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THERAPEUTIC AND EDUCATIONAL APPS – GENERATIVE AI-DRIVEN SOFTWARE (MOBILE APPS, VR EXPERIENCES, OR SOCIAL ROBOTS) THAT TEACH SOCIAL SKILLS, EMOTION RECOGNITION, OR JOB TRAINING TO AUTISTIC INDIVIDUALS THROUGH INTERACTIVE ROLE-PLAY AND STORYTELLING

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ABSTRACT
The increasing use of generative AI-driven tools, including mobile apps, virtual reality (VR) experiences, and social robots, offers new possibilities for supporting individuals with Autism Spectrum Disorder (ASD) in acquiring social skills, emotion recognition, and job training. This paper explores the potential of these AI-powered applications for autism therapy, with a particular focus on interactive role-playing and storytelling techniques that foster learning in controlled, repetitive environments. By reviewing recent research and technological innovations, we discuss the effectiveness of these tools in enhancing social communication and daily-life skills for autistic individuals (Lee, Lee, Hwang, Park, & Kim, 2025; Barua, Vicnesh, Gururajan, & Oh, 2022). Despite the promising outcomes observed in several studies, challenges such as accessibility, long-term engagement, and real-world applicability remain (Ahmad, Shokeen, & Raj, 2025). The paper concludes by suggesting future directions for research, including the need for more personalized and scalable solutions, as well as ethical considerations regarding the use of AI in sensitive therapeutic contexts (Huang, 2025; Karuppasamy, 2025).

Keywords
Generative AI**,** Autism Spectrum Disorder (ASD)**,** Social Skills Training**,** Emotion Recognition**,** AI-powered Therapy**,** Virtual Reality (VR)**,** Social Robots

INTRODUCTION

Autism Spectrum Disorder (ASD) is a developmental condition characterized by challenges in social communication, behavior, and sensory processing. Traditional therapeutic interventions often focus on improving social skills, emotion recognition, and daily-living skills. However, these interventions can sometimes be limited in their accessibility, engagement, and scalability, particularly for individuals who may not respond well to conventional therapy methods (Barua, Vicnesh, Gururajan, & Oh, 2022). In recent years, the advent of generative AI technologies has introduced new possibilities for enhancing the learning experience for individuals with autism. AI-powered tools such as mobile apps, virtual reality (VR) environments, and social robots are being developed to assist in therapy by offering personalized, interactive learning experiences.

These AI-driven platforms aim to improve various skills, including social interaction, emotional recognition, and vocational readiness, by simulating real-life situations in a safe and controlled virtual space (Lee, Lee, Hwang, Park, & Kim, 2025). Role-playing and storytelling techniques incorporated into these systems are designed to create environments where individuals can practice social scenarios, learn emotional cues, and prepare for job situations without the pressure of real-world consequences (Huang, 2025). Despite their promise, there remain several challenges, including issues of accessibility, affordability, and the transfer of skills learned in virtual environments to real-world situations.

The purpose of this article is to explore the potential of generative AI-driven tools in autism therapy, focusing on the ways in which they help individuals develop social skills, recognize emotions, and gain vocational training through interactive role-play and storytelling. By examining the current literature and technological advancements in this field, this article will identify the benefits, limitations, and future directions for research and development of AI-based therapeutic and educational tools for individuals with ASD.

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2. LITERATURE REVIEW

The use of artificial intelligence (AI) in autism therapy has gained increasing attention in recent years, especially with the development of generative AI-driven tools such as mobile applications, virtual reality (VR), and social robots. These technologies aim to address several core challenges faced by individuals with Autism Spectrum Disorder (ASD), particularly in areas such as social skills training, emotion recognition, and job readiness. This literature review examines the current research on AI tools used in autism therapy, focusing on their effectiveness, benefits, and the challenges that remain in their implementation.

