

TLIC PAPER

# Immersive Educational Assessments with Augmented Reality as a Tool for Teacher Training Using Synthetic Data

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## ABSTRACT

This study explores using immersive assessments with Augmented Reality (AR) and synthetic data to enhance teacher training. By combining AR technology with artificial data, the study aims to create dynamic, realistic scenarios that simulate classroom environments, allowing teachers-in-training to apply their pedagogical knowledge in real time. The research employed a Delphi method, involving three experts from different fields—pedagogy, technology, and literature—to evaluate the effectiveness of these assessments using a rubric. The experts provided feedback on key areas such as cognitive skills assessment, AR integration, and instructional clarity, identifying strengths and improvement areas. The results show that AR-based assessments improve engagement, foster higher-order thinking, and offer personalized learning experiences. However, challenges such as the cost of AR technology, the need for teacher training, and ensuring the integrity of assessments were also noted. The findings highlight the potential of AR and synthetic data to transform teacher education by providing more interactive, practical, and adaptive assessments. Future research is needed to fully understand the long-term impact of these technologies in real-world educational settings and to explore the combination of natural and synthetic data to enhance the effectiveness of immersive assessments further.

## KEYWORDS

augmented reality, immersive assessments, teacher training, synthetic data

## 1 INTRODUCTION

Technology integration into education has revolutionized teaching methods and assessment practices in recent decades. One of the most transformative technologies in this regard is Augmented Reality (AR), which allows for the overlay of digital elements onto the physical environment, creating hybrid scenarios that can be used as powerful tools for learning and evaluation. This article examines the role of AR in immersive assessments for teacher training, highlighting its potential to provide more interactive

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and personalized experiences. AR-based assessments, with their interactive nature, have the potential to significantly engage and involve educators-in-training in the learning process [1], [18]. Traditional assessments often reflect practical and situational classroom learning, limiting their effectiveness in preparing future educators. AR, however, offers a solution to these limitations by providing virtual environments that simulate real-world classroom situations, allowing for more dynamic evaluations [12].

Teacher education faces the ongoing challenge of preparing professionals for constantly evolving educational contexts. This requires adaptive and innovative approaches to evaluation. Historically, evaluations have been static and disconnected from the real-world challenges that teachers face. The introduction of AR in assessments has the potential to address this gap, offering immersive scenarios that place teachers-in-training in simulated classroom environments where they must make decisions and interact with virtual students [6]. These simulations test content knowledge and provide an opportunity to apply pedagogical skills in real time, enhancing the practical aspects of teacher training.

Immersive technologies such as AR can offer several advantages when designing assessments that engage students and assess their competencies in authentic contexts. First, they can provide realistic learning experiences in which students apply their skills and knowledge in relevant scenarios [2]. For example, an AR simulation might allow students to practice a medical procedure, participate in a linguistic conversation, or explore a historical event [4]. In the context of teacher training, AR could enable future educators to navigate complex classroom dynamics and make pedagogical decisions based on realistic student behavior. Second, AR can foster higher-order thinking skills, such as problem-solving, critical thinking, creativity, and collaboration, by presenting students with complex and dynamic challenges that require analysis, synthesis, and the creation of solutions [8]. Third, AR increases motivation and engagement by offering students a sense of agency, autonomy, and real-time feedback while appealing to their curiosity and imagination [7].

Designing immersive assessments with AR requires careful planning and alignment with educational objectives, learning outcomes, and standards. The process begins by defining the purpose and scope of the assessment: what is being measured and why? Once the objectives are clear, the appropriate immersive technology—whether AR or another platform—must be selected, considering the technical possibilities and accessibility challenges. The next step involves designing the immersive scenario and assessment tasks, including the context, storyline, learning activities, interactions, feedback mechanisms, and participant guidance [13]. Finally, the assessment must be developed and tested to ensure its usability, functionality, and effectiveness in achieving the desired learning outcomes.

Despite the many advantages immersive assessments offer, specific challenges must be addressed. Technical issues, such as AR technology's cost, complexity, and reliability, can pose significant obstacles [3]. Furthermore, ethical considerations—such as privacy, security, consent, and safety—must be considered when using AR in educational settings. Pedagogical challenges, including cognitive overload, distraction, isolation, and disorientation, may also arise. To ensure successful implementation, educators must have access to the necessary resources and skills, and assessments must be designed to balance immersive technologies with other forms of teaching and learning [12].

