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From a Teacher's Perspective, How Has Using Innovative Pedagogy Affected Primary Students' Academic Engagement?

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Abstract

Background: Innovative pedagogical strategies, such as integrating technology and play-based learning, are increasingly used to enhance primary students' academic engagement.

Purpose: The purpose of this study is to assess the benefits and challenges associated with innovative pedagogical approaches in primary education. It aims to understand how digital tools, differentiated instruction, and hands-on activities influence student motivation, participation, and comprehension of key concepts.

Methods: A mixed-method approach was employed, involving qualitative data from teacher interviews, classroom observations, and online sources. The study was conducted in government and non-government primary schools in Victoria, Australia. The sample consisted of 21 primary school teachers selected through convenience sampling. Data collection tools included guided interviews, direct observations of classroom practices, and document analysis of teaching resources and NAPLAN results. Thematic analysis was used to identify recurring patterns and themes.

Results: Findings indicate that innovative pedagogical strategies positively impact student engagement, with teachers reporting increased motivation and participation when using technology and play-based learning. However, challenges such as inadequate teacher training, resource limitations, and misalignment with curriculum goals were noted. The study also revealed inconsistencies between technology use and academic outcomes, suggesting a need for further research.

Conclusion :The study suggests that innovative pedagogical strategies can significantly enhance primary students' academic engagement. However, their success depends on adequate teacher training, proper resource allocation, and alignment with curriculum objectives. Further research is recommended to explore these inconsistencies and optimize pedagogical approaches in primary education.

Keywords: Innovative pedagogy, primary education, academic engagement, technology integration, play-based learning, teacher perspectives, differentiated instruction.

Introduction

Developing and implementing effective classroom management and lesson planning are essential for pre-service and graduate teachers to foster student engagement in their teaching practice. The Australian Professional Standards for Teaching (APST) emphasize the use of creative strategies and resources, including ICT, to enhance student participation, development, and equitable access to content (APST 1.1, 6; 2.6; 3.3, 4; 4.1) (Australian Institute for Teaching and Leadership

[AITSL], 2018). Engagement encompasses various forms, including behavioral, physical, cognitive, and academic aspects related to self-efficacy, attentiveness, and persistence (Barghaus et al., 2016; Boyce et al., 2014).

The current educational landscape calls for innovative pedagogical approaches that cater to diverse student learning needs and promote academic outcomes and well-being (Heredotou et al., 2019; Zhang et al., 2020). Traditional teaching methods have shown limitations in meeting the needs of today's students, prompting a shift toward active, student-centered approaches that foster critical thinking, problem-solving, and digital literacy (Zhang et al., 2020). By incorporating modern pedagogical models such as play-based learning and technology integration, educators can promote inclusivity, engagement, and sustainable learning practices (Chigbu et al., 2019; Zhao et al., 2019).

Play-based learning, often employed in preschool and lower primary settings, leverages students' intrinsic motivation to engage in activities that promote learning (Kobylak & Kalyn, 2017). Research indicates that play-based learning positively impacts students' executive function, self-regulation, and school readiness (Allee-Herndon & Killingsworth Roberts, 2021). In mathematics education, it has been found to enhance spatial language development and early arithmetic strategies (Cohen & Emmons, 2016; Simoncini et al., 2020).

However, barriers such as limited resources, space, and support from school leadership hinder its widespread implementation (Whitlock et al., 2023).

Integrating digital technologies in education is crucial for preparing students for future roles in a technology-driven world (Schindler et al., 2017). Despite a decline in Australian students' mathematical performance (Odell et al., 2020), technology integration has shown promise in improving student engagement and academic outcomes (Thurm & Barzel, 2021; Alalwan, 2022).

Interactive and visually stimulating platforms, such as virtual manipulatives, can enhance student engagement in math (Osamah et al., 2019). However, inconsistencies between technology usage and academic performance suggest a need for further research on effective integration strategies (Odell et al., 2022; Fredricks et al., 2016). Teachers face challenges in obtaining proper training for technology integration, which is often used as a complementary tool rather than a replacement for traditional practices (Leon et al., 2017; Bray & Tangney, 2017).

Digital technologies have also demonstrated potential in overcoming barriers and promoting engagement among students with learning disabilities, such as dyslexia (Rizk & Hiller, 2022). For example, the use of iPads in the classroom has shown improvements in engagement and academic outcomes for students with dyslexia (Ok & Kim, 2017).

However, more research is needed to confirm these benefits and their impact on academic engagement. This study aims to explore teachers' perspectives on student academic engagement through innovative pedagogy, specifically using digital technologies and play-based strategies. The findings will provide insights for educators, curriculum developers, and policymakers to enhance student learning outcomes by making informed decisions on pedagogical practices.

