Enhancing Accessibility, Engagement, and Motivation in Counseling Services for Secondary Schools through Gamified Blended Mobile and Virtual Reality Therapy

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Abstract— Background: Secondary school counseling services often face challenges such as limited counselor availability and low student participation. Traditional counseling methods frequently fail to engage students, thus reducing both accessibility and impact. Integrating Virtual Reality (VR) and mobile-based interventions presents a promising solution to address these issues. **Objective**: This study aims to evaluate the effectiveness of a gamified blended mobile and VR therapy in enhancing accessibility, cognitive-emotional-behavioral engagement, and motivation within secondary school counseling services. **Methods**: A mixed-methods research design was employed, combining quantitative methods (pre- and post-intervention surveys, along with behavioral tracking) and qualitative methods (semi-structured interviews and thematic analysis of focus group discussions). These methods were chosen to capture both measurable impacts and participants' perceptions of the intervention. A total of 384 students and 10 counselors participated in an 8-week intervention. **Results**: The intervention led to a significant improvement in the Accessibility Index (from 3.2 to 4.6). Additionally, engagement across cognitive, emotional, and behavioral dimensions showed marked improvements. Thematic analysis revealed that students appreciated the safety and realism provided by the digital counseling environment. **Conclusion**: The gamified blended therapy approach effectively enhanced counseling accessibility and multidimensional engagement, offering a scalable, student-centered solution for secondary school counseling services.
Keywords— Blended Mobile Therapy, Gamification, Virtual Reality Therapy, School Counseling, Student Engagement

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I. INTRODUCTION

Integrating digital technologies into education has revolutionized teaching methodologies, learning environments, and student support services, enabling more dynamic and interactive experiences. Among these technological advancements, mobile applications and Virtual Reality (VR) have shown exceptional promise in enhancing accessibility and engagement in educational and psychological contexts. These technologies hold unique potential in secondary school counseling, where traditional methods often face challenges such as limited counselor availability, high student-to-counselor ratios, and disengagement from conventional practices[1], [2], [3]. Recent studies have further highlighted the transformative role of gamification in addressing these challenges.

School counseling is critical for students' social, emotional, and academic development. However, existing counseling approaches often fail to meet students' diverse and complex needs due to systemic barriers. Traditional methods, reliant on static tools and face-to-face interactions, may not appeal to tech-savvy students who prefer engaging and interactive platforms[5]. Moreover, these methods are often resource-intensive, leaving students in underserved communities with inadequate access to support services [6], [7].

The advent of VR and mobile technologies provides innovative solutions to these challenges. VR, with its ability to simulate real-life scenarios in controlled environments, has been widely acknowledged for its effectiveness in fostering emotional regulation, problem-solving, and decision-making skills [8], [9], [10]. Simultaneously, mobile technologies offer unmatched accessibility, allowing users to access support services from anywhere, making them particularly beneficial for students in remote or resource-constrained areas [11], [12]. These dual capabilities of VR and mobile platforms represent a critical convergence of technology for addressing multifaceted counseling needs.

Despite the demonstrated potential of these technologies, existing research primarily focuses on their applications in clinical psychology or higher education. Limited attention has been paid to their combined use in secondary school counseling. Studies investigating blended approaches—integrating mobile and VR technologies—are sparse, leaving a significant gap in understanding their impact on accessibility and engagement in counseling services [2], [13]. Furthermore, there is a lack of comprehensive studies examining user interface (UI) and user experience (UX) design principles that optimize the effectiveness and inclusivity of these technologies in educational settings [14], [15].

Mobile technologies offer unmatched accessibility, allowing users to engage with services anytime and anywhere [12]. Meanwhile, VR provides immersive experiences that simulate real-

life scenarios, enhancing emotional regulation, problem-solving, and decision-making skills [1], [2]. Despite their individual benefits, few studies have explored the combined use of mobile and VR technologies in secondary school counseling[2]. Even fewer have examined The potential of gamification—the use of game design principles in non-game settings—which has garnered considerable attention. such as points, rewards, and progress tracking—to further enhance motivation and sustained engagement in counseling sessions [3].

Gamification is increasingly recognized as a powerful tool in educational and psychological contexts [4]. By incorporating challenges, achievements, and feedback loops, gamification transforms mundane or difficult tasks into engaging and rewarding activities. When applied to counseling, these elements can create an environment where students feel more motivated to participate and actively engage with the content, leading to better outcomes [5]. Gamification involves the integration of game design elements, such as points, rewards, and progress tracking, into non-game contexts to boost motivation and engagement. For instance, gamified systems have proven effective in fostering emotional and behavioral engagement in mental health interventions, particularly by employing user-centered design principles that cater to individuals [4]. In educational counseling, these elements can make sensitive topics like mental health more approachable, enabling students to engage meaningfully in virtual environments designed to simulate real-world challenges.

