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Evaluation and Strategies for Addressing Learner Differences in Knowledge Construction in Building Information Modeling Courses: Enhancing Education Quality

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ABSTRACT

This study investigates how different teaching strategies and learning methods impact learners' knowledge construction processes in a Building Information Modeling (BIM) course, with a focus on enhancing education quality outcomes. An investigation based on qualitative data from 10 individual undergraduate and postgraduate students from China was carried out. Semi-structured interviews were conducted to obtain the data. The study employed simple random sampling for participant selection and data were analysed through NVivo. The research identifies key factors influencing learners' engagement with BIM, including their prior experience, preferred learning styles, and the teaching methods employed. The findings reveal that students with prior experience in BIM or related fields tend to benefit more from hands-on, project-based learning, whereas students with less technical background face challenges in understanding software and applying theoretical knowledge. Collaborative learning strategies, such as group discussions and team projects, also significantly enhance knowledge construction, promoting deeper understanding and problem-solving. The study underscores the importance

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of personalized teaching approaches to accommodate the diverse learning needs of students and suggests incorporating emerging technologies like artificial intelligence and virtual reality to further support personalized learning and immersive experiences. One limitation is the relatively small sample size. Additionally, the study focused primarily on qualitative data, which limits the ability to generalize findings to a wider audience. Another limitation is the scope of the research, which concentrated on a specific set of BIM courses within a particular Chinese educational context.

Keywords: Building Information Modeling; Education Quality; Knowledge Construction; Teaching Strategies; Personalized Learning; Emerging Technologies

1. Introduction

Building Information Modeling (BIM) has become a cornerstone of digital transformation in the architecture, engineering, and construction (AEC) industries. As BIM adoption accelerates globally, there is growing industrial demand for graduates proficient in BIM tools, workflows, and collaborative practices [1]. This has led to the integration of BIM education into higher education curricula, especially in engineering and architecture programs. However, despite its industry relevance, BIM education faces significant pedagogical challenges. These include diverse learner backgrounds, varying cognitive styles, and uneven levels of prior technical knowledge, all of which complicate efforts to deliver equitable and effective instruction [2].

In addition to addressing learner diversity and differentiated instruction, it is also important to consider how BIM education can nurture students' critical and creative thinking abilities. Strategies such as cooperative learning have shown strong potential in this regard. Cooperative learning encourages students to work together to solve complex design challenges, fostering communication, perspective-taking, and shared problem-solving skills that are essential for meaningful engagement with BIM processes [3]. Furthermore, instructional methods like inquiry-based learning, reflective dialogue, and problem-based assignments are also valuable in promoting critical reasoning and creativity [4]. Embedding these approaches into BIM instruction allows students not only to acquire technical skills but also to become more adaptive, independent thinkers prepared for dynamic industry environments.

Educators often struggle to design instructional strategies that meet the differentiated needs of learners in BIM courses. Students new to digital modeling may encounter steep learning curves, while those with relevant experience may seek more advanced applications. Therefore, the key challenge lies in designing differentiated instructional strategies based on learner diversity (e.g., cognitive styles, prior knowledge), to support effective knowledge construction and improve educational quality outcomes [5].

In this context, lean education principles derived from lean construction practices offer promising avenues for optimizing BIM teaching. By minimizing instructional inefficiencies and emphasizing continuous improvement and standardization, lean strategies can support personalized learning at scale [6]. Moreover, advances in digital tools such as virtual reality (VR), artificial intelligence (AI), and online learning platforms further enable adaptive and immersive learning experiences tailored to individual student needs [7].

Despite growing interest in learner-centered and technology-enhanced approaches, there remains a lack of in-depth understanding of how students from diverse backgrounds construct knowledge in BIM courses. Furthermore, existing pedagogical models may not fully accommodate emerging industry expectations or evolving learning modalities. In line with the United Nations Sustainable Development Goal on quality education (Goal 4), there is an urgent need to enhance the inclusiveness, accessibility, and effectiveness of BIM instruction for all learners.

To address this gap, the present study investigates the question: How can differentiated instructional strategies based on learner diversity (e.g., cognitive styles, prior knowledge) be designed to enhance knowledge construction in BIM courses? Through qualitative analysis of learners' experiences, this research aims to identify practical teaching strategies that can improve engagement, comprehension, and skill development in BIM education.