Evaluating the effectiveness of immersive assessments presents its challenges due to the variety of data, criteria, and methods involved. Data collection requires specialized tools and permissions to gather and store rich, diverse datasets [6]. Moreover, data analysis demands advanced skills, software, and frameworks to interpret complex and multidimensional data. Finally, data reporting must be clear and valid, with explanations, visualizations, and recommendations that

effectively communicate the findings. Immersive technologies can provide novel and meaningful insights that traditional assessments may not offer, enriching the understanding of how students learn in dynamic environments [4].

AR-based immersive assessments also introduce the opportunity to use synthetic data, which can enhance personalization and flexibility in teacher training [10]. Synthetic data can create adaptive assessments tailored to the skills and knowledge of each teacher-in-training, offering a customized learning experience. These personalized evaluations are crucial in modern education as they allow for a deeper understanding of each teacher's strengths and areas for improvement [1]. Moreover, using synthetic data ensures the protection of both student and teacher privacy, a key consideration in developing new educational technologies. By simulating realistic classroom behaviors, synthetic data allows educators to practice and refine their decision-making skills in a controlled yet realistic setting [4].

However, implementing AR in education still faces significant challenges, particularly regarding teacher training and access to necessary resources. While AR technology offers exciting possibilities for teacher education, ensuring that educators are proficient in using these tools is essential for successful integration. Additionally, the cost of AR devices and software can be a barrier, especially for institutions with limited budgets. Ensuring that AR technology is accessible to all educators and students remains a critical goal for its widespread adoption [2].

This study aims to analyze how immersive assessments with AR and synthetic data can improve teacher training, promoting the acquisition of critical pedagogical competencies and preparing educators to adapt to the challenges of 21st-century education. By using synthetic data in combination with AR, the assessments provide flexible and varied scenarios that do not rely on real-world data, offering a more personalized and adaptable evaluation process [10]. The study also explores the potential for immersive assessments to enhance the quality of teacher training by simulating natural classroom environments and providing opportunities for reflective, experiential learning [17].

Given the technology's reliance on personal devices, one potential issue with AR-based assessments is the risk of students bypassing the system to cheat. To address this, educators and developers must implement strict protocols and safeguards to ensure the integrity of the assessment process. Solutions such as real-time monitoring, limiting the scope of technological manipulation, and developing secure systems for AR interactions can help mitigate these concerns [12]. The study will further explore how these safeguards can be integrated into the assessment design to ensure the validity and reliability of the results.

In summary, AR-based immersive assessments represent a promising approach to teacher education, offering opportunities for deeper engagement, real-world scenario simulations, and synthetic data to enhance flexibility and personalization [12]. This study will examine the benefits and challenges of implementing AR in teacher training. It will provide insights into how these technologies can be effectively integrated into educational practices to improve teacher preparedness for contemporary classrooms. The results of this research will contribute to the growing body of knowledge on the role of immersive technologies in education and the potential of AR to transform assessment methodologies for teacher training [6].

## 2 MATERIALS AND METHODS

This study employed a Delphi method to gather and analyze expert evaluations on immersive assessments utilizing Augmented Reality (AR) and synthetic data.

The goal was to refine the assessment design before its application to actual students. Three experts specializing in technology, pedagogy, and literature were selected to evaluate the assessment using a detailed rubric (see Table 1). Using synthetic data and AR allowed for a unique simulation of classroom scenarios designed to test cognitive skills, AR integration, and instructional clarity. The expert evaluations were vital in identifying strengths and areas for improvement, ensuring that future applications of the assessment would be pedagogically sound and technically feasible [1], [12], [10]. Supplementary Material 1 (SM1) about experts: expert 1, expert 2, and expert 3.