2.1 AI and Autism Therapy

Several studies highlight the potential of AI-powered applications to facilitate social communication and emotional learning for individuals with ASD. For example, VR-based interventions have been shown to improve social skills by simulating real-world scenarios where individuals with ASD can practice and learn appropriate responses to social cues (Barua, Vicnesh, Gururajan, & Oh, 2022). These interventions often incorporate role-playing and storytelling to allow users to engage in interactive learning without the pressures of real-life social interactions (Huang, 2025). Moreover, social robots, such as Milo, Kaspar, and QTrobot, have been employed as therapeutic tools to teach emotion recognition, social behaviors, and turn-taking skills in controlled, repeatable environments (Lee, Lee, Hwang, Park, & Kim, 2025).

2.2 Social Skills and Emotion Recognition

A growing body of research has shown that emotion recognition is a key area where AI-driven interventions can be particularly beneficial for individuals with ASD. Studies have demonstrated that AI tools, particularly robotics and interactive apps, can teach users to recognize facial expressions, tone of voice, and other emotional cues that are often difficult for individuals with ASD to interpret (Ahmad, Shokeen, & Raj, 2025). These tools are able to provide real-time feedback, helping users practice emotional understanding and adjust their responses accordingly. VR environments are especially useful for simulating dynamic social situations, where individuals can learn appropriate emotional responses and practice social skills in a safe, controlled space (Barua et al., 2022).

2.3 Job Training and Vocational Readiness

Job training and vocational readiness are essential aspects of preparing individuals with ASD for independent living and employment. Recent advancements in AI-powered job training programs have shown promise in helping individuals with ASD navigate job interviews, workplace scenarios, and customer service roles. Role-playing simulations, integrated into VR platforms or mobile applications, allow users to practice real-world tasks, build confidence, and improve their readiness for employment (Kushwah & Dave, 2025). These tools can simulate a wide range of job-related interactions, from basic communication and teamwork to more specialized tasks such as retail or office work.

2.4 Challenges and Limitations

Despite the advancements in AI-driven autism therapy, several challenges remain. One major limitation is the accessibility and affordability of these tools. High costs associated with VR headsets, social robots, and other AI-based systems can limit access for many families and individuals, particularly in lower-income or under-resourced areas (Huang, 2025). Additionally, while AI-based tools have been shown to improve skills in virtual environments, there are concerns about how well these skills transfer to real-world situations. Research has shown mixed results regarding the long-term effectiveness of VR-based interventions and their ability to impact social behaviors outside of the controlled setting (Ahmad et al., 2025).

2.5 Gaps in the Literature

While numerous studies have demonstrated the potential of AI-driven tools for autism therapy, significant gaps remain in the research. For instance, much of the existing literature focuses on small sample sizes or short-term interventions, which may not reflect the broader population of individuals with ASD. Additionally, there is a lack of research exploring the integration of generative AI models, such as large language models (LLMs), in interactive autism therapy tools. Further studies are needed to explore how these technologies can be adapted for personalized therapy, as well as to evaluate their effectiveness over longer periods of time and in real-world settings (Lee et al., 2025; Barua et al., 2022).

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3. METHODOLOGY

This article adopts a qualitative research approach to explore the application of generative AI-driven tools in autism therapy. A review of existing literature, technological advancements, and case studies was conducted to assess the effectiveness, challenges, and future possibilities of AI-based therapeutic tools for individuals with autism spectrum disorder (ASD). The research methodology consisted of the following components:

3.1 Research Design

This article employs a systematic literature review methodology to synthesize and analyze existing studies on AI-driven autism therapy. A systematic approach was chosen to ensure a comprehensive and unbiased selection of relevant studies. The aim was to critically examine published research from peer-reviewed journals, conference proceedings, and other academic sources on the integration of AI technologies, including mobile apps, VR experiences, and social robots, in autism therapy.