Research on counseling methods often highlights the challenges of maintaining student engagement, particularly when addressing sensitive or complex topics such as mental health, conflict resolution, and emotional regulation. Mobile applications are well-suited to provide students with tools and exercises they can use at their own pace, fostering autonomy and comfort [19]. Meanwhile, VR environments offer immersive experiences encouraging active participation by simulating real-world scenarios. These simulations can help students practice responses to various challenges in a safe and controlled setting, enhancing their confidence and skillsets [1], [16]. However, the lack of research on how these platforms can be seamlessly integrated to maximize their individual strengths has left a critical gap in the literature.

This study addresses these gaps in the literature by exploring a gamified, blended mobile and VR therapy approach tailored to secondary school counseling services. It evaluates the impact of this innovative method on accessibility, engagement, and motivation among students while providing actionable insights for implementation in diverse educational settings. By leveraging the combined strengths of gamification, mobile technology, and VR, this research aims to modernize school counseling practices, making them more inclusive, scalable, and effective for today's digital learners.

The potential of blended mobile and VR technologies extends beyond addressing systemic limitations in counseling services. By incorporating user-centered design principles, such as cultural relevance and ease of use, these technologies can be tailored to meet the unique needs of diverse student populations [13], [20]. For instance, VR counseling sessions could simulate culturally specific scenarios to foster a greater sense of relatability among students. Similarly, mobile applications could include multilingual support and adaptive features that cater to varying levels of digital literacy[6], [7]

The significance of this study lies in its potential to transform educational counseling practices, aligning them with the digital preferences of today's students and addressing systemic barriers to support. The findings contribute to the broader adoption of innovative technologies in education and psychological support services by bridging the gap between technological advancements and practical application. Moreover, this research offers actionable insights into designing and implementing scalable solutions that can be adapted to various educational settings.

Blended mobile and VR therapy also holds promise for addressing emerging educational challenges, such as the growing need for mental health support during global crises [8]. By leveraging the strengths of both technologies, schools can create hybrid models of counseling that are accessible, engaging, and effective. For example, students could participate in VR sessions during school hours to explore complex scenarios, followed by mobile-based follow-ups that reinforce key takeaways. This approach maximizes resource efficiency and ensures continuity in counseling interventions.

In parallel, research has demonstrated that gamification strategies are effective in educational settings and domains like mobile banking, where personalized approaches significantly enhance user engagement and satisfaction [9]. The findings emphasize the importance of tailored interventions that leverage psychological principles such as autonomy, competence, and relatedness to drive engagement [10]. By merging these insights, this study aims to explore the potential of gamified blended mobile and VR therapy to modernize secondary school counseling practices and address systemic barriers to accessibility and engagement. Despite the emergence of numerous strategies aimed at enhancing student engagement within counseling services, there remains a notable deficiency in research that holistically incorporates the multidimensional aspects of engagement. Engagement in the counseling context extends beyond mere physical attendance or platform usage; it encompasses interconnected cognitive, emotional, and behavioral dimensions. These dimensions have been conceptualized in frameworks such as the Student Engagement Inventory (SEI) [11] and elaborated further within the theoretical model of student engagement proposed by Fredricks, Blumenfeld, and Paris (2004), particularly in relation to

educational technologies[12]. In light of these gaps, the present study seeks to address the following research questions:

1. How does gamified blended mobile and VR therapy impact the accessibility of counseling services in secondary schools?

2. To what extent does the intervention enhance student engagement across cognitive, emotional, and behavioral dimensions?

3. How do students and counselors perceive the motivational value and usability of gamification elements embedded in the therapeutic process?

II. RESEARCH METHOD

Integrating digital technologies into education has revolutionized teaching methodologies, learning environments, and student support services, enabling more dynamic and interactive experiences. Among these technological advancements, mobile applications and Virtual Reality (VR) have shown exceptional promise in enhancing accessibility and engagement in educational and psychological contexts. These technologies hold unique potential in secondary school counseling, where traditional methods often face challenges such as limited counselor availability, high student-to-counselor ratios, and disengagement from conventional practices [6], [13], [14]Recent studies have further highlighted the transformative role of gamification in addressing these challenges [15]

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The advent of VR and mobile technologies provides innovative solutions to these challenges. With its ability to simulate real-life scenarios in controlled environments, VR has been widely acknowledged for its effectiveness in fostering emotional regulation, problem-solving, and decision-making skills. Simultaneously, mobile technologies offer unmatched accessibility, allowing users to access support services from anywhere, making them particularly beneficial for students in remote or resource-constrained areas. These dual capabilities of VR and mobile platforms represent a critical convergence of technology for addressing multifaceted counseling needs.