**Table 1.** Evaluation rubric for instructional design elements

Item	Criterion	Performance Level 1	Performance Level 2	Performance Level 3	Performance Level 4	Approved/Deprecated
1. Clarity of instructions	The instructions for students are clear and accessible.	The instructions are confusing, and students may have difficulty following them.	The instructions are partially clear, but they could lead to confusion.	The instructions are clear, although they could be simplified on some points.	The instructions are prominent and accessible to all students.	
2. Cognitive Skills Assessment	Cognitive skills such as analysis, reflection, and synthesis through activities are correctly assessed.	Necessary cognitive skills are not adequately assessed.	Some cognitive skills are assessed but in a limited way.	Cognitive skills are correctly assessed, but some aspects could be deepened.	The cognitive skills of analysis, reflection, and synthesis are thoroughly evaluated.	
3. AR integration	AR is effectively integrated into activities.	AR integration is poor or irrelevant to the objectives.	AR is integrated, but its relevance is limited.	AR is well integrated, although its potential is not fully exploited.	AR is fully integrated in ways that are effective and relevant to learning.	
4. Technical and pedagogical feasibility	Resources are available (availability of resources) and pedagogical (impact on learning).	It is not technically or pedagogically viable.	It is feasible but with excellent technical or pedagogical challenges.	It is viable, but it has some challenges that can be overcome.	It is feasible both technically and pedagogically.	

## 2.1 Expert profiles

The three experts involved in this study were carefully selected based on their expertise in areas critical to the assessment. Expert 1, a specialist in pedagogy, focused on evaluating the educational aspects of the assessment, such as cognitive skill development and instructional clarity. Expert 2, a technology expert, assessed the integration and usability of AR technology in the assessment. Finally, Expert 3, an expert in Ecuadorian literature, provided insights into the cultural and historical relevance of the content. Their profiles were generated using Large Language Models (LLMs) and synthetic data, ensuring diverse perspectives in the evaluation process [3], [12]. Supplementary Material 2 (SM2).

## 2.2 Rubric for evaluation

The primary instrument used for the evaluation was a rubric developed specifically for immersive assessments (see Table 1). The rubric included four key categories: (1) Clarity of instructions, (2) Cognitive skills assessment, (3) AR

integration, and (4) Technical and pedagogical feasibility (Evaluation rubric (2)) [13]. Each category was rated on a scale of 1 to 5, with detailed qualitative feedback for each criterion. The rubric was designed to assess both the technical and pedagogical elements of the AR-based assessment, ensuring that it was feasible for use in natural classroom environments [6]. Supplementary Material 3 (SM3).

### 2.3 Delphi method and expert evaluation process

The Delphi method by [16] was used in this study to establish a consensus on the evaluation outcomes. Each expert conducted the assessment independently, and their ratings and qualitative feedback were then gathered. The Delphi process involved multiple rounds of evaluation, where experts reviewed the aggregated results and provided further feedback until a consensus was reached on the necessary improvements [4]. This iterative process allowed for thoroughly refining the assessment design, guided by expert input at each stage.

### 2.4 Assessment structure

The immersive assessment designed for this study was based on Ecuadorian literature, specifically focusing on five key activities, each leveraging AR to enhance the learning experience. The activities were designed to test students' cognitive skills, such as analysis, reflection, and synthesis while integrating AR to simulate real-world scenarios Supplementary Material 4 (SM4). The activities included:

- The Literary Map of Ecuador: Using AR to explore the geographical origins of Ecuadorian authors and answer questions related to their work.
- Interact with the Characters: This is a 3D visualization of literary characters in AR that requires students to identify their origins and reflect on their roles in the narrative.
- Construction of a Visual Poem: Reconstructing a fragmented poem by Medardo Ángel Silva using AR, followed by a literary analysis of its themes and structure.
- A Journey through Time: Using AR, create a timeline of Ecuadorian literary movements, relating the authors' works to their historical contexts.
- Create Your Story with AR: An opportunity for students to write their narratives, incorporating themes from Ecuadorian literature and AR visuals to enhance the storytelling (Immersive assessment (1)).

**Table 2.** Analysis categories and Delphi consensus

Category	Expert 1 (Pedagogy)	Expert 2 (Technology)	Expert 3 (Literature)
Clarity of Instructions	4	4.5	4.5
Cognitive Skills Assessment	3.5	4	5
AR Integration	5	4	4
Technical & Pedagogical Feasibility	3.5	4	3.5

The Delphi method used in this study was qualitative, as the experts provided in-depth feedback on the assessment design. The Table 2 above summarizes the experts' ratings across the four key categories. The agreement among the experts on

the cognitive skill assessment and technical feasibility reflects a strong consensus on the pedagogical effectiveness of the assessment [8]. However, discrepancies in AR integration highlight the need for further adjustments to ensure that the technology is fully aligned with the educational goals of the assessment [2], [12].

### 2.5 Future application to students

Once the assessment design has been refined through expert feedback, it will be tested with real students. The immersive nature of the AR activities will provide a dynamic learning experience, allowing students to interact with literary content in ways that traditional assessments do not offer. The assessment will measure content knowledge, critical thinking, creativity, and the ability to apply literary analysis in context [15]. These elements are expected to foster deeper engagement and better learning outcomes, making this method highly relevant for teacher training and student assessments [4].