2. Literature Review

In the field of BIM education, learner differences and the effectiveness of teaching strategies have become the focus of attention. Existing research focuses on how to respond to learners' diverse needs through appropriate teaching methods to improve the teaching effect of the course. This literature review will focus on the differences in learners' knowledge construction and the optimization of BIM teaching strategies and explore the effectiveness of personalised teaching and learning resources based on the latest research results.

2.1. Learner Diversity in BIM Education

Learner diversity refers to the range of differences in students' backgrounds that influence how they engage with and construct knowledge. In the context of BIM education, three key dimensions of learner diversity are particularly influential: cognitive styles, prior experience, and learning motivation[8]. Cognitive style refers to how individuals perceive, process, and retain information. Visual learners often prefer spatial and graphical tools, which align well with 3D modeling environments in BIM, while auditory or verbal learners may benefit more from lectures and discussions[9].

Prior experience, such as exposure to CAD, architectural drafting, or engineering software, also plays a critical role in learners' capacity to comprehend BIM concepts. Students with such experience tend to adapt more readily to complex modeling tasks, while novices often face cognitive overload[10]. Learning motivation driven by academic goals or perceived career value further differentiates how deeply learners engage with course materials. These variances emphasize the need for differentiated instructional design tailored to learner profiles.

2.2. Instructional Strategies for Addressing Diversity

In addressing learner diversity, instructional approaches in BIM education have increasingly embraced constructivist principles, where knowledge is actively constructed through experience and reflection[11]. Two dominant models Project-Based Learning (PBL) and standardised instruction offer contrasting benefits depending on learner background.

PBL has been shown to be especially effective for students with moderate to high prior exposure to BIM or related technical disciplines. It immerses learners in real-world problems and collaborative environments, supporting deeper understanding and higher-order thinking[12]. However, for students with limited technical background, the open-ended nature of PBL may be overwhelming unless scaffolded appropriately. In contrast, standardized instruction provides structured, sequential learning which can benefit novices but may not adequately engage advanced learners[13].

Recent studies also support the integration of personalized learning paths using differentiated content, pacing, and feedback to meet diverse needs[14]. These are often enhanced with digital tools such as online tutorials, virtual simulations, and interactive modules[15]. Emerging technologies like virtual reality and augmented reality are increasingly seen as enablers of learner-centered environments, particularly for visual learners and those needing repeated exposure to complex procedures[16].

2.3. Theoretical Framework and Research Gaps

This study adopts constructivist learning theory as its guiding framework, which posits that learners build understanding through active involvement and contextual experience. BIM, by nature, lends itself to constructivist learning due to its visual, iterative, and collaborative design features[11]. The framework helps analyse how students with varying cognitive styles and experiences engage with BIM content and tools.

Despite the growing use of constructivist-aligned methods in BIM education, several research gaps remain. First, few studies have explored how specific learner characteristics (e.g., cognitive style, prior knowledge) shape the knowledge construction process. Second, there is limited research on the comparative effectiveness of different teaching strategies across diverse learner groups. Third, while personalized learning is a promising solution, its implementation in BIM curricula is still in early stages and lacks empirical validation[17].

This study addresses these gaps by investigating how learner diversity affects BIM knowledge construction and what differentiated instructional strategies can be developed to enhance educational outcomes.

3. Methodology

This research was guided by a clear overarching aim and several targeted objectives.

The general objective of the study was to explore how differentiated instructional strategies, tailored to student diversity in cognitive styles and prior experience, can enhance learning in building information modeling education. The specific objectives were:

1. To identify the major challenges faced by students from diverse academic and experiential backgrounds in BIM courses.
2. To examine student perceptions of various teaching strategies (e.g., project-based learning, peer mentoring).
3. To analyse how learners with different backgrounds construct knowledge in BIM environments.
4. To offer recommendations for designing inclusive, differentiated pedagogical frameworks in BIM instruction.

3.1. Sampling and Participants

This study utilized purposive sampling to select participants enrolled in BIM courses at a university in China. The final sample comprised ten students between the ages of 21 and 27. These participants were drawn from both undergraduate and postgraduate programs in architecture and civil engineering. The sampling strategy was designed to ensure diversity in terms of prior experience with digital modeling tools, academic level, and exposure to different learning formats such as online, in-person, and hybrid modalities. This diverse sample enabled a richer examination of how learner characteristics influence engagement with BIM instruction.

