educational technologies. It emphasizes identifying and resolving barriers such as technical issues, resource constraints, and resistance to change to ensure successful adoption and effective utilization of innovative teaching tools and methods. Thus, the remarks of the participants revealed below:

> *I have observed during my class that my pupils are more interested in having our class, they pay attention whenever I used interactive games during evaluation (IDI_P5).*
> *Immersive learning technology is best used as a complementary tool, rather than as a replacement for traditional teaching methods (IDI_P6).*
> *It is vital to bring in the voice of the students, to understand their needs and to get their feedback (FGD_P8).*

From the statements of the participants, participants 5 and 6 that reflects the positive impact of interactive games on student engagement and attention during classes. It indicates that when immersive learning techniques, such as interactive

games, are incorporated into teaching practices, students become more interested and attentive, resulting in a more effective learning environment.

In addition, during the interview for Focus Group Discussions, participants 8 pointed out that the importance of student input and feedback in the educational process. It suggests that educators should actively seek the perspectives of students to understand their needs, preferences, and learning experiences. By incorporating student feedback, educators can tailor their teaching methods and curricula to better meet the needs of their students, ultimately enhancing the learning outcomes.

This implies that overcoming obstacles such as technical issues and resistance to change to ensure successful adoption of educational technologies. It underscores the importance of proactive problem-solving and collaboration to optimize the integration process and maximize the benefits of innovative teaching tools.

The implications are supported by Mayer, R. E. (2021). Technical issues represent one of the most common implementation challenges in educational technology integration. Research indicates that issues such as hardware malfunctions, software compatibility issues, and network connectivity problems can significantly impede the effective use of technology in the classroom. These technical challenges often require timely troubleshooting and technical support to minimize disruptions to teaching and learning activities.

Also, Mishra, P., & Koehler, M. J. (2021) supported the resistance to change among educators and stakeholders is another key implementation challenge identified in the literature. Educators may be hesitant to embrace new technologies due to concerns about their effectiveness, lack of familiarity with the tools, or fear of increased workload. Addressing this resistance requires proactive communication, professional development opportunities, and ongoing support to help educators overcome apprehensions and build confidence in using technology.

Joint display of Quantitative and Qualitative Results

The data of salient quantitative and qualitative results. It reveals the nature and purpose of data integration in both quantitative and qualitative findings of the study.

In the aspect of the status of the first variable Level of Immersive Learning Technology obtained the three indicators such as Technology Utilization, Student Engagement, and Learning Outcomes obtained the overall mean score of 4.33 and standard deviation of 0.530 which reflects the consistency of the responses of the participants. But as far as the themes are concerned, the result of the interview confirmed the three indicators. Hence, it forms an axiological implication that the goal of Immersive Learning Technology is to is to enhance learning engagement, integrate methodology and technology effectively, and improve learning outcomes. This aligns with the need for educator skill development and addresses technological implementation challenges, ultimately aiming to boost engagement and retention through strategic technology integration.

In the aspect of Pedagogical Practices, all items from the variable of 1.2. Teachers' Pedagogical Practices are high. The indicators under this variable ranging from 4.21-4.41 and the overall mean score of 4.33 .554 which interpreted as high level

of teachers' pedagogical practices. Participants justify the result describe as high of Teachers' pedagogical practices. The result suggest a robust framework for educational excellence. This confirms the effectiveness of current methodologies and underscores the need for ongoing professional development to merge traditional and innovative practices, fostering a connected and dynamic learning environment.

Furthermore, in the aspect of Teacher's Digital Competence, the three indicators of Teacher's Digital Competence such as Technological Proficiency, Professional Development, and Innovative Use of Technology obtained the overall mean score of 4.31 and standard deviation of .547 which reflected the consistency of the responses of the participants. These indicators obtained the mean score ranging from 4.21-4.37 which interpreted as High Level of Teachers' Digital Competence. Participants justify the result describe as high of Teacher's Digital Competence. The result highlighted a foundational digital adeptness among educators. This consistency underscores the importance of confirming, merging, and connecting technological proficiency with professional development and innovative practices. Such competence fosters a conducive learning environment, embracing both current and emerging educational technologies.

CONCLUSIONS

Based on the summary of findings from the quantitative and qualitative results, the following conclusion may establish:

1. The descriptive results highlight a significant engagement with immersive learning technology, evidenced by a consistent overall mean score of 4.33. This suggests a strong and uniform application of technology in enhancing student engagement, learning outcomes, and overall technology utilization across educational settings.
2. The data indicates a high level of pedagogical practices among educators, with an overall mean score of 4.33. This reflects a widespread adoption of effective instructional strategies, curriculum integration, and assessment methods, showcasing a commitment to high-quality teaching and learning processes.
3. Findings show a high level of digital competence among teachers, as demonstrated by an overall mean score of 4.31. This underscores the significant role of technological proficiency, ongoing professional development, and the innovative use of technology in educators' practices.
4. The analysis revealed significant correlations between immersive learning technology and pedagogical practices, as well as between immersive learning technology and teachers' digital competence. Additionally, a significant relationship was identified between pedagogical practices and teachers' digital competence, highlighting the interconnected nature of these variables in enhancing educational outcomes.
5. Regression results indicate that immersive learning technology and pedagogical practices are key predictors of teachers' digital competence. This emphasizes the critical role of both elements in developing and enhancing educators' digital skills and capabilities.
6. The Sobel test findings suggest that immersive learning technology acts as a significant mediator between pedagogical practices and teachers' digital

competence, highlighting the integral role of technology in linking teaching methods and digital proficiency.

7. The thematic analysis of teachers' experiences identified eight key themes, including the integration of methodology and technology, skill development, and the challenges of technological implementation. These themes reflect the complex landscape of using immersive learning technology in education and the diverse factors that influence its effectiveness.
8. The integration of quantitative and qualitative data provided a comprehensive view of the study's findings, confirming, merging, and connecting the significant relationships between immersive learning technology, pedagogical practices, and teachers' digital competence. This comprehensive approach underscores the multifaceted impact of technology in education and the importance of a holistic understanding of its application and implications.

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