The study addresses several key questions:

- How has the use of innovative pedagogy affected primary students' academic engagement from a teacher's perspective?
- How has technology been integrated into classroom practices to enhance engagement in mathematics learning?
- How have iPads been utilized within the classroom to improve the engagement of primary students with dyslexia?
- How have teachers used play-based learning to develop mathematical engagement in primary school?

Methods

Design

A mixed-method approach was utilized to gather evidence on the implementation of innovative pedagogical strategies, digital technologies, and play-based learning in primary school mathematics classrooms.

Setting

The research was conducted in both government and non-government schools located in the northern suburbs of Victoria, Australia, during the second semester. The study specifically targeted primary school teachers from various year levels, focusing on their mathematics sessions through direct observation and interviews.

Sample

This study employed four distinct samples, each corresponding to a different school. The sample sizes for the schools were 9, 8, 2, and 2, respectively, resulting in a total of 21 participants, all of whom were primary school teachers. Convenience sampling was used to select participants who were readily available.

Instruments

In this study, multiple research instruments were employed to gather comprehensive data on the integration of innovative pedagogical strategies, digital technologies, and play-based learning in primary school mathematics education. Qualitative interviews served as a primary instrument, involving in-depth conversations

with 21 experienced primary school teachers. These interviews were designed to capture the teachers' perspectives and practices, offering rich qualitative insights into their approaches.

In addition to interviews, direct observations were conducted during mathematics sessions. This allowed the researchers to witness firsthand how the teachers implemented the strategies in their classrooms, providing contextual evidence to support the interview findings. To further triangulate the data, the study also included document analysis. This involved reviewing published online materials, NAPLAN results, and teaching resources voluntarily provided by the teachers. These documents offered additional insights into the practical application of the discussed strategies.

To ensure consistency across the interviews, guided questions were used, allowing for a more structured and uniform data collection process. The data collected through these various instruments were then subjected to thematic analysis, following Bowen's methodology. This process involved systematically identifying and analyzing recurring themes and patterns, which were critical in developing a coherent understanding of the research findings.

Data Collection

Qualitative data was primarily obtained through conversations and observations with experienced primary school teachers (Sutton & Austin, 2015). To ensure consistency in data collection, guided questions were used during these conversations (Swain & King, 2022). Participants were asked to reflect on the specific teaching practices they have found most effective in promoting both student engagement and academic achievement. They were encouraged to describe the methods they employ and how these methods contribute to enhancing student outcomes. Additionally, teachers were prompted to explain how they assess and adapt their teaching strategies to address the diverse needs of their students, ensuring that all learners are adequately supported and challenged.

Critical Factors in Technology Integration: Enhancing Student Engagement in Mathematics:

The discussion also covered the critical factors involved in integrating technology to enhance student engagement in mathematics. Teachers were invited to identify and elaborate on the key elements they consider when incorporating technological tools into their math instruction. They were asked to provide examples of how technology has been utilized effectively to support student learning in mathematics, highlighting any specific tools or approaches that have yielded positive results.

iPads Features and Applications Used to Support Learning:

Another area of focus was the use of iPads as educational tools. Participants were questioned about the features and applications they utilize on iPads to support learning in their classrooms. They were asked to detail which apps are specifically used to assist students with dyslexia and to describe how the iPad's built-in features contribute to supporting these students' needs. Additionally, teachers were requested to discuss any challenges they have faced in using iPads for this purpose and the strategies they have employed to address these challenges.

Types of Play-Based Learning Used in Math and Other Subjects:

Finally, the conversation addressed the implementation of play-based learning strategies across various subjects, including mathematics. Teachers were asked to describe the types of play-based activities they use in their instruction and how they are thematically integrated into their teaching. They were encouraged to discuss the intended educational outcomes of these play-based approaches. Furthermore, participants were invited to share the challenges they have encountered when implementing play-based learning and the methods they have used to overcome these challenges.

Additional data were collected from online sources, including NAPLAN results and teaching materials voluntarily provided by the teachers. This triangulation of evidence offered insights into the integration of these innovative approaches (Kemmis et al., 2014).

Ethical Considerations

Ethical considerations were rigorously addressed throughout the study. Informed consent was obtained from all participants, and measures were taken to maintain confidentiality and anonymity. Pseudonyms were assigned to the teachers, and identifying information was removed from the collected documentation. Ethical approval was obtained from the school principals, and informed consent was secured from all participating teachers prior to their involvement in the interviews and observations.