3.2. Statistical Tools

Although the study adopted a qualitative research design, several digital tools were employed to support the analysis process. NVivo 12 was used to facilitate the organization and thematic coding of interview transcripts, allowing for a structured and systematic approach to identifying patterns within the data. To enhance the analytical rigor, natural language processing (NLP) tools were also utilized. These tools assisted in detecting semantic trends and emotional tones across the dataset, thereby complementing the manual coding process. This combination of human analysis and AI-supported validation strengthened the credibility of the thematic findings.

3.3. Interview Questions

The study relied on a semi-structured interview format, which allowed participants to express their experiences and perspectives freely while maintaining a degree of focus across sessions. One core question was used to anchor the discussion: how learners perceived their knowledge construction process in BIM courses. This was supplemented by four sub-questions covering perceived learning challenges, instructional preferences, resource utilization, self-reflections on learning progress, and expectations for improved teaching strategies (**Table 1**). The flexible yet guided format enabled the collection of in-depth and context-rich qualitative data.

Table 1. Semi-Structured Interview Questions.

Question Type	Interview Question
Core Question	How do you structure and understand the relevant knowledge in the BIM course?
Sub-question 1	What are the biggest challenges you encounter in learning BIM? How do you overcome these challenges?
Sub-question 2	Which teaching method or activity is most helpful for your BIM learning? Why?
Sub-question 3	Did you use any additional learning resources to assist in understanding the BIM course? How did these resources help your learning?
Sub-question 4	Do you feel that the current teaching methods of the BIM course meet your learning needs? If not, what improvements do you hope to make?

Through strict ethical review and confidentiality measures, this study aims to ensure respect for participants and the reliability of research results.

3.4. Data Collection Methods

Data were collected over a three-month period from March to May 2024. Interviews were conducted via secure online video conferencing platforms to ensure accessibility and participant convenience. Each interview lasted between 45 and 60 minutes and was audio-recorded with participant consent. The recordings were transcribed verbatim to ensure accuracy in capturing participants' responses. Thematic analysis was carried out using Braun and Clarke's (2006) six-step framework. This involved initial familiarization with the data, followed by open coding, identification and refinement of themes, and detailed theme definition. NVivo 12 was employed to support the coding process, while NLP tools were used to validate emerging themes by identifying recurrent language patterns and emotional sentiment. This multimodal approach ensured that the thematic findings were robust and data-driven.

3.5. Confidentiality and Ethical Considerations

Ethical standards were rigorously upheld throughout the research process. Ethical clearance for the study was obtained from the host university's ethics review board. All participants received detailed information about the study's purpose, the voluntary nature of their participation, and their right to withdraw at any point without penalty. Written informed consent was collected from each participant prior to the interviews. To safeguard participant confidentiality, all identifying information was anonymized during transcription and data reporting. In addition, member checking was conducted to ensure the accuracy of interpretations; participants were given the opportunity to review their transcripts and the thematic summaries derived from their responses. An audit trail documenting each phase of the data analysis was maintained and independently reviewed to support transparency and reliability.

4. Results

The thematic analysis of interview data revealed key patterns in how students with different backgrounds experienced learning challenges and engaged with instructional strategies in BIM courses. These findings are presented through the three-dimensional framework of student background, learning challenges, and instructional strategies.

4.1. Student Background

Participants exhibited notable diversity in prior BIM exposure, technical experience, and academic disciplines. Students were categorized broadly into three groups:

(a) Beginners: those with less than one year of BIM or CAD experience (mostly first-year undergraduates);
(b) Intermediates: those with one to two years of exposure to modeling tools (typically final-year undergraduates);
(c) Advanced: those with more than two years of BIM-related experience, often postgraduates with project involvement.

Table 2 indicates the characteristics of the respondents. By analysing the background information of these respondents, it was found that they had diverse learning styles and professional experiences when studying BIM courses, which led to different learning needs and challenges.

Table 2. Characteristics of the Respondents.