Despite the demonstrated potential of these technologies, existing research primarily focuses on their applications in clinical psychology or higher education. Limited attention has been paid

to their combined use in secondary school counseling. Studies investigating blended approaches—integrating mobile and VR technologies—are sparse, leaving a significant gap in understanding their impact on accessibility and engagement in counseling services [15], [16]. Furthermore, there is a lack of comprehensive studies examining user interface (UI) and user experience (UX) design principles that optimize the effectiveness and inclusivity of these technologies in educational settings [4][17].

Mobile technologies offer unmatched accessibility, allowing users to engage with services anytime and anywhere [6]. Meanwhile, VR provides immersive experiences that simulate real-life scenarios, enhancing emotional regulation, problem-solving, and decision-making skills [8], [16]. Despite their benefits, few studies have explored the combined use of mobile and VR technologies in secondary school counseling[2]. Even fewer have examined The potential of gamification—the use of game design principles in non-game settings—has garnered considerable attention. such as points, rewards, and progress tracking—to further enhance motivation and sustained engagement in counseling sessions [17].

Gamification is increasingly recognized as a powerful tool in educational and psychological contexts [14]. By incorporating challenges, achievements, and feedback loops, gamification transforms mundane or difficult tasks into engaging and rewarding activities. When applied to counseling, these elements can create an environment where students feel more motivated to participate and actively engage with the content, leading to better outcomes [18]. Gamification involves integrating game design elements, such as points, rewards, and progress tracking, into non-game contexts to boost motivation and engagement. For instance, gamified systems have proven effective in fostering emotional and behavioral engagement in mental health interventions, particularly by employing user-centered design principles that cater to individuals [4]. In educational counseling, these elements can make sensitive topics like mental health more approachable, enabling students to engage meaningfully in virtual environments designed to simulate real-world challenges.

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Gamification in Education and Counseling

Gamification involves applying game design elements, such as points, badges, and leaderboards, to enhance motivation and engagement in non-game contexts. Research has shown that gamification fosters intrinsic motivation by creating a sense of achievement and progress [4], [21]. In education, gamification has improved learning outcomes and increased participation, particularly among younger, tech-savvy audiences [22]

In counseling, gamification has been less explored but demonstrates significant potential. Interactive tasks and gamified challenges can make sensitive topics like emotional regulation and conflict resolution more approachable [23]. However, most studies focus on individual gamification elements rather than their integration into broader, blended approaches.

Virtual Reality

The concept of a virtual reality crisis emerged as a novel idea in the technology sector during the early 1990s, with speculation about its potential already present at the time [24]Virtual Reality (VR) is characterized as an immersive multimedia experience or a computer-simulated reality that replicates objects from the surrounding environment by visually simulating physical presence in the real world. This technology enables users to engage reliably within that environment, offering a realistic visual experience through a stereophonic viewer or a computer-generated setting. VR allows individuals to conduct realistic simulations of specific objects using computer-generated 3D environments, ensuring users' physical involvement. The objective is to create experiences that immerse users in a virtual world while enhancing relevant physical interactions, deepening their engagement in the digital environment [25]. This system is commonly applied in designing structural objects such as infrastructure, manufacturing, and everyday activities that mimic real-world experiences[26], [27]. The emergence of VR technology has expanded technological applications and introduced innovative models for learning English. By integrating gaming concepts, VR enhances student engagement, encouraging active participation. This technology is a new media form that facilitates virtual English learning experiments, skill development, and interactive experiences within VR scenes[28], [29], [30]. Visual representation and active involvement foster student learning initiatives and creativity, contributing to the development of knowledge-building frameworks. VR technology integrates various disciplines, including dual-sensing interactive technology, control science, simulation environments, high-resolution display techniques, visual systems, psychology, computer graphics, and mathematics, to create 3D immersive environments[31], [32]

VR is widely recognized for its capacity to develop immersive and controlled environments that replicate real-life scenarios. This capability promotes emotional regulation, problem-solving, and decision-making skills [1], [2]. It has been extensively employed in education to teach

abstract concepts and facilitate experiential learning, enhancing engagement and knowledge retention [3].

In counseling, VR provides a secure setting where students can practice responses to complex situations. It has been successfully utilized to address concerns such as anxiety, stress management, and social skills development [14], [33]. Despite its benefits, limited research has examined the integration of VR with mobile technologies or gamification approaches.

Mobile Technologies in Counseling

Mobile learning represents a modern approach to accessing educational content through mobile devices. In recent literature, mobile game-based learning has emerged as a widely adopted solution, enhancing student learning engagingly and enjoyably [34]. Among young individuals, touch-screen mobile devices are the most popular, with rapid technological advancements further accelerating their adoption[35]. These devices provide easy internet access, allowing users to engage with learning materials from virtually anywhere [36], [37]. As a flexible learning method, mobile learning enables students to study independently of time and location, positioning it as an applied innovation in education [38], [39], [40]. Also known as M-learning, it facilitates educational interactions through mobile technology, serving as a resource for learning, fostering collaboration among students, and aiding in problem-solving [37], [41]. Students tend to prefer practice-oriented learning content over rote memorization [42], [43], [44]. Mobile learning is not merely about utilizing mobile devices for education; it encompasses all interactions among educators, students, learning theories, the environment, and other factors—anywhere and at any time[45], [46]. One of the primary advantages of mobile learning is its ability to provide students with a flexible and comfortable learning environment, ensuring that they can study at the most convenient time and place while maintaining a pleasant and engaging experience[47].