Data Analysis

Thematic analysis was conducted following Bowen's (2009) methodology, which involved identifying recurring themes and patterns. The analysis process included the team's familiarization with the data, coding, categorization, and the development of themes and sub-themes. Rigorous discussions and peer debriefing were used to enhance the credibility and trustworthiness of the analysis. The findings were presented coherently, supported by direct quotations and examples from the collected evidence, and were compared to existing literature to provide a comprehensive understanding of the topic (Hilton & Hilton, 2020).

Documentation and Data Storage

Throughout the study, clear documentation, memo notes, and secure data storage practices were maintained to ensure transparency, traceability, and the protection

of participants' rights.

Results

Integrating Technology in Classroom Practices to Enhance Student Engagement in Mathematics Learning

Integration of Technology in Mathematics Education

Our literature review revealed that digital manipulative tasks were widely adopted and implemented in both public and independent schools. However, other strategies, such as the use of social media and the flipped classroom model, were less commonly employed. Notably, some strategies were more frequently adopted, including extra learning support through homework, online assessments, and feedback in upper primary grades, as well as online math competitions. These strategies were observed in one of the four schools in our sample, but the flipped classroom model was not adopted in any of the primary schools studied. Augmented and virtual reality technologies were only used in School A, an independent school, and were not observed in the public schools in our sample.

Teacher Practices and Methodologies

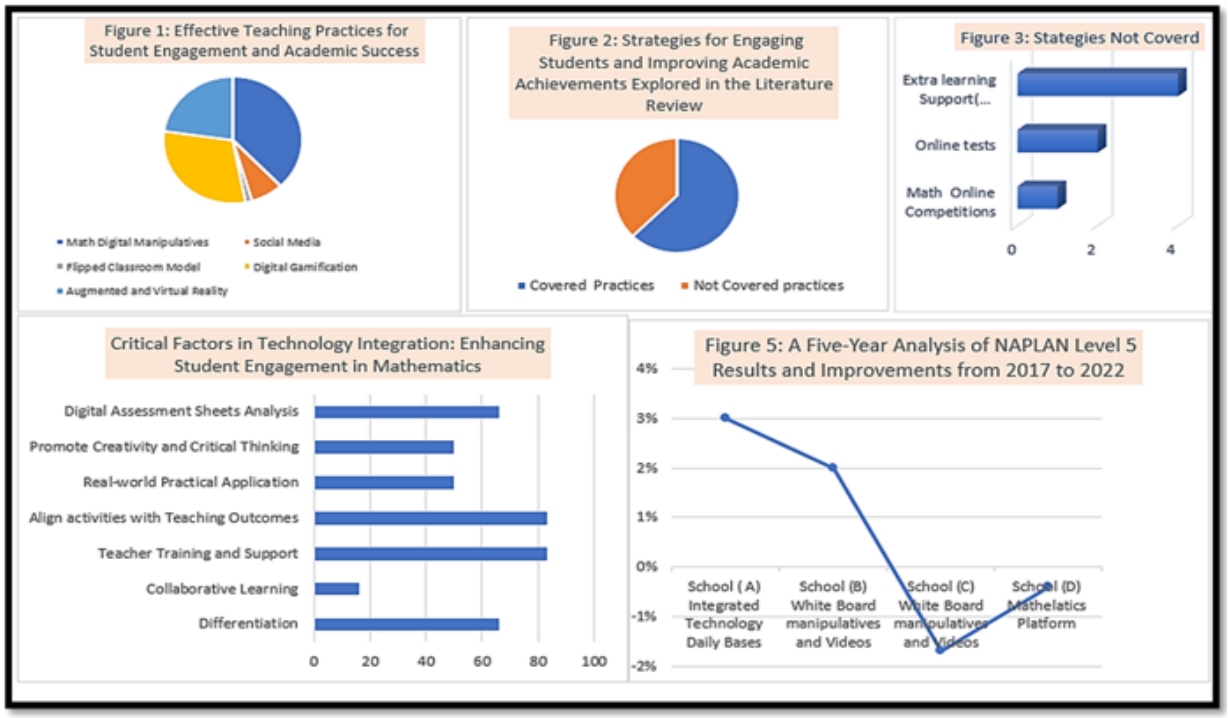
Teachers in our study emphasized the importance of aligning technology with teaching objectives and outcomes. Approximately half of the sample reported fully integrating technology into their daily lessons. One teacher stated, "Firstly, I identify the learning objectives and the skills I expect the students to gain." Another noted, "I choose the technology tool based on the student's learning needs and interests. Some students are good with technology and are better engaged when working with it." However, two foundation-level teachers limited their use of technology to YouTube videos and rotation lessons, which, while appropriate for the level, were not personalized or aligned with specific lessons or learning objectives.