By incorporating expert insights and synthetic data, the study aims to develop a scalable, adaptive tool for educational settings. The Delphi method’s iterative nature ensures that the assessment remains both innovative and practical, offering a new model for integrating AR into immersive education.

## 3 RESULTS

In the evaluation of immersive assessments with AR and synthetic data, the results from the three experts revealed significant variations across key dimensions: AR integration, depth of analysis, and instruction quality (see Figure 1). Each expert provided detailed feedback, offering a comprehensive view of how AR enhances or detracts from learning. Their evaluations focused on how AR effectively integrates with educational content and supports cognitive development. The experts’ assessments highlight strengths and areas for improvement in the assessment design, particularly in balancing technological innovation with pedagogical depth and clarity.

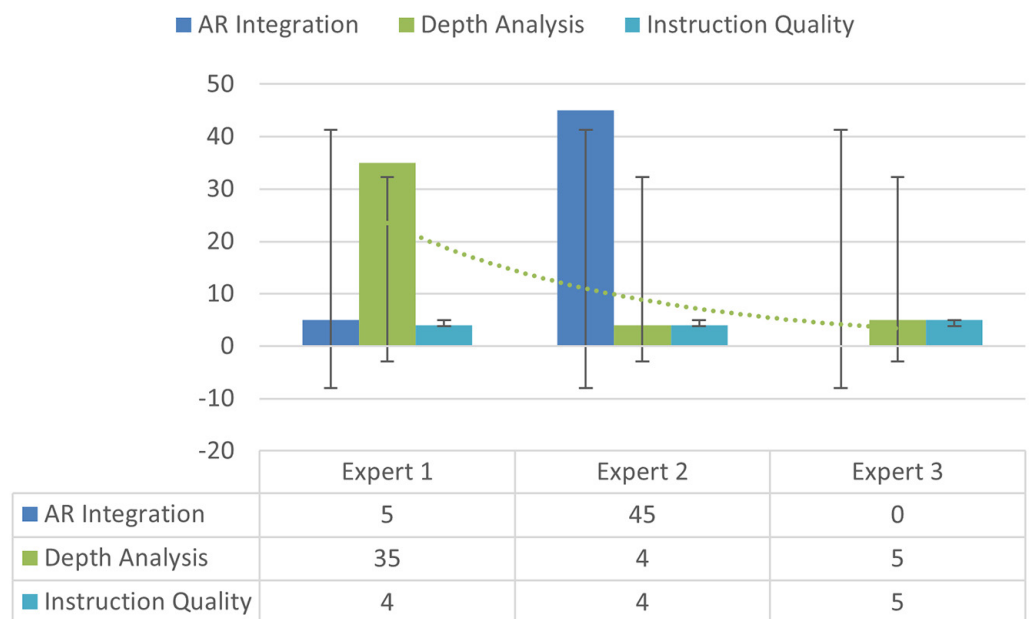


Fig. 1. AR integration, depth analysis, and instruction quality

Expert 1 gave the highest score to depth analysis (35 points), suggesting a strong emphasis on content depth but a relatively low score for AR integration (5 points). This indicates that while this expert appreciated the depth of the material, they perceived the integration of AR as insufficiently effective in enhancing the educational experience. Instruction quality received a moderate score of 4 points, indicating room for improvement in how the instructions supported learning.

On the other hand, Expert 2 focused primarily on AR integration, assigning it a score of 45 points, the highest among the three categories. This score reflected a belief in AR’s technological potential to create engaging learning environments. However, the scores for depth analysis and instruction quality were significantly lower, at 4 points each. This indicates that while the experts valued technological innovation, they found the depth of the content and clarity of instructions lacking in pedagogical rigor.

Expert 3’s evaluation was more balanced, scoring 5 for instruction quality, 5 for depth analysis, and 0 for AR integration. This expert appeared to be the most critical of AR’s role in the learning process, possibly suggesting that the integration was either ineffective or irrelevant to the educational objectives, as supported by their comments on the need for better content alignment with the learning goals.