3.2 Data Collection

Data collection involved identifying relevant studies published within the last five years (2020-2025) in academic databases such as Google Scholar, PubMed, IEEE Xplore, and ResearchGate. Keywords such as "AI in autism therapy," "generative AI for autism," "social robots for ASD," "emotion recognition AI," and "VR in autism therapy" were used to search for relevant articles. Only studies that focused on interactive role-play, storytelling, emotion recognition, and job training for autistic individuals were included in this review. Exclusion criteria included studies that focused on non-AI interventions, non-peer-reviewed sources, and studies without clear methodological explanations.

3.3 Inclusion Criteria

- Peer-reviewed journal articles, conference papers, and reports from credible academic sources.
- Studies that investigate the effectiveness of AI-based applications, including mobile apps, VR, and social robots, in supporting individuals with ASD.
- Studies with measurable outcomes such as improvements in social skills, emotion recognition, and vocational readiness.

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3.4 Data Analysis Techniques

The selected articles were analyzed using thematic analysis. Key themes, patterns, and trends were identified across studies to provide insights into the benefits, challenges, and limitations of AI-driven interventions in autism therapy. Studies were categorized according to their primary focus, including:

- Social Skills Development
- Emotion Recognition and Regulation
- Vocational Training and Job Readiness
- Ethical and Accessibility Issues

Where applicable, statistical methods (if available) from the studies were also summarized to assess the impact of AI tools on the targeted outcomes. This approach allowed for a clear comparison of findings across various studies, providing a comprehensive understanding of the current state of AI in autism therapy.

3.5 Limitations of Methodology

While the systematic review methodology provided a broad overview of the research landscape, it is important to note that the majority of studies reviewed were qualitative in nature. There was limited availability of long-term, large-scale studies assessing the real-world transfer of skills learned through AI-driven tools. Furthermore, studies often lacked standardized metrics for measuring the effectiveness of these tools, which makes direct comparisons difficult.

4. RESULTS

This section presents the key insights and findings based on the systematic review of the literature regarding the use of generative AI-driven tools in autism therapy. The results are organized by the main themes identified during the analysis: social skills development, emotion recognition, vocational training, and challenges and limitations.

4.1 Social Skills Development

The use of AI-driven tools, particularly social robots and VR environments, has shown positive results in enhancing social skills among individuals with Autism Spectrum Disorder (ASD). Table 1 below summarizes findings from several studies that evaluated the impact of social robots and VR platforms in improving social interaction skills, such as turn-taking, eye contact, and communication.

Study/Source	**Intervention Type**	**Key Findings**	**Technology Used**
Lee, Lee, Hwang, Park, & Kim (2025)	Social Robots (QTrobot, Milo)	Increased social interaction skills in children with ASD.	Social Robots
Barua, Vicnesh, Gururajan, & Oh (2022)	VR Social Scenarios	Improved ability to recognize social cues and engage in peer interactions.	Virtual Reality (VR)
Huang (2025)	VR Role-Playing	Enhanced social communication and confidence.	Virtual Reality (VR)

4.2 Emotion Recognition

AI tools have proven to be effective in helping individuals with ASD recognize and understand emotions. This has been achieved through mobile apps, VR environments, and social robots that focus on facial expression recognition, tone of voice, and other emotional cues. Table 2 below summarizes key findings from studies that evaluated AI's role in emotion recognition.

Study/Source	**Intervention Type**	**Key Findings**	**Technology Used**
Ahmad, Shokeen, & Raj (2025)	Mobile Apps (Emotix)	Significant improvements in identifying emotions via facial expressions and voice tone.	Mobile Apps

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Study/Source	Intervention Type	Key Findings	Technology Used
Barua, Vicnesh, Gururajan, & Oh (2022)	AI-Enabled AR/VR	Increased ability to identify and respond to facial emotions.	Augmented Reality (AR) and Virtual Reality (VR)
Lee et al. (2025)	Social Robots	Enhanced recognition of emotional states through interactive feedback.	Social Robots

4.3 Vocational Training and Job Readiness

AI-driven tools have also been utilized for job training and vocational readiness, helping individuals with ASD prepare for the workplace. These tools provide role-playing scenarios, job interviews, and customer service simulations. Table 3 below summarizes key findings from studies on AI tools for vocational training.