Respondent No.	Age	Background	Study Level	Areas of Expertise	Learning Method	Previous Experience
S1	22	Bachelor of Architecture	Junior year	BIM	Face-to-face + online	Participated in small architectural design projects
S2	24	Civil Engineering Bachelor's Degree	Postgraduate	Civil Engineering	Face-to-face teaching + self-study	Participated in small structural design and construction projects
S3	23	Bachelor of Architecture	Junior year	BIM	Face-to-face + online	Learned basic CAD and architectural design
S4	26	Master of Architecture	Postgraduate	BIM	Face-to-face	Participated in BIM practice of construction projects
S5	21	Civil Engineering Bachelor's Degree	Sophomore year	BIM	Face-to-face + online	Experience in using basic BIM software
S6	27	Master of Civil Engineering	Postgraduate	Civil Engineering	Face-to-face teaching + self-study	Participated in many BIM related projects
S7	25	Bachelor of Architecture	Senior year	BIM	Face-to-face + online	Participated in construction projects and used BIM
S8	24	Bachelor of Architecture	Junior year	BIM	Face-to-face	Have some experience in building information modeling

Table 2. *Cont.*

Respondent No.	Age	Background	Study Level	Areas of Expertise	Learning Method	Previous Experience
S9	22	Civil Engineering Bachelor's Degree	Junior year	Civil Engineering	Face-to-face + online	Learned basic BIM software operation
S10	23	Bachelor of Architecture	Senior year	BIM	Face-to-face	Participated in design and modeling related projects

4.2. Learning Challenges

4.2.1. Technical Barriers and Software Difficulties

Beginners often struggled with mastering BIM software interfaces and terminology. One first-year civil engineering student with no prior modeling background explained, "It was hard to know where to start with Revit. I watched YouTube videos, but they were too fast or assumed I already knew things." This indicates a gap in foundational software literacy and highlights the cognitive overload experienced by novices [13].

In contrast, intermediate students cited tool integration issues across platforms. A fourth-year architecture student noted, "Sometimes the tools from AutoCAD and Revit don't align properly, and it messes up my workflow." This reflects the challenge of navigating interoperability—an issue also identified in earlier studies [8].

4.2.2. Time Management and Workload Pressure

Students across all backgrounds mentioned difficulties in managing BIM coursework alongside other academic responsibilities. However, the intensity varied by experience level. A postgraduate architecture student with over three years of BIM experience said, "Even with my background, the modeling tasks were time-consuming. I needed to balance design studio, thesis work, and BIM assignments." For beginners, the challenge was compounded by slower learning curves, leading to frequent deadline stress.

4.2.3. Learning Isolation and Resource Limitations

Several students expressed a lack of structured guidance, particularly in online or hybrid settings. A second-year engineering student with limited BIM exposure reflected, "Most of the time I didn't know if I was doing it right. There weren't enough walkthroughs." The absence of accessible, scaffolded resources made it difficult for students to build confidence independently, especially among those who preferred visual or guided learning formats [9].

4.3. Instructional Strategies

4.3.1. Scaffolded Learning for Beginners

To address foundational knowledge gaps among beginners, participants recommended step-by-step tutorials, slower pacing, and visual guides embedded within the course structure. Several students also emphasized the usefulness of recorded sessions for revisiting difficult sections. This aligns with research advocating for layered instructional scaffolding in technical learning environments [17].

4.3.2. Blended and Adaptive Instruction

Intermediate and advanced students suggested the integration of flexible learning paths, where core concepts are delivered uniformly but additional modules or tasks can be selected based on experience level. A fourth-year architecture student proposed, "Maybe the first few weeks can be the same for all, but after that, let advanced students take on complex case studies while others get more practice time." This model reflects personalized learning principles discussed by Nabizadeh et al. [13].

4.3.3. Peer Collaboration and Mentorship

Several participants highlighted the benefits of peer mentoring, especially when students with more experience helped guide those still learning. A postgraduate participant stated, "I think I learned more when my senior walked me through a building model than in class." Formalizing such mentorship could mitigate learning isolation and provide social scaffolding [11].

4.3.4. Integrated Project-Based Learning (PBL)

Advanced students responded positively to project-based assignments that mimicked real-world BIM tasks. However, they cautioned against assigning such tasks too early for less experienced students. A third-year civil engineering student with over two years of BIM exposure explained, "PBL makes sense, but only when you're ready. Otherwise, it feels like being thrown in the deep end." This reinforces the importance of aligning PBL intensity with learners' prior knowledge and scaffolding it accordingly[12].

5. Discussion

This study investigated how differentiated instructional strategies could support diverse learners in BIM courses, drawing on constructivist learning theory to frame the findings. By comparing the findings with existing literature, it becomes possible to situate the results in a broader pedagogical context, while also identifying novel contributions and divergences.