Mobile technologies provide unparalleled accessibility, allowing users to engage with counseling resources anytime and anywhere. Mobile applications have been shown to support self-paced learning and enhance user autonomy [6]. Features like push notifications, interactive exercises, and real-time feedback contribute to sustained engagement and improved outcomes.
In counseling, mobile apps can serve as a complementary tool, offering exercises and follow-up activities to reinforce key concepts introduced during face-to-face or VR sessions[42]. However, the potential of mobile apps to integrate gamification and VR remains underexplored

Virtual Reality in Game Education

Virtual Reality (VR) has become a significant technology that is widely discussed for its applications and the distinct advantages it offers in real-world scenarios[48]. Educational games incorporate learning content within a game model, providing students with meaningful learning experiences. Game-based learning introduces an interactive and innovative approach using

computer games with educational value. The primary objective of developing educational games and training simulators is to maintain children's focus during study sessions [49] incorporating multimedia elements such as audio and animation to enhance engagement A literature review has explored various themes, including learning outcomes, instructional design, educational benefits, as well as the advantages and challenges of using VR in education. The review in [50]presents findings on the development of research concerning VR, AR, and MR technologies in education, aligning them with attitudes, motivation, interaction, performance, problem-solving, collaboration, and communication.

Research conducted in [51]highlights how VR enables students to visualize places, objects, or situations they have never encountered before, offering a new and innovative VR component to enhance learning experiences. The study by [52]emphasizes that VR provides substantial benefits across multiple fields, particularly education. Its applications allow students to engage in experiences they would not have had in real life, promoting experiential learning. Consequently, VR is regarded as a crucial innovation for the future of educational environments. However, challenges persist in classroom implementation. As noted in [53]one such challenge is the requirement for a premium account to access full features, which raises concerns about an institution's ability to afford the necessary licenses for VR-based learning. While significant progress has been made in understanding the individual benefits of gamification, VR, and mobile technologies, limited research exists on their combined use in educational counseling. Most studies focus on higher education or clinical psychology, leaving a gap in understanding their application within secondary school settings[4], [16].

Additionally, few studies address the scalability and inclusivity of these technologies. Factors such as cultural relevance, ease of use, and adaptability, which could enhance their effectiveness in diverse educational settings, remain largely unexplored [5]. This study expands upon existing literature by examining a gamified, blended approach that integrates mobile and VR therapy specifically for secondary school counseling. By leveraging the strengths of these technologies, the study aims to address systemic challenges such as limited counselor availability and low student engagement, while providing valuable insights for future research and implementation.

The findings contribute to bridging the gap between technological advancements and practical applications, paving the way for more inclusive, scalable, and effective counseling practices in modern educational environments.

This section outlines the methodologies and tools employed to evaluate the impact of gamified blended mobile and Virtual Reality (VR) therapy on accessibility, engagement, and motivation in secondary school counseling services. The study adopts a user-centered approach to align with the journal's emphasis on interactive technologies (see Fig. 1).
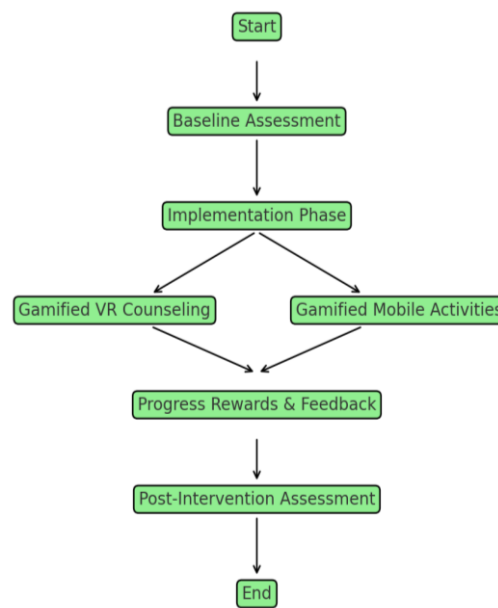
Fig 1. Gamified Blended Mobile and VR Therapy Metodology

Figure 1 outlines a gamified therapy methodology integrating mobile and VR technologies. It begins with a Baseline Assessment and an Implementation Phase featuring Gamified VR Counseling and Mobile Activities. Progress is reinforced through Rewards & Feedback, concluding with a Post-Intervention Assessment to evaluate outcomes.