Use of Online Assessments

According to the study, 75% of teachers used online assessment tests to evaluate their lessons. One teacher shared, "I used data from Kahoot to identify areas where students need support." Another explained, "We conducted pre- and post-tests, analyzed student results, and generated individualized worksheets." These practices illustrate teachers' reliance on online assessments to assess student progress and tailor instruction to individual needs.

Differentiated Tasks and Student Engagement

Differentiated tasks were notably implemented in School A, showing a positive correlation with higher NAPLAN test scores. Teachers who integrated technology into their daily lessons and differentiated activities based on students' needs reported increased



Graph 1: Integrating Technology in Classroom Practices to Enhance Student Engagement in

student engagement. One teacher shared, "I am using various technology tools to include all learners. Last year, one student had a medical condition and struggled to read from the whiteboard, so I emailed him the PowerPoint presentation earlier, allowing him to adjust the lighting on his laptop." Another mentioned, "I differentiate my instructions and modify some games for certain students." However, the improvement compared to School B was not statistically significant, underscoring the importance of factors such as teacher preparedness and practical techniques, as noted by Fredricks et al. (2016). These findings suggest an inconsistent relationship between technology use and academic outcomes, consistent with existing literature.

Promoting Problem-Solving and Independent Discovery

Promoting problem-solving and independent discovery emerged as key considerations when selecting technology tools. One teacher explained, "With digital resources and visuals, mathematical learning helps develop students' critical and creative thinking and improves their understanding of mathematical concepts." Another teacher emphasized the value of virtual manipulatives: "I found that virtual manipulatives provide students with a hands-on and interactive experience, bridging the gap between mathematical concepts and real-world applications, thereby increasing students' engagement." These insights align with our literature review on the effectiveness of augmented and virtual reality in spatial tasks (Osamah et al., 2019; Elsayed & Al-Najrani, 2021).

Challenges and Teacher Training

The importance of sufficient training when implementing new technology was highlighted by almost all teachers. One teacher stressed the value of seeking support from colleagues and collaborating: "Introducing new technology requires extra time and preparation." Another teacher pointed out the need to monitor technology use to ensure students remain focused on their tasks. These observations align with challenges identified in integrating technology into math education, such as access, equity, teacher training, infrastructure, digital distractions, and pedagogical alignment (Leon et al., 2017).

Adulyasas (2018) emphasized the importance of integrating technology, pedagogy, and content knowledge (TPACK). Despite advancements in math teaching methods, the integration of technology for improved conceptual understanding remains insufficient, indicating a need for enhanced teacher training (Rakes et al., 2022). Additionally, a grade 6 teacher noted the significant responsibility of teachers in integrating technology effectively while ensuring student well-being and responsible use.

Utilizing iPads in the classroom to Enhance Engagement for Primary Students with Dyslexia

The findings from this study reveal strong agreement among participants regarding the accessibility and differentiation benefits of incorporating iPads in the classroom. Specifically, three participants recognized the positive impact of iPads on student engagement and

Graph 2: Utilizing iPads in the Classroom to Enhance Engagement for Primary Students with Dyslexia

motivation. Notably, the Epic reading program received positive feedback from four participants, while ClassDojo was highly regarded by three participants . However, there were variations in app usage for NESSY, SeeSaw, and Google Classroom.

Participants widely agreed on the usefulness of text-to-speech features (dictation) and customizable display options (fonts and spacing), though Siri and Speak Selection were underutilized. Identified challenges included issues related to distractibility, the abundance of applications, the need for adequate training, and financial considerations for funding specific apps and devices . These findings underscore the benefits of iPads for students with dyslexia while also emphasizing the importance of addressing implementation challenges.

According to Gunderson et al. (2021), students with learning disabilities often experience isolation from their peers and work in environments with lower academic expectations. Dyslexia, defined by Protopapas and Parrila (2018) as a neurobiological disorder affecting literacy skills—particularly in word recognition, phonics, spelling, and writing—presents unique challenges in educational settings. Although technology integration has shown success in enhancing student engagement and active learning, there is a lack of research specifically addressing how iPad usage improves academic outcomes for students with dyslexia (Chmilia, 2017).