Study/Source	Intervention Type	Key Findings	Technology Used
Lee, Lee, Hwang, Park, & Kim (2025)	AutiHero Platform	Effective role-playing scenarios for job readiness, focusing on customer service and interviews.	Mobile App
Kushwah & Dave (2025)	VR Job Training	Improved confidence and readiness for workplace interactions.	Virtual Reality (VR)
Barua et al. (2022)	AI-Assisted Job Training	Positive impact on job-related communication and teamwork skills.	Virtual Reality (VR)

4.4 Challenges and Limitations

Despite the promising results, there are several challenges related to the implementation and accessibility of AI-driven tools in autism therapy. Table 4 outlines the key challenges identified in the literature.

Challenge	Description	Impact on AI Integration
Accessibility & Cost	High cost of VR headsets and social robots limits access.	Reduces widespread adoption, especially in low-income settings.
Real-World Transfer	Skills learned in virtual environments may not transfer effectively to real-life scenarios.	Limits the effectiveness of AI interventions outside controlled settings.
Ethical Considerations	Concerns around privacy, data security, and informed consent.	Risks regarding the misuse of personal data and potential biases in AI algorithms.

5. DISCUSSION

5.1 Interpretation of Findings

The findings of this review suggest that AI-driven tools, including mobile applications, virtual reality (VR) environments, and social robots, show significant promise in enhancing therapeutic interventions for individuals with Autism Spectrum Disorder (ASD). These tools, particularly those utilizing role-playing and storytelling, have been demonstrated to improve core skills such as social interaction, emotion recognition, and vocational readiness. For example, the use of VR simulations has provided a controlled, immersive environment in which individuals with ASD can practice real-world social interactions without the risk of social anxiety or failure. This aligns with prior research by Barua, Vicnesh, Gururajan, and Oh (2022), who highlighted the effectiveness of VR in promoting social and emotional learning.

In particular, social robots such as QTrobot and Milo have been successful in creating interactive, engaging experiences for children with ASD. These robots help bridge the gap between theoretical learning and real-world application by modeling social behavior and offering real-time feedback, a strategy that has proven effective for improving social skills (Lee et al., 2025). The combination of interactive storytelling and role-playing further enhances learning by allowing users to step into scenarios where they can practice social norms and emotional responses in a low-risk setting.

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5.2 Relating Findings to Literature

The findings from this review are consistent with the growing body of literature on the positive impact of AI and robot-assisted interventions for individuals with ASD. Studies such as those by Ahmad, Shokeen, and Raj (2025) and Huang (2025) have shown that AI-based tools offer personalized and adaptive learning experiences, which is crucial for individuals with ASD who often have unique learning needs. Furthermore, the integration of real-time feedback and adaptive learning algorithms in these tools allows for tailored interventions that can better meet the needs of individuals at different stages of development.

However, despite these promising results, some contradictions and challenges exist. For example, while studies like those by Barua et al. (2022) and Lee et al. (2025) demonstrate significant improvements in social skills, questions remain about the generalizability of these skills outside the virtual or controlled settings. This concern echoes previous research that highlights the limitations of technology-based interventions, particularly in the transfer of learned behaviors to natural, real-world environments (Ahmad et al., 2025). This limitation suggests that while AI-based tools can provide valuable training, they should complement, rather than replace, in-person therapy and real-world social interactions.

5.3 Implications for Practice

The results of this review suggest several important implications for both practitioners and developers of AI-based autism therapy tools. First, AI-driven platforms can be a powerful tool in increasing accessibility to autism therapy, especially in areas where traditional therapy options may be limited or unavailable. By providing interactive, customized, and repeatable learning environments, these tools can ensure that individuals with ASD receive continuous support regardless of geographical constraints.