2.1 Study Design

A mixed-methods research design was employed to evaluate the intervention's impact comprehensively. The quantitative component consisted of structured pre- and post-intervention surveys and digital behavioral tracking to assess changes in accessibility and engagement. The qualitative component involved conducting semi-structured interviews and focus group discussions, which were analyzed using Braun and Clarke's thematic analysis framework. This combination enabled the study to measure both objective outcomes and subjective experiences.

2.2 Participants

The study involved 384 students and 10 school counselors drawn from four different secondary schools located in both urban and rural areas. These schools were selected based on their varying levels of digital infrastructure, prior engagement with digital counseling initiatives, and willingness to implement technology-based interventions. Stratified random sampling was used within each school to ensure participant diversity in demographics, socio-economic status, and digital literacy, thereby enhancing the representativeness and generalizability of the findings.

2.3 Intervention Tools

A gamified Virtual Reality (VR) therapy platform was developed to simulate counseling scenarios, featuring immersive modules focused on emotional regulation, stress management, and

conflict resolution. Gamification elements were integrated into the system, including achievement badges to recognize milestones achieved during VR exercises, scenario-based challenges that required students to apply learned skills in interactive tasks, and immediate feedback to provide real-time insights and promote skill refinement.

To complement the VR platform, a mobile application was designed to extend its benefits and enhance user engagement. This app incorporated gamification features such as progress tracking with visual dashboards displaying completed tasks and progress levels, reward systems offering virtual points and incentives for consistent engagement and task completion, and interactive challenges like weekly tasks or quizzes to reinforce the skills acquired during VR sessions.

2.4 Procedure

The project followed a structured three-phase approach to enhance accessibility, engagement, and motivation through a gamified VR therapy platform and a complementary mobile app.

a. **Baseline Assessment:** Surveys and digital engagement tests were conducted to establish initial levels of accessibility, engagement, and digital proficiency among participants.

b. **Implementation Phase:** Students engaged in gamified VR counseling sessions over eight weeks and used the mobile app for supplementary activities. The integrated gamification elements were designed to boost motivation and encourage sustained participation. VR sessions simulated real-life counseling scenarios, incorporating interactive challenges and rewards, while the mobile app maintained continuous engagement through gamified tasks and progress incentives.

c. **Post-Intervention Assessment:** Follow-up surveys, interviews, and focus group discussions were conducted to evaluate changes in accessibility, engagement, and motivation, providing valuable insights into the program's impact.

2.5 Data Collection

Quantitative data were collected using validated instruments to measure engagement levels, accessibility, and motivation. Qualitative data were obtained through semi-structured interviews and thematic analyses of focus group discussions. The Accessibility Index used in this study was adapted from the WHO eAccessibility framework, measuring digital access comfort, service availability, and ease of access through mobile and VR technologies[54]. Student engagement was measured using a modified version of the Student Engagement Inventory (SEI), which assesses cognitive, emotional, and behavioral engagement dimensions relevant to digital counseling environments[11].

2.6 Data Analysis

Thematic analysis was conducted following the six-phase method by Braun and Clarke (2006), allowing for the identification of key themes from semi-structured interviews and focus group

discussions. This approach enabled a deeper understanding of participant perceptions regarding gamification and digital engagement [55].

a. Quantitative Analysis: Descriptive and inferential statistical methods were applied to identify significant pre- and post-intervention differences.

b. Qualitative Analysis: Thematic coding was used to extract insights from participant feedback, focusing on the impact of gamification on user experience and counseling outcomes.

2.7 Ethical Considerations

Ethical approval was obtained from the Institutional Review Board. Participants provided informed consent, and data confidentiality was maintained throughout the study. This methodology ensures a robust evaluation of gamified blended mobile and VR therapy, aligning with the journal's emphasis on interactive and mobile technologies for educational innovations.

III. RESULT AND DISCUSSION

This section presents the findings and analysis of implementing blended mobile and virtual reality (VR) therapy in secondary school counseling. Quantitative and qualitative data were analyzed to evaluate the impact on accessibility and student engagement, highlighting key improvements and discussing their implications.