However, this study indicates that participants agree on the numerous benefits of iPad implementation within the classroom, particularly for students with dyslexia. Applications like Epic, ClassDojo, and Seesaw were found to promote engagement and assist with literacy skills, while some built-in iPad features were underutilized. Participants also recognized the benefits of display customization, fonts, and spacing options on iPads to support students with learning disabilities. Nonetheless, challenges such as taking photos, browsing the internet, and peer distractions were acknowledged (Gunderson et al., 2021; Protopapas & Parrila, 2018; Chmilia, 2017).

The iPad has been effectively utilized within the classroom to enhance student engagement and support primary students with dyslexia. The Epic reading program, for example, is particularly beneficial for dyslexic students as it reads aloud to them, ensuring that video content is appropriate and allowing students to read along with books, thereby promoting literacy skills.

Utilizing Play-Based Learning to Enhance Mathematical Engagement in Primary School

Teachers have effectively used play-based learning to foster mathematical engagement among primary school students. This approach leverages students' natural curiosity and intrinsic motivation, making mathematics more accessible and enjoyable. Play-based learning activities are designed to align with key mathematical concepts, allowing students to explore these ideas in a hands-on and interactive manner.

Teachers have incorporated various strategies, such as using games, manipulatives, and real-world scenarios, to help students grasp mathematical concepts. For example, board games and digital math games are frequently used to teach number sense, problem-solving, and spatial reasoning. Manipulatives like blocks, counters, and geometric shapes enable students to visualize and physically manipulate mathematical ideas, deepening their understanding.

Moreover, teachers have created opportunities for collaborative play, where students work together to solve mathematical challenges, thus promoting critical thinking, communication, and teamwork. Through structured play activities, students are encouraged to experiment, make predictions, and test their hypotheses, which fosters a deeper engagement with mathematical content.

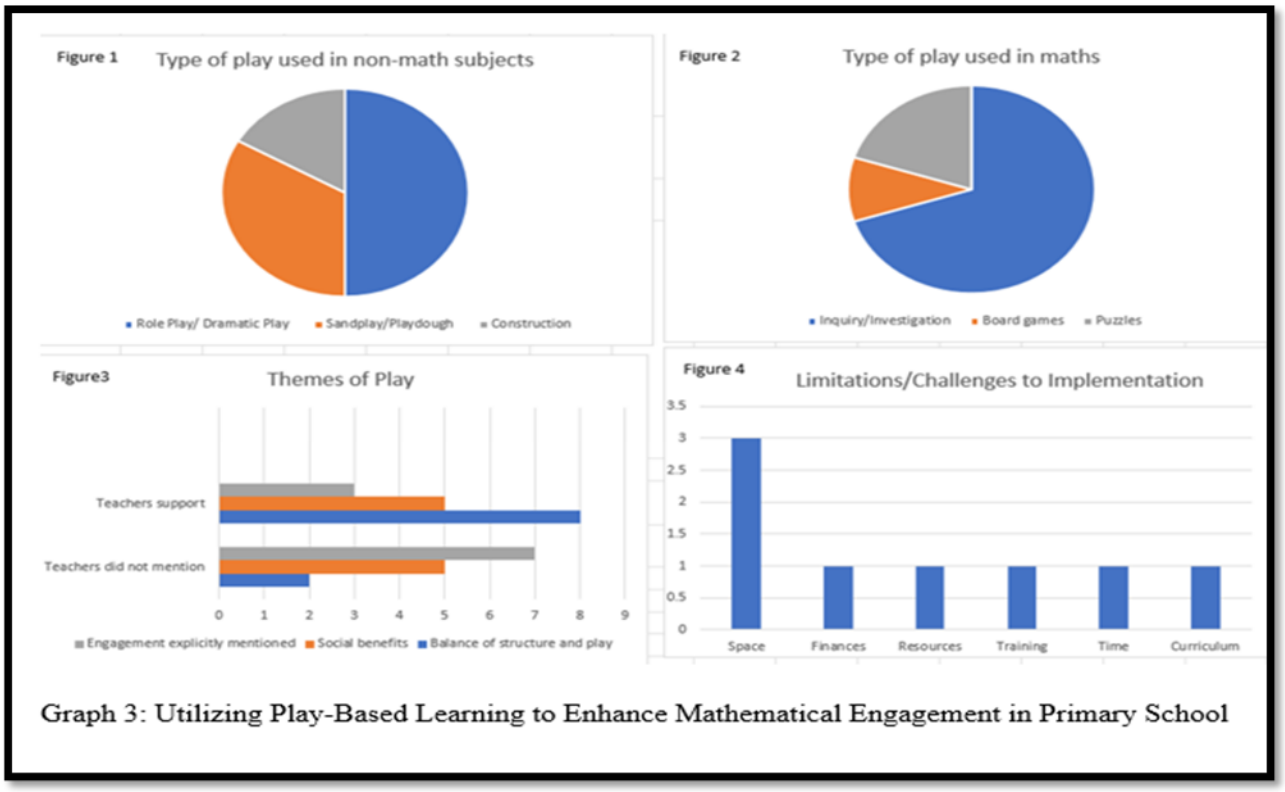
The impact of play-based learning on student engagement has been positive, with teachers observing increased participation, enthusiasm, and confidence in mathematics. However, some challenges include ensuring that play-based activities are adequately aligned with curriculum goals and providing sufficient resources and time for implementation.