5.1. Alignment with Existing Literature

The finding that prior BIM experience plays a critical role in shaping knowledge construction aligns closely with previous studies[18]. For instance, students with background in CAD or architectural modeling benefitted more from project-based learning (PBL), a pattern also documented in Obi et al. (2023). Similarly, the usefulness of collaborative learning echoed previous findings that teamwork and discussion help deepen conceptual understanding[19].

Moreover, the study confirms the established value of personalized learning tools. Tools such as video tutorials and virtual simulations were highlighted by students as key supports for mastering BIM an observation consistent with findings by Schiavi et al.[19] and Childs et al.[4]. These tools serve not just as resources but also as scaffolding mechanisms that address learner variance in pace and style.

5.2. Divergences and Novel Contributions

While the alignment with existing literature validates the study's findings, several unique contributions also emerged. First, this study provides a more granular linkage between learning challenges and learner characteristics. For example, students with visual learning preferences expressed a need for slow-paced visual guides, while auditory learners leaned on peer discussion and teacher narration. While Emma[6] and Wang et al.[20] acknowledged learning styles, this study bridges those preferences directly to suggested instructional responses.

Second, unlike many prior studies that broadly promote PBL, this study emphasizes the phased integration of PBL based on learner readiness. Advanced learners advocated for early exposure to real-world modeling tasks, while beginners preferred foundational instruction followed by simplified projects. This nuanced staging of PBL contributes a more inclusive framework for curriculum design.

Third, while some studies have noted student stress in technical courses[13], this research highlights time management challenges as an emerging theme across all experience levels, suggesting a need for instructional design that better balances workload.

5.3. Theoretical Contributions

The study advances the application of constructivist learning theory by demonstrating how learner-centered instructional design can be adapted to digital and technical education contexts like BIM. It shows that the interplay between learner characteristics and instructional strategies is dynamic and reciprocal, reinforcing the constructivist premise that learners actively shape their understanding through experience, scaffolding, and social interaction[11].

Furthermore, it extends the theory by integrating emerging tools, such as NLP-driven learning analytics and AI-guided feedback as part of the learner's construction process. These digital extensions of constructivism are rarely addressed in traditional theoretical discussions and represent a forward-looking contribution to pedagogy in engineering and design education.

6. Conclusions

The objective of this study is to assess the differences in knowledge construction among learners in BIM courses, focusing on evaluating the effectiveness of teaching strategies and learning methods. The research explored how varied educational approaches impacted students' understanding and skills development in the context of BIM education. Specifically, the study sought to identify the challenges learners face and determine the teaching strategies that are most beneficial for fostering effective learning outcomes in this technical field.

The findings highlighted that students engage with BIM content differently based on their learning styles, background experiences, and preferred teaching methods. Practical projects and real-world applications were the most effective in helping students grasp complex BIM concepts, as they allowed for the direct application of theoretical knowledge. Small group work, classroom demonstrations, and interactive discussions also emerged as significant contributors to students' learning success. Students benefited from personalized guidance and had a greater understanding of BIM through hands-on practice, showcasing the importance of diverse teaching strategies that adapt to individual learning needs.

Key takeaways from this study suggest that a balanced approach, integrating both theoretical and practical components, is crucial in BIM education. Educators should consider incorporating more practice-based tasks, interactive group activities, and real-world projects into the curriculum. Additionally, providing opportunities for students to engage in hands-on experiences and encouraging collaborative learning can greatly enhance the effectiveness of teaching and support students' professional development in the field of BIM. Moving forward, educators are encouraged to tailor their teaching strategies to address the varied backgrounds and skill levels of students, ensuring that learning is accessible, practical and engaging for all.

7. Limitations and Future Research

This study has several limitations, yet the findings remain valid and offer valuable insights into the process of knowledge construction in BIM courses.

7.1. Limitations

One limitation is the relatively small sample size. The study involved a limited number of participants, which may not fully represent the diverse population of BIM learners in different educational settings. While the insights gathered were in-depth, a larger and more varied sample could have provided a broader understanding of the challenges and effective teaching methods in BIM education.

Additionally, the study focused primarily on qualitative data, which limits the ability to generalize findings to a wider audience. While qualitative research offers a rich and detailed exploration of individual experiences, it lacks the statistical validation that quantitative data might provide. Despite this, the qualitative approach was chosen to gain a deeper understanding of the learners' experiences and to explore the nuances of BIM education.