3.1 Accessibility Improvements

One of the significant outcomes of this study was the improvement in perceived accessibility to counseling services. In this study, accessibility was measured using an adapted version of the **Accessibility Index** developed by the World Health Organization's eHealth framework. This index assesses perceived ease of access to counseling services, including digital availability, user comfort with technology, and access time and location flexibility. The use of this index aligns with the research objective of evaluating how digital platforms—especially gamified mobile and VR systems—enhance the inclusivity and reach of school counseling services. Quantitative analysis revealed a notable increase in the Accessibility Index, with mean scores rising from 3.2 (SD = 0.6) at baseline to 4.6 (SD = 0.5) post-intervention (p < 0.01). Integrating gamified VR modules and mobile platforms enabled students to access counseling sessions more conveniently, overcoming traditional barriers such as hesitancy to engage face-to-face. Key gamification elements such as achievement badges and progress rewards encouraged consistent use. The figure 2 shows the change in the Accessibility Index before and after implementing blended mobile and VR therapy in secondary school counseling.
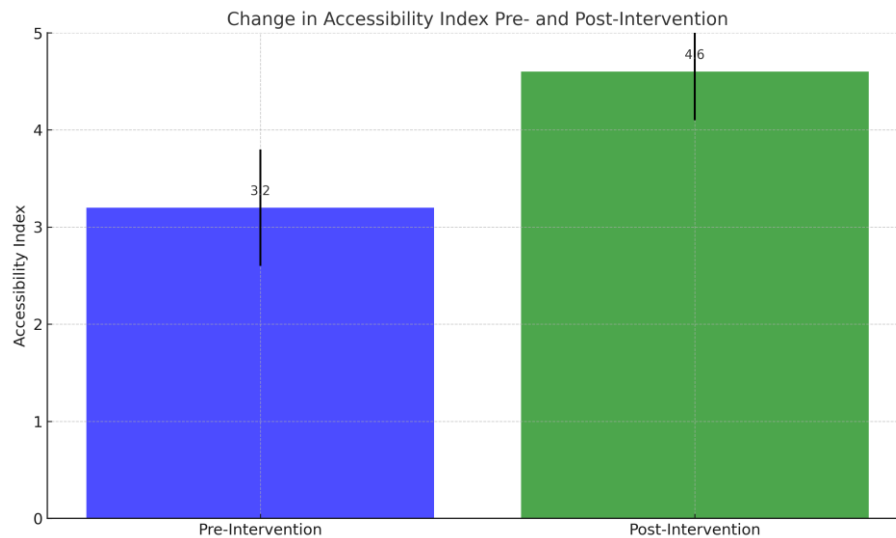
Fig 2. Accessibility Index Pre- and Post-Intervention

Qualitative feedback supported these findings, with students expressing a sense of ease and comfort in interacting with digital tools. One participant noted, "The VR sessions made it easier for me to connect with the counselor. It felt like I was part of a safe environment, even when discussing personal issues." Counselors also reported increased session participation, particularly among students who had previously avoided traditional methods.

3.2 Engagement Levels

The concept of student engagement used in this study follows the three-dimensional model proposed by Fredricks, Blumenfeld, and Paris (2004), categorizing engagement into cognitive, emotional, and behavioral dimensions [12]. Cognitive engagement refers to students' psychological investment in learning and the willingness to exert effort in understanding complex ideas. Emotional engagement involves students' affective reactions, such as interest, enjoyment, or a sense of belonging. Behavioral engagement relates to participation in academic and social activities. This framework has been widely applied in educational and psychological research, including by Appleton et al. (2006), who operationalized these dimensions through the Student Engagement Instrument (SEI), which was adapted in this study to fit the context of digital counseling[11]. Student engagement was evaluated across cognitive, emotional, and behavioral dimensions, each showing significant improvement post-intervention:

a.   Cognitive Engagement: Scores increased from 3.8 (SD = 0.7) to 4.4 (SD = 0.6) ($p < 0.05$).

b.   Emotional Engagement: This dimension showed the most substantial improvement, with scores rising from 3.6 (SD = 0.9) to 4.8 (SD = 0.5) ($p < 0.01$).

c.   Behavioral Engagement: Scores improved from 3.9 (SD = 0.8) to 4.5 (SD = 0.6) ($p < 0.05$).

Table 1 summarizes the statistical comparison of engagement dimensions before and after the intervention. The t-statistic measures the strength of the difference between pre- and post-intervention scores for each dimension. Higher absolute values indicate stronger evidence of change. The P-value represents the probability of observing these results by chance. Since all p-values are below the threshold of 0.05, we can conclude that the intervention had a significant and positive impact on all three engagement dimensions: Cognitive, Emotional, and Behavioral. Emotional engagement shows the strongest improvement, as reflected by the largest t-statistic (see Table 1).