On the other hand, (see Figure 2) presents the evaluation results across four key categories: clarity of instructions, cognitive skills assessment, AR integration, and technical and pedagogical feasibility, as assessed by three experts. The scores reflect the experts’ perceptions of how well these elements were executed within the immersive assessment framework. Each category was rated according to the experts’ views on the strengths and areas for improvement, providing a comprehensive analysis of how these critical dimensions contributed to the overall effectiveness of the AR-based evaluation tool. The results show a close alignment between experts in some areas while highlighting specific differences in their assessments.

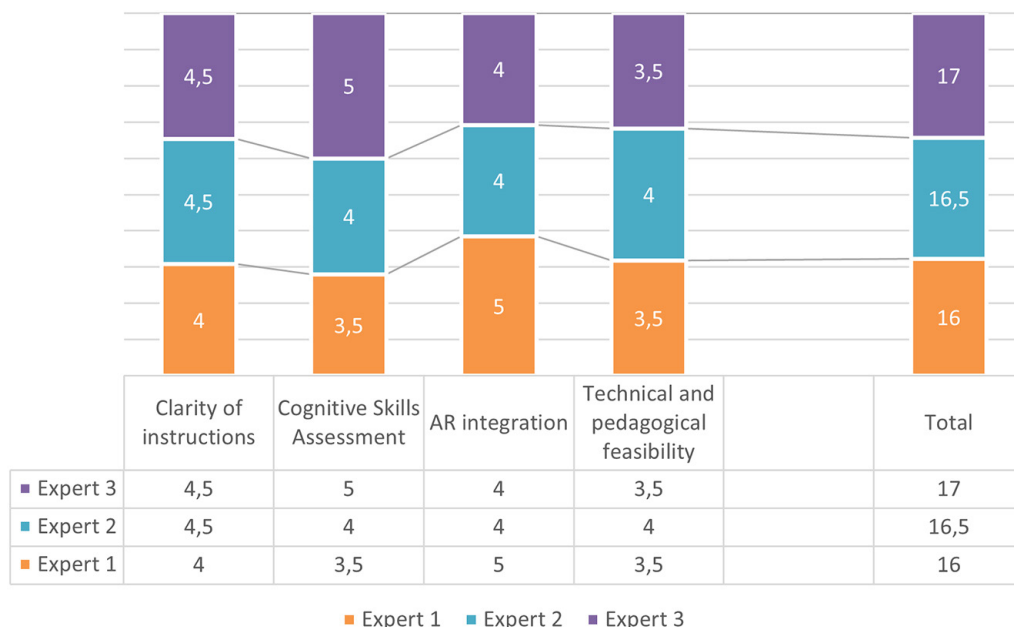


Fig. 2. Assessment of categories by experts

The second set of data (see Figure 2) evaluated four key areas: clarity of instructions, cognitive skills assessment, AR integration, and technical and

pedagogical feasibility. Expert 3 gave the highest scores in the rubric, particularly awarding 5 points for cognitive skills assessment, highlighting the importance of these skills in immersive evaluations. The clarity of instructions received 4.5 points from both Expert 2 and Expert 3, indicating general agreement that the instructions were clear but could be improved. However, Expert 1 assigned a slightly lower score of 4 points, suggesting that instructions might have been somewhat difficult for students to follow, as detailed in their qualitative feedback (Evaluation rubric (2)) (Expert 3) (Expert 2) (Expert 1).

Regarding AR integration, Expert 1 rated it highest with a score of 5, reflecting their belief in the technological aspects. At the same time, Experts 2 and 3 gave 4 points, indicating satisfactory but not exceptional integration. The total scores ranged narrowly between 16 and 17 across the experts, with Expert 3 providing the highest total (17), showing their overall satisfaction with the assessments, particularly in cognitive skills and technical feasibility. This analysis demonstrated the importance of aligning AR integration with educational goals. The experts' evaluations showed that while AR has the potential to enrich the learning experience, it needs to be more closely tied to pedagogical objectives. Additionally, cognitive skills assessment and instructional clarity were highlighted as areas requiring improvement to maximize the effectiveness of immersive learning environments for teacher training.

## 4 DISCUSSION

The results of this study demonstrate that AR-based immersive assessments, particularly when combined with synthetic data, bring substantial value to teacher training by creating more dynamic and interactive learning environments. (Figures 1 and 2) clearly illustrate the variations in expert evaluations across critical dimensions, such as AR integration, depth of analysis, and instructional quality. The simulations made possible by AR allow teachers in training to experience realistic classroom scenarios, providing opportunities to apply their knowledge and skills in controlled environments. These simulations offer a level of practical experience that traditional assessments often lack, reinforcing the role of AR as a tool for enhancing practical learning, as supported by recent studies [13], [1]. The findings underscore the importance of creating engaging and motivating experiences critical for active learning and retention.