In summary, play-based learning has proven to be an effective strategy for developing mathematical engagement in primary school students. By integrating playful, hands-on activities into their lessons, teachers can make mathematics more engaging, relevant, and enjoyable for their students.

Discussion

The analysis of the evidence provides valuable insights into the impact of strategies and interventions used in innovative pedagogy on primary students' academic engagement. However, it is important to note that this analysis does not directly address how teachers perceive the impact of these strategies on students' academic engagement. Our findings indicate that most of the strategies and interventions discussed were both covered in our literature review and actively utilized by the teachers, which aligns with our initial research (Adulyasas, 2018; Rakes et al., 2022). Despite this, many teachers struggled to establish a clear and direct connection between the effectiveness of these interventions and the specific strategies they were intended to support.

The limitations associated with the sample size of primary schools, as well as the constraints on the length and depth of scheduled conversations and observations,



Graph 3: Utilizing Play-Based Learning to Enhance Mathematical Engagement in Primary School

only allow for a general understanding of the effectiveness of these interventions and strategies. This limitation underscores the need for the development and implementation of a more robust research tool specifically designed to assess the impact of these interventions on primary students, with a particular focus on their ability to enhance mathematical engagement and academic achievement (Thomson et al., 2016; Leon et al., 2017). For strategies not covered in our literature review, the conversations and observations provided valuable opportunities to gather additional insights. These newly identified interventions, which have been developed and implemented by teachers, should be considered for further investigation. Such exploration could enrich the existing body of knowledge and offer new avenues for improving student engagement in mathematics.

The use of technology to improve teaching methods, customize learning experiences, and encourage problem-solving aligns well with earlier research findings (Bray & Tangney, 2016; Geer et al., 2017). However, further investigation is needed to thoroughly evaluate the impact of specific technological interventions on elementary students' mathematical engagement and academic achievement. The strategies and associated interventions identified in both our literature review and through the analysis of conversations and observations should be considered when formulating an effective integration plan. Implementing interventions that have shown a high impact, as recommended by the teachers, can help avoid failure or undesirable outcomes (McKnight et al., 2016; Adulyasas, 2018).

Innovative pedagogy has demonstrated a positive impact on primary students' academic engagement, prompting a shift in educational thinking and the evolution of teaching practices (Fredricks et al., 2016; Watt & Goos, 2017). This shift reflects a growing recognition of the need for teaching methods that not only engage students but also enhance their overall learning experiences. The integration of innovative strategies has encouraged teachers to move beyond traditional methods, fostering a more dynamic and interactive learning environment (Leon et al., 2017; Callaghan, 2021).

Additionally, the conversations and observations conducted during this study provided valuable opportunities for knowledge exchange and professional development. These interactions allowed for a practical exploration of how theoretical concepts are applied in real classroom settings, thereby bridging the gap between theory and practice. Both the researchers and the participating teachers benefited from these exchanges, gaining new perspectives and insights that could inform future teaching practices (Blundell et al., 2020; Heo et al., 2021).

In conclusion, while the evidence gathered offers a general understanding of the impact of innovative pedagogical strategies, there remains a clear need for more targeted research. By developing and implementing tools that can accurately assess the effects of these strategies on student engagement and academic achievement, educators can better understand and enhance the effectiveness of their teaching methods. This ongoing research and reflection will ultimately contribute to the continued evolution of teaching practices, ensuring that they meet the diverse needs of primary students (Thomson et al., 2016; Leon et al., 2017).

Conclusion

From a teacher's perspective, the use of innovative pedagogy has had a significant positive impact on primary students' academic engagement, as evidenced by the study's findings. Teachers reported that incorporating technology, play-based learning, and differentiated instruction into their classroom practices fostered a more dynamic and interactive learning environment, which in turn enhanced student participation, motivation, and understanding of key concepts. However, the study also revealed challenges, such as the need for adequate teacher training, access to resources, and the alignment of new methods with established curriculum goals. While the overall impact of these pedagogical innovations is promising, further research is necessary to explore and address the inconsistencies observed between technology use and academic outcomes. This ongoing research will be crucial in refining these approaches to better meet the diverse needs of students and to ensure that the potential benefits of innovative pedagogy are fully realized in primary education.