Table 1. Statistical Significance of Engagement Dimensions

Dimension	t-Statistic	p-Value	P Significance (p<0.05)
Cognitive	-4.99	< 0.0001	True
Emotional	-5.91	< 0.0001	True
Behavioral	-3.96	0.0002	True

The gamified components, such as scenario-based challenges in VR sessions and interactive quizzes in the mobile app, were critical in driving these improvements.
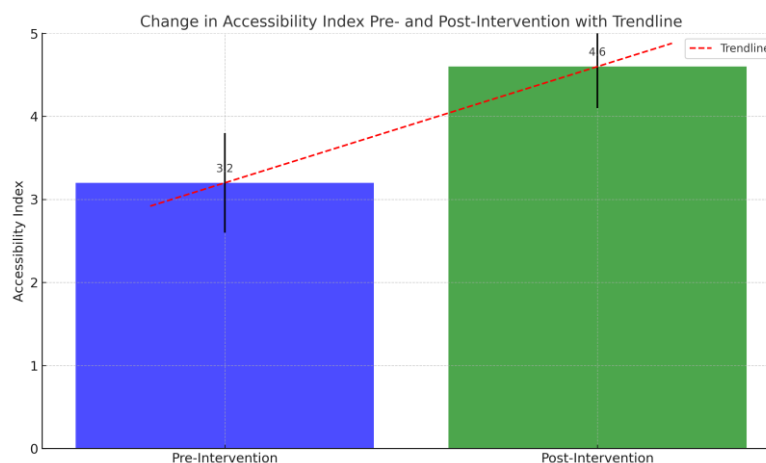
Fig 3. Engagement Levels by Dimension (Cognitive, Emotional, Behavioral)

The chart in Figure 3 compares engagement levels across three key dimensions: cognitive, emotional, and behavioral, before and after implementing gamified blended mobile and VR therapy. The data indicates substantial improvements in all dimensions post-intervention. Emotional engagement exhibited the most significant increase, reflecting the effectiveness of immersive and gamified components in fostering deeper emotional connections. Cognitive and behavioral dimensions also showed notable enhancements, demonstrating improved focus and participation. These results underscore the intervention's holistic impact, promoting active student engagement across multiple facets of their counseling experiences.

3.3 Gamification Impact

Insights from interviews and focus group discussions provided further context to the quantitative results:

a. Student Feedback: Many students highlighted the gamified elements—such as badges, progress tracking, and interactive challenges—as highly engaging. A participant stated, "I felt like I was achieving something real, which motivated me to stay involved."

b. Counselor Observations: Counselors noted that initially hesitant students became more willing to participate, driven by the gamification rewards and interactive activities.

c. Students reported that the immersive VR scenarios felt realistic and relatable, enhancing their understanding and application of counseling concepts. Counselors observed that students were more engaged and willing to participate actively during sessions.

Furthermore, the thematic analysis of the qualitative interviews and focus group discussions revealed five core themes that enrich the understanding of how students and counselors experienced the gamified blended mobile and VR therapy:

1. **Digital Comfort Zone** – Students reported feeling more open and emotionally safe when discussing personal issues within VR environments. The immersive setting helped establish psychological security, often difficult to achieve in traditional face-to-face sessions.

2. **Gamification as a Motivational Booster** – Badges, leaderboards, and progress bars were consistently considered drivers of sustained participation. Students expressed that these features created a sense of achievement and friendly competition, keeping them motivated throughout the intervention.

3. **Realistic Simulation Enhances Relevance** – The VR scenarios were perceived as highly relatable and contextually accurate, which helped students internalize counseling content. Participants indicated that the realism of scenarios made it easier to apply learned concepts to their real-life challenges.

4. **Flexible Access via Mobile Platforms** – Students praised the ability to access counseling content anytime and anywhere through mobile apps. Flexibility in time and location reduced logistical barriers and enabled more consistent engagement, especially for remote or underserved areas.

5. **Need for Technical Support and Guidance** – Both students and counselors emphasized the importance of introductory training and ongoing technical support. Initial unfamiliarity with VR tools posed a challenge, underscoring the need for structured onboarding to maximize effectiveness.

3.4 Challenges and Limitations

While the intervention yielded positive results, certain challenges were identified:

a. Technical Barriers: Initial training and technical support were necessary for both students and counselors to navigate the VR tools effectively.

b. Resource Constraints: Limited availability of VR equipment restricted simultaneous participation for larger groups.

c. Contextual Limitations: The study was conducted in a specific set of schools, which may limit the generalizability of the findings to broader educational contexts.

3.5 Discussion

The findings of this study demonstrate the transformative potential of gamified blended mobile and VR therapy in enhancing accessibility and engagement within secondary school counseling services. By addressing traditional barriers and providing innovative tools, this intervention has successfully modernized the counseling experience for students, particularly those in underserved or remote areas.