Moreover, integrating synthetic data into AR-based assessments adds a layer of flexibility that is particularly valuable in teacher training, where educational needs and backgrounds vary widely among participants. By adjusting scenarios based on individual needs, synthetic data enables personalized and adaptive assessments that align with the specific challenges faced by each trainee. This adaptability is crucial for fostering meaningful learning experiences in teacher education, as noted by [10]. Customizing assessments according to the context enhances learning outcomes and ensures that the assessments are relevant and responsive to real-world teaching situations.

However, as reflected in Figures 1 and 2, the study also highlights significant challenges that must be addressed for AR-based assessments to achieve their full potential. One of the most pressing obstacles is comprehensive technical training for educators and students using AR tools effectively. Expert 2, in particular, emphasized the importance of streamlining AR technology to ensure it aligns with pedagogical objectives, pointing out that insufficient training could lead to confusion and diminished learning outcomes. These findings align with those of [12],

who argue that the success of AR in education depends on thorough professional development programs that empower educators to integrate these tools seamlessly into their teaching.

Another barrier is the financial cost of implementing AR technology in educational settings. Although AR devices are becoming more affordable, widespread adoption remains challenging, particularly for institutions with limited resources. As highlighted by Expert 1, the cost of AR technology can be a significant limitation, preventing institutions from fully embracing this innovative approach to assessment. Other researchers have noted this financial obstacle, similarly [17], emphasizing the need for cost-effective solutions to make AR a viable option in education, especially in resource-constrained environments.

Despite these challenges, the findings from Figures 1 and 2 suggest that AR-based immersive assessments should not be viewed as a replacement for traditional methods but as a complement. Traditional assessments, such as knowledge recall and conceptual understanding, continue to offer valuable insights into a learner's grasp of foundational concepts. AR, however, adds a layer of practical, real-world applicability, offering situational assessments that better mirror the complexities of teaching. As suggested by Expert 3, immersive assessments have the potential to offer a more comprehensive evaluation of a teacher's readiness to handle diverse classroom scenarios. This dual approach—combining traditional and AR-based assessments—has been advocated by [15] as a way to create a more well-rounded evaluation process.

As seen in the results, the experts' feedback underscores the importance of a balanced integration of AR into teacher training assessments. While AR undoubtedly enhances the learning process, it must be used strategically and with clear educational goals. Expert 3, in particular, highlighted the need to ensure that AR integration complements pedagogical objectives rather than overshadowing them. This finding echoes the work of [4], who emphasize that AR is most effective when it aligns closely with curriculum goals and enhances content understanding and cognitive skills.

The study reveals that AR can foster higher-order thinking, such as analysis, synthesis, and reflection, regarding cognitive skills assessment. However, as Expert 1 noted, the tasks must be designed rigorously to challenge students intellectually and promote more profound engagement with the material. This finding is consistent with the research of [8], who argue that for AR to reach its full educational potential, the design of tasks and assessments must be aligned with learning objectives that encourage critical thinking and problem-solving.

The role of instructional clarity in AR-based assessments is another key area for improvement, as indicated by the feedback from all three experts. While AR creates an immersive and engaging environment, the instructions must be clear and accessible to avoid confusion. Expert 2 pointed out that overly technical instructions can detract from the learning experience, making it difficult for students to fully engage with the content. This aligns with the findings of [11], who suggest that streamlined and accessible instructions are critical to the success of immersive learning environments, ensuring that learners can focus on the content rather than navigating the technology.

Moreover, the technical and pedagogical feasibility of AR-based assessments must be carefully considered. As noted by Expert 1, AR technology should support educational objectives without becoming a distraction. The study reinforces the importance of grounding AR implementation in a strong pedagogical framework, ensuring that the technology enhances rather than overshadows the learning process. This is supported by the work of [14], who argue that the most effective

AR applications are deeply embedded within a clear pedagogical structure and reinforce the learning objectives.

The discussion highlights the need for further research to address the challenges identified in this study. Future studies should focus on how to scale AR technology effectively in educational settings, address technical and financial barriers, and ensure that AR-based assessments remain pedagogically sound. The work of [9] suggests that with continued innovation and collaboration between educators and technologists, many of these challenges can be overcome, paving the way for AR to play a transformative role in teacher training.