Implications for Future Practice

The findings of this study highlight several key implications for the future integration of technology and innovative pedagogy in primary education. It is essential for educators to establish clear learning goals that align with academic outcomes, ensuring that technology and pedagogical strategies directly support these objectives. The careful selection of relevant digital tools and resources is crucial, as these should foster active learning and be effective in enhancing student engagement and academic performance. Emphasizing hands-on exploration and independent discovery through methods such as play-based learning and digital manipulatives can encourage critical thinking and creativity. Additionally, fostering collaboration and communication through online platforms can enhance student engagement and social skills. Personalized learning experiences should be prioritized, with technology enabling differentiated instruction tailored to individual student needs. Real-world applications, such as incorporating simulations, data analysis, and virtual field trips, can make learning more relevant and motivating for students. Continuous professional development and support for teachers are vital to ensure the successful integration of technology, and it is important to balance the use of digital tools with traditional teaching practices to maintain strong teacher-student relationships and a supportive learning environment. Overall, these implications point to a future where technology enhances, rather than replaces, traditional educational practices, creating a more engaging and effective learning experience for students.

Limitations

Several limitations should be acknowledged in this research. These include time constraints on evidence gathering, restricted access to research materials without ethics approval, a small participant pool that may not be representative of the broader population, potential bias from self-reporting, and the impact of ICT on student outcomes (Makonye, 2020) as well as on teachers' skills and motivation (Rodriguez-Jimenez, 2023).

Conflict of Interest

The authors declare no conflicts of interest in conducting this study. All efforts were made to ensure the integrity and impartiality of the research process, and no financial or personal relationships influenced the study's outcomes.

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References

Adulyasas, L. (2018). Fostering pre-service mathematics teachers' technological pedagogical content knowledge (TPACK) through the learning community. Journal of Physics: Conference Series, 1097(1). https://doi.org/https://doi.org/10.1088/1742-6596/1097/1/012094

Alalwan, N. (2022). Actual use of social media for engagement to enhance students' learning. Education and

Information Technologies, 27(7), 9767-9789. https://doi.org/10.1007/s10639-022-11014-7

Allee-Herndon, K. A., Killingsworth Roberts, S. (2021). The Power of Purposeful Play in Primary Grades: Adjusting Pedagogy for Children's Needs and Academic Gains. Journal of Education 201(1), 54-63. https://doi-org.ez.library.latrobe.edu.au/10.1177/0022057420903272

Australian Institute for Teaching and School Leadership. (2018). Australian Professional Standards for Teachers. https://www.aitsl.edu.au/docs/default-source/national-policy-framework/australian-professional-standards-for-teachers.pdf

Bowen, G. A. (2009). Document analysis as a qualitative research method. Qualitative research journal, 9(2), 27-40. https://doi.org/10.3316/QRJ0902027

Bray, A., & Tangney, B. (2017). Technology usage in mathematics education research – A systematic review of recent trends. Computers and education, 114, 255-273. https://doi.org/10.1016/j.compedu.2017.07.004

Cohen, L. E. & Emmons, J. (2016). Block play: spatial language with preschool and school-aged children. Early Childhood Development and Care, 187(5-6), 967-977. https://doi-org.ez.library.latrobe.edu.au/10.1080/03004430.2016.1223064

Chigbu, B. I., Ngwevu, V., & Jojo, A. (2023). The effectiveness of innovative pedagogy in the industry 4.0: Educational ecosystem perspective. Social Sciences & Humanities Open, 7(1), 100419. https://doi.org/10.1016/j.ssaho.2023.100419

Elsayed, S. A., & Al-Najrani, H. I. (2021). Effectiveness of the Augmented Reality on Improving the Visual Thinking in Mathematics and Academic Motivation for Middle School Students. Eurasia Journal of Mathematics, Science and Technology Education, 17(8), em1991. https://doi.org/10.29333/ejmste/11069

Fredricks, J. A., Filsecker, M., & Lawson, M. A. (2016). Student engagement, context, and adjustment: Addressing definitional, measurement, and methodological issues. Learning and Instruction, 43, 1–4. https://doi.org/10.1016/j.learninstruc.2016.02.002

Herodotou, C., Sharples, M., Gaved, M., Kukulska-Hulme, A., Rienties, B., Scanlon, E., & Whitelock, D. (2019). Innovative Pedagogies of the Future: An Evidence-Based Selection. Frontiers in Education (Lausanne), 4. https://doi.org/10.3389/feduc.2019.00113

Hilton, A., & Hilton, G. (2020). Engagement with research: locating, reading, critiquing and reviewing literature. In Learning to Research and Researching to Learn : An Educator's Guide. Cambridge University Press. http://ebookcentral.proquest.com/lib/latrobe/detail.action?docID=6185946

Kemmis, S., McTaggart, R., & Nixon, R. (2014). The action research planner: doing critical participatory action research. Singapore: Springer.