Another limitation is the scope of the research, which concentrated on a specific set of BIM courses within a particular educational context. Different institutions or educational environments may have unique teaching strategies and learner dynamics that were not fully captured in this study. Therefore, while the findings are relevant to the studied context, they may not be universally applicable.

7.2. Practical Implications

The insights generated from this study offer several actionable steps to enhance BIM education and better address learner diversity. Recognizing that students enter BIM courses with varying levels of technical knowledge and cognitive preferences, educators can apply differentiated instructional designs tailored to their needs.

Step-by-Step Onboarding for Novice Learners

For students with minimal or no experience in BIM or CAD tools, instructors should implement a structured onboarding plan. This could include introductory modules covering software basics, common modeling terminology, and simple exercises with walkthroughs. These materials should be delivered using multiple modalities, video guides, annotated screenshots, and low-stakes quizzes to accommodate different learning styles[16]. Additionally, repeating foundational content across multiple sessions can help reduce cognitive load and increase retention among novice learners[9].

Personalized Training Pathways for Experienced Learners

Learners who already possess BIM exposure, such as final-year undergraduates or postgraduates with industry project experience, benefit more from accelerated and project-intensive tracks. These students should be offered flexible learning pathways, such as independent case studies, simulations of real-world scenarios, and advanced modeling tasks[21]. Instructors may also consider assigning such learners leadership roles in team projects, leveraging their skills to mentor peers while deepening their expertise.

Differentiated Instructional Stages

To cater to diverse learners across a course's timeline, instructional design should be segmented into three progressive stages:

Theoretical Foundation Stage: Focus on lectures and concept mapping tools to introduce BIM theory, emphasizing software logic, industry context, and collaborative frameworks[11].

Software Training Stage: Introduce scaffolded software practice through tutorials, virtual labs, and peer mentoring systems.

Project-Based Practice Stage: Encourage students to integrate knowledge through capstone-style team projects, real-world modeling tasks, and reflective journaling[22].

This tiered approach aligns with constructivist learning principles and helps ensure that students progressively build confidence while engaging in increasingly complex tasks[15].

Technology-Enabled Differentiation

Emerging technologies such as AI-driven feedback platforms and VR-based design environments can further support tailored instruction. AI systems can track learner progress and recommend adaptive content, while VR platforms allow immersive practice in simulated construction environments, enhancing engagement and comprehension for spatial learners[20, 22–25].

Overall, these strategies support a more inclusive and effective BIM education system that recognizes and responds to the diversity of student backgrounds and learning needs.

7.3. Future Research

Future research can focus on how to more effectively integrate advanced technologies such as artificial intelligence (AI) and machine learning in BIM courses to support personalized learning and automated assessment. In addition, exploring how to better utilize virtual reality and augmented reality technologies to provide an immersive learning experience is also a direction worthy of further research.

Future research should aim to include a larger and more diverse sample of BIM learners, encompassing a range of educational backgrounds, institutions, and geographic locations. This would provide a more comprehensive understanding of how different learning contexts influence knowledge construction in BIM education.

Additionally, incorporating a mixed-methods approach that includes both qualitative and quantitative data could provide a more balanced perspective. Quantitative data, such as surveys or statistical analysis of student performance, could complement qualitative insights, offering a more holistic view of effective teaching strategies in BIM courses[26].

It would also be beneficial to explore the long-term impact of different teaching strategies on learners' professional development in the BIM field. Tracking students' progress over time and their application of BIM skills in real-world scenarios could provide valuable insights into the sustainability of various educational methods.

Lastly, future studies might consider investigating the role of emerging technologies, such as AI-driven tools and virtual reality simulations, in BIM education. These technologies could potentially enhance practical learning experiences and offer new ways to engage students, making them valuable areas for further exploration in the context of BIM learning.

Author Contributions

Conceptualization, D.W. and P.V.; methodology, D.W.; software, D.W.; validation, M.I.; formal analysis, M.I.; investigation, L.W.; resources, L.W.; data curation, M.I.; writing—original draft preparation, D.W.; writing—review and editing, D.W.and M.I.; visualization, A.A.; supervision, S.B.M.H.; project administration, M.I.; funding acquisition, D.W..

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Informed consent was obtained from all participants involved in the study.

Data Availability Statement

The authors confirm that the data supporting the findings of this study are included in the manuscript. Additional data can be provided by the corresponding author upon reasonable request.

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Conflicts of Interest

The authors declare no conflict of interest.

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