3.5.1 Accessibility Improvements

One of the key outcomes of this study was a marked improvement in accessibility to counseling services. Using gamified VR and mobile technologies mitigated traditional barriers, such as limited counselor availability and students' reluctance to engage in face-to-face sessions. The integration of these tools allowed students to access counseling more flexibly and comfortably. Quantitative results showed a significant increase in the Accessibility Index, as illustrated in Figure 4, while qualitative feedback highlighted the convenience and approachability of digital tools. For example, students expressed that VR sessions created a safe environment to discuss sensitive issues, fostering a sense of trust and ease[56].
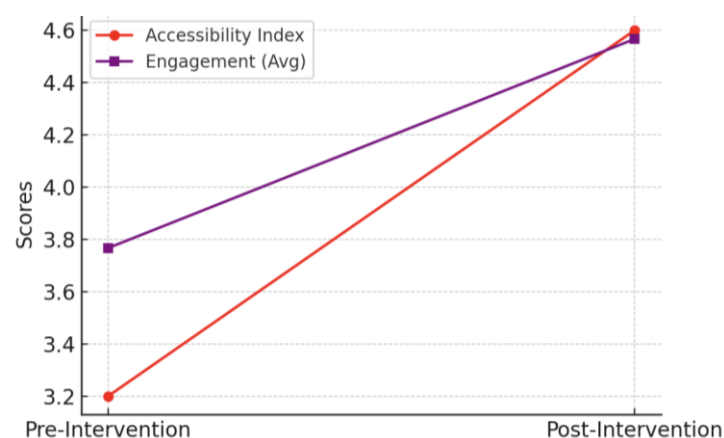
Fig 4. Engagement and Accessibility Scores Before and After Intervention

3.5.2 Engagement Enhancements

Engagement levels across cognitive, emotional, and behavioral dimensions saw significant improvements, with emotional engagement experiencing the most pronounced change. This suggests that the immersive nature of VR and the motivational aspects of gamification effectively captured students' interest and fostered deeper emotional connections. The gamified elements, such as progress tracking, achievement badges, and interactive challenges, played a pivotal role in sustaining student participation. Counselors also observed that students who were initially hesitant became more actively involved over time, driven by the engaging and rewarding nature of the intervention[9].

3.5.3 Challenges and Limitations

While the intervention was successful, several challenges were identified:

a. Technical Barriers: Initial training was required for both students and counselors to familiarize themselves with the VR and mobile tools. This highlights the need for robust technical support in future implementations.

b. Resource Constraints: Limited VR equipment restricted the number of students who could participate simultaneously, posing logistical challenges for scaling up the intervention.

c. Contextual Limitations: The study was conducted within a specific set of schools, potentially limiting the generalizability of the findings to other educational settings.

3.5.4 Implications for Future Research

These findings contribute to the growing literature on integrating gamified technologies in educational and psychological support settings. They underscore the importance of designing interventions that are not only innovative but also user-centered, addressing the diverse needs of students. Future research should explore scalable models for implementing similar interventions across various schools and cultural contexts. Additionally, further studies could investigate the long-term effects of such interventions on student outcomes, including academic performance and mental well-being[10].

IV. CONCLUSION

The findings of this study demonstrate that gamified blended mobile and VR therapy significantly improves the accessibility and engagement of counseling services in secondary schools. By integrating immersive VR experiences with the flexibility of mobile platforms, this approach effectively addresses key systemic barriers, such as limited counselor availability and student reluctance to participate in traditional face-to-face counseling. The quantitative results indicate a substantial increase in accessibility and engagement levels across cognitive, emotional,

and behavioral dimensions. At the same time, qualitative feedback highlights the value of gamified elements in fostering motivation and active participation.

The intervention provided a more engaging and interactive counseling experience and created a supportive environment that encouraged students to seek help more readily. Using scenario-based challenges, achievement badges, and progress tracking played a crucial role in sustaining student involvement, reinforcing the effectiveness of gamification in psychological and educational support systems. Furthermore, counselors observed that students who were initially hesitant became more engaged over time, underscoring the potential of digital and immersive tools to make counseling more approachable and impactful.

Despite these positive outcomes, technical barriers, resource constraints, and contextual limitations must be acknowledged. Addressing these issues will be essential for scaling up and optimizing similar interventions in diverse educational settings. Future research should explore strategies to enhance the accessibility of VR equipment, streamline technical support, and investigate the long-term impact of gamified counseling interventions on students' mental health and academic performance.

Overall, this study highlights the transformative potential of gamified blended mobile and VR therapy in modernizing school counseling services. This approach presents a scalable and inclusive model for enhancing student well-being by leveraging innovative technology and evidence-based engagement strategies. As digital mental health solutions continue to evolve, integrating gamification and immersive experiences into counseling practices could play a vital role in shaping the future of student support services.

We are also grateful to the participants who willingly engaged with the system and provided valuable feedback during the evaluation phase. Their insights were instrumental in refining the usability and functionality of the system.

This research was conducted collaboratively, and all individual and institutional contributions are greatly appreciated.

Conflicts of Interest: The authors declare no conflict of interest

Data Availability: Data is available upon request to the corresponding author.

Informed Consent: Informed consent was obtained from all participants before their involvement in the study. A detailed explanation of the study's objectives, procedures, potential risks, and benefits was provided in the Methods section. Participants were informed of their right to withdraw at any time without consequences, ensuring voluntary participation by ethical research guidelines.

Animal Subjects: No animal subjects were involved in this research.

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