However, the findings also emphasize the need for ethical considerations in the design and use of these technologies. As AI tools become more personalized, they collect sensitive data, such as behavioral and emotional responses, raising concerns about privacy and data security. Developers must prioritize user consent, data protection, and safeguards against misuse of personal information.

5.4 Limitations of the Review

While this review synthesizes a broad range of literature, several limitations must be acknowledged. Firstly, the studies reviewed often focused on small sample sizes, and many lacked long-term follow-up. This makes it difficult to determine whether the improvements observed in controlled environments persist over time in real-world situations. Additionally, the review did not cover all AI tools available in the market; there may be other emerging technologies or apps that were not included in the study. Lastly, the review largely concentrated on studies from higher-income countries, which means that the accessibility and applicability of these tools in low-resource settings remain underexplored.

5.5 Suggestions for Future Research

Given the limitations identified, future research should address the long-term effectiveness of AI-driven interventions and their ability to translate skills into everyday contexts. Large-scale studies with diverse populations, including individuals from different cultural and socioeconomic backgrounds, would help broaden our understanding of the universal applicability of AI tools for autism therapy. Further, more research is needed into the use of generative AI (such as language models) in therapeutic tools, especially in creating more natural, conversational interfaces for social skills development.

Moreover, exploring the integration of AI-driven tools with biofeedback or neurofeedback could provide deeper insights into how these technologies can be customized to meet the sensory and emotional needs of individuals with ASD (Huang, 2025). Lastly, ethical frameworks for the development and use of AI in autism therapy need to be established, focusing on user consent, data privacy, and the protection of vulnerable populations.

6. CONCLUSION

The integration of generative AI-driven tools such as mobile applications, virtual reality (VR), and social robots into autism therapy represents an exciting frontier in the treatment of Autism Spectrum Disorder (ASD). This review has demonstrated that these AI-based tools offer promising outcomes in enhancing critical areas such as social skills, emotion recognition, and job readiness. AI technologies have the potential to provide personalized, scalable, and repeatable interventions, giving individuals with ASD access to therapeutic support in ways that traditional methods may not be able to offer. The use of role-playing and storytelling techniques, incorporated

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into VR and robot-assisted platforms, is particularly effective in creating a safe and controlled environment for learning social and emotional behaviors.
However, the findings also highlight several limitations that need to be addressed. Accessibility and affordability remain significant barriers to widespread adoption, especially in under-resourced areas. Additionally, while the results from virtual environments are promising, there is still a need for more research into the real-world applicability of these skills and the long-term outcomes for individuals with ASD. Moreover, ethical considerations around data privacy, user consent, and the security of sensitive information are critical as these technologies become more integrated into therapeutic practices.
The review suggests that while AI-driven tools have great potential, they should be viewed as complementary to traditional therapy methods rather than replacements. These technologies should be used alongside human interaction to ensure that individuals with ASD continue to receive the full spectrum of support needed for their development. Additionally, more personalized and adaptive interventions are needed to address the unique challenges faced by each individual with ASD.

Future Research Directions
Future research should focus on long-term studies to evaluate the effectiveness of these technologies in real-world settings. There is also a need to develop scalable solutions that make these AI tools accessible to individuals from diverse socioeconomic backgrounds. Furthermore, exploring the integration of biofeedback and neurofeedback with AI-driven platforms could lead to more adaptive and dynamic learning experiences. Finally, ethical frameworks around the use of AI in autism therapy must be developed to ensure that these technologies are used responsibly and with respect for individuals' privacy and autonomy.
In conclusion, AI-driven tools have the potential to transform autism therapy, offering new and innovative ways to support individuals with ASD. While challenges remain, the continued advancement of these technologies holds great promise for improving the lives of those with autism, making therapy more accessible, engaging, and effective.

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