Kobylak, K. & Kalyn, B. (2017). Play and Exploration in Grade One: Extending the Principles of Early Learning. Journal of Childhood Studies, 42(1), 32-44. DOI:10.18357/jcs.v42i1.16885

Leon, J., Medina-Garrido, E., & Núñez, J. L. (2017). Teaching quality in mathclass: The development of a scale and the analysis of Its relationship with Engagement and Achievement. Frontiers in psychology, 8, 895-895. https://doi.org/10.3389/fpsyg.2017.00895

Odell, B., Cutumisu, M., & Gierl, M. (2020). A scoping review of the relationship between students' ICT and performance in mathematics and science in the PISA data. Social Psychology of Education : An International Journal, 23(6), 1449-1481. https://doi.org/https://doi.org/10.1007/s11218-020-09591-x

Ok, M. W., & Kim, W. (2017). Use of iPads and iPods for Academic Performance and Engagement of PreK-12 Students with Disabilities: A Research Synthesis. Exceptionality, 25(1), 54–75. https://doi.org/10.1080/09362835.2016.1196446

Osamah M, A., Ababneh, Z., Bawaneh, A., & Alzubi, W. (2019). Effect of Augmented Reality and Simulation on the Achievement of Mathematics and Visual Thinking Among Students. International Journal of Emerging Technologies in Learning (Online), 14(18), 164-185. https://doi.org/https://doi.org/10.3991/ijet.v14i18.10748

Rizk, J., & Hillier, C. (2022). Digital technology and increasing engagement among students with disabilities: Interaction rituals and digital capital. Computers and Education Open, 3, 100099. https://doi.org/10.1016/j.caeo.2022.100099

Schindler, L. A., Burkholder, G. J., Morad, O. A., & Marsh, C. (2017). Computer-based technology and student engagement: a critical review of the literature. International Journal of Educational Technology in Higher Education, 14(1), 1–28. https://doi.org/10.1186/s41239-017-0063-0

Simoncini, K., Forndran, A., Manson, E., Sawi, J., Philip, M. & Kokinai, C. (2020). The impact of block play on Children's Early Mathematics Skills in Rural Papua New Guinea. International Journal of Early Childhood, 52, 77-93. https://doi.org/10.1007/s13158-020-00261-9

Spector, P. E. (2019). Do Not Cross Me: Optimizing the Use of Cross-Sectional Designs. Journal of Business and Psychology, 34(2), 125-137. https://doi.org/10.1007/s10869-018-09613-8

Sutton, J., & Austin, Z. (2015). Qualitative Research: Data Collection, Analysis, and Management. Canadian Journal of Hospital Pharmacy, 68(3), 226–231. https://doi.org/10.4212/cjhp.v68i3.1456

Swain, J., & King, B. (2022). Using Informal Conversations in Qualitative Research. International Journal of Qualitative Methods, 21, 160940692210850. https://doi.org/10.1177/16094069221085056

Thurm, D., & Barzel, B. (2022). Teaching mathematics with technology: a multidimensional analysis of teacher beliefs. Educational Studies in Mathematics, 109(1), 41–

63. https://doi.org/10.1007/s10649-021-10072-x

Whitlock, B., Eivers, A., & Walker, S. (2023). The state of play-based learning in Queensland schools. Australasian Journal of Early Childhood, 0(0), 112-126. https://doi-org.ez.library.latrobe.edu.au/10.1177/18369391231159672

Zhang, A., Olelewe, C. J., Orji, C. T., Ibezim, N. E., Sunday, N. H., Obichukwu, P. U., & Okanazu, O. O. (2020). Effects of Innovative and Traditional Teaching Methods on Technical College Students' Achievement in Computer Craft Practices. SAGE Open, 10(4), 215824402098298. https://doi.org/10.1177/2158244020982986

Zhao, L., He, W., & Su, Y.-S. (2021). Innovative Pedagogy and Design-Based Research on Flipped Learning in Higher Education. Frontiers in Psychology, 12, 577002–577002. https://doi.org/10.3389/fpsyg.2021.577002

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https://doi.org/10.5281/zenodo.13387908