In conclusion, this study provides significant insights into the benefits and limitations of immersive assessments using AR and synthetic data. The results suggest that while AR has the potential to significantly enhance teacher training by creating more interactive and personalized learning experiences, careful attention must be given to its implementation. By aligning technological innovation with pedagogical objectives and addressing the technical and financial challenges, AR can become a powerful tool in the field of education, as corroborated by the growing body of literature [5], [12].

## 5 CONCLUSION

The findings of this study suggest that immersive evaluations with Augmented Reality (AR) and synthetic data provide a transformative approach to teacher training, offering a more dynamic and realistic evaluation environment than traditional methods. The experimental group, which utilized AR-based assessments, demonstrated notable improvements in key teaching competencies such as classroom management, pedagogical decision-making, and adaptability to unexpected situations. The AR-based assessments allowed participants to engage in more authentic learning experiences by simulating real classroom scenarios, likely contributing to their enhanced performance. This highlights the potential of AR as a powerful tool for the future of educational assessments.

Additionally, using synthetic data in the immersive evaluations played a critical role in creating a wide range of realistic classroom scenarios without compromising participant privacy. The ability to generate diverse, complex scenarios allowed for a richer and more varied assessment experience, which traditional written case-based evaluations could not match. This dynamic learning environment provided opportunities for teacher trainees to apply their knowledge and skills in real time, making the learning process more engaging and reflective of actual teaching situations. These results underscore the value of incorporating synthetic data in educational technology, particularly in immersive learning environments.

The experimental and control groups' comparisons revealed significant differences in their perceptions of the assessment process. Participants in the AR-based evaluation group reported higher levels of engagement and found the assessments more relevant to their future teaching practice. In contrast, the control group, which completed traditional evaluations, preferred more interactive and practical evaluation formats. These findings suggest that immersive assessments are practical in developing pedagogical skills and are preferred by future educators as a more practical and applicable evaluation form.

In conclusion, this study contributes to the growing literature on using AR and synthetic data in educational assessments. The integration of these technologies offers a promising alternative to traditional evaluation methods by providing a

more interactive, realistic, and adaptable assessment environment. The results demonstrate that AR-based assessments, coupled with synthetic data, can enhance teacher training by better preparing educators for the complexities of real-world teaching. However, to fully realize the potential of this approach, further research is needed to refine the design of AR-based assessments and ensure they align closely with pedagogical goals.

## 5.1 Future research

Future research should explore the long-term impact of immersive AR-based assessments on teacher performance in actual classroom settings. It would be valuable to investigate whether the skills developed through these immersive evaluations translate into improved teaching practices and student outcomes over time. Additionally, studies should examine the scalability of this approach, focusing on its integration into broader educational systems and exploring cost-effective solutions for widespread implementation. Further research should also involve the application of real data and input from actual experts to complement and validate the synthetic data used in this study.

Moreover, the refined assessments, with adjustments based on the findings of this research, should be administered to a new cohort of teacher trainees, allowing for a more comprehensive understanding of the effectiveness of immersive AR-based evaluations in real-world educational contexts. Finally, investigating the combination of AR with generative AI and synthetic data will open new avenues for creating even more personalized and adaptive assessments tailored to the individual needs of learners.

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## 8 SUPPLEMENTARY MATERIALS

- SM1:  
[Expert 1\\_Pedagogical Expert Assessment.pdf](#)  
[Expert 2\\_Technology Specialist Assessment.pdf](#)  
[Expert 3\\_Ecuadorian Literature Expert Assessment.pdf](#)
- SM2:  
[Prompt\\_3 experts.docx](#)
- SM3:  
[Evaluation rubric.docx](#)
- SM4:  
[Example of immersive assessment with synthetic data.docx](#)

## 9 AUTHOR

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## 10 AI TOOLS

In the Methods section of the article, ChatGPT-4o was specifically used as an artificial intelligence tool. The specific areas where AI was utilized in the methodology include:

1. Generation of Expert Profiles: The profiles of the experts (specialists in pedagogy, technology, and literature) were generated using Large Language Models (LLMs) and synthetic data.
2. Refinement of the Evaluation Rubric: The rubric for assessing the integration of Augmented Reality (AR) was refined with the assistance of AI.
3. Analysis of Delphi Evaluation Data: Patterns in the expert evaluations were identified using AI.