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Research Article

Generative conversational AI: Active practices for fostering students with mild intellectual disabilities to improve English communication skills

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ABSTRACT

Utilizing artificial intelligence (AI) technology in educational institutions for students with mild intellectual disabilities offers promising avenues for enhancing this population's learning outcomes and skill development. This study aims to investigate the effect of using generative conversational AI to improve English communication skills among students with mild intellectual disabilities. The study involved twelve students diagnosed with mild intellectual disabilities, divided equally into two groups. Six students engaged in guided conversations with AI, while the other six participated in free conversations with AI. These participants were randomly chosen from educational institutions specializing in intellectual disability education and mainstream schools. The results indicate that guided conversations significantly enhance English communication skills among participants. Additionally, the study highlights the development gains from engaging in guided conversations by AI applications. Statistical analysis reveals notable differences in the effect of guided versus free conversational approaches, with guided conversations yielding superior outcomes. This underscores the importance of structured guidance for comprehension and participation in different English communication skills among students with mild intellectual disabilities. Moreover, the study recommends the integration of AI tools in education to support students with disabilities, emphasizing the need for tailored AI applications to cater to diverse learning needs.

Keywords: conversational AI, intellectual disability, education, communication skills

INTRODUCTION

The integration of artificial intelligence (AI) into the education process is a transformation of the educational landscape that requires the preparation of consideration of teaching methods and strategies,

educational activities, and the real experiences of students (Sanabria-Navarro et al., 2023). AI offers effective and customized solutions to support learning outcomes and specifically student engagement and interaction. The application and integration of information and communication technology (ICT) into the educational context have also been made easier by advances in ICT (Aremu et al., 2023), affecting the system of technology use in education. With the proliferation of large language models based on Generative AI, its characteristics are similar to human intelligence's capabilities to generate text and visual content and intelligent communication (Cheng, 2023), which represents an unprecedented achievement that simulates human language to provide educational services that support and assist in the process of self-learning. In this context, AI tools provide a great opportunity to enhance students' communication skills in English anytime, anywhere (Chaka, 2023) These tools have proved to be very useful, especially for those who cannot provide human trainers to talk to them or partners in the conversation, enabling continuous practice and improving language efficiency, providing self-efficacy (Youssif et al., 2024) promising opportunities to improve language for communication among learners (Ali & Algane, 2020; Mohammed et al., 2021).

In addition to providing an opportunity for conversation and continuous training that simulates the human speaker, these tools provide immediate feedback on the learners' response, allowing them to identify their strengths and weaknesses and adjust their communication style accordingly (Yang et al., 2024) where these AI tools benefit from natural language processing (NLP), educational data mining, learning analytics to generate feedback based on students' interactions and performance data (Olga Tzirides et al., 2023) In addition, AI-based tools use visual dashboards, audio modifications and neural networks to provide real-time feedback, enhancing emotional speech training and real engagement (Wynn & Wang, 2023). Chaka (2023) indicates that direct conversation with AI tools helps learners build confidence in their English communication skills by practicing with an AI-enabled conversation partner, learners can feel more comfortable speaking English and be better prepared for real-life conversations.

On the other hand, this technology under the umbrella of obstetric AI augurs well for enhancing English communication skills among students with mild intellectual disabilities, specifically about data allocated to their needs (Papangelis et al., 2021). These applications provide dedicated support for students to develop language skills and improve communication capabilities So it represents a transformative approach to personal learning and developing their communication skills, This has been addressed by some studies that have undergone the impact of AI-based chat tools on developing communication skills among learners with minor mental disabilities and have demonstrated improvements in those skills. The current study is looking at a new point that has not been covered by the studies in this area, which is the kind of conversation that takes place between these learners and the AI tools. The current study assumes that there are two patterns of AI conversation. The first pattern is based on teacher guidance for students during the conversation with AI tools. The second is the free-standing pattern that stems from leaving free space for learners to speak unrestricted and teacher-guided, and then measuring the impact of the difference between these patterns and which is better at developing communication skills in learners with minor mental disabilities. Therefore, the current study primarily aims to develop English communication skills for students with mild intellectual disabilities, as many studies have indicated a weakness in these skills among these learners, such as the studies Klefbeck (2023) and Masłowska (2020), in addition to identifying the most influential style in developing their communication skills.

The present study therefore aims to answer the following questions:

1. What is the effect of active practice for students with mild intellectual disabilities (directed type) with communication tools based on generative AI on improving English communication skills?
2. What is the effect of active practice for students with mild intellectual disabilities (free type) with communication tools based on generative AI on improving their English communication skills?
3. What is the effect of the difference between the two types of active practice for students with mild intellectual disabilities (directed type and free type) with communication tools based on generative AI on improving English communication skills?

In light of what has been presented, the theoretical and practical importance of the current study can be clarified in directing the view of those in charge of the educational process to adopt learning based on the use of AI in education curricula, specifically those with mild intellectual disabilities, as well as keeping pace

with modern educational trends that emphasize the necessity of benefiting from smart digital learning tools, and employing them, as well as providing results that help those in charge of general education to benefit from them in developing the communication skills of students with mild mental disabilities, and finally providing a model of educational and technological treatment tools, and a test of communication and conversation skills that researchers can benefit from in other similar studies.

LITERATURE REVIEW

Generative Conversational AI

Generative conversational AI (GCAI) is the use of AI to initiate and manage interactive conversations with users. This technology has made considerable advances and is now used in various fields, including customer service, education, and healthcare. In education, GCAI uses AI systems to mimic human responses, enabling individualized and interactive learning experiences (Ng & Chan, 2024) These systems use NLP and machine learning algorithms to provide feedback and explanations and adjust instructional methods to meet individual needs, enhancing student engagement and promoting active learning (Ligot, 2024; Okaiyeto et al., 2023). Moreover, GCAI imitates human replies, facilitating dynamic and contextually aware interactions (Adiguzel et al., 2023).

AI systems offer feedback, provide explanations, and adapt instructional approaches to cater to the specific needs of each student. Developing interactive content can enhance student engagement, promote active learning, and facilitate tailored education initiatives (Jin & Kim, 2023). In their study, they not only explored the creation of an eLearning system using advanced software technologies like GPT to generate personalized course content, automate coding exercises, and manage sessions without human intervention but also addressed challenges like covering multiple languages, teaching diverse language aspects, and evaluating student contributions.

GCAI in education is effective in personalized learning and enhancing language acquisition, social engagement, and communication skills (Ali, 2020). He added that the increasing use of AI in language acquisition has attracted much discussion and debate. This revolutionary technology can greatly enhance language learning environments by introducing intelligent tutoring, automated feedback, and personalized learning experiences (Weng & Chiu, 2023). Online education and teaching are further advanced by AI systems, which improve adaptive evaluations, simplify repetitive tasks for teachers, and allow for personalized student learning (Seo et al., 2021). According to Aldosari (2020), AI is a program that can learn and accomplish various tasks. For example, users can ask AI-powered gadgets for help with schoolwork, and the answers they get back are spot on. In educational contexts, AI is used to make smart decisions similar to how humans make decisions.

Furthermore, AI has found extensive application in the field of language acquisition, namely in improving students' language abilities and sub-skills (Elkot & Ali, 2020; Xia et al., 2023). A plethora of AI-powered language learning software available on desktops and mobile devices supports language learners in their pursuit of language acquisition. These resources are fantastic for enhancing a wide range of language acquisition abilities (Ali, R. & Algane, 2020; Carolus et al., 2023). Many studies proved that ChatGPT is an AI-assisted technology that might be utilized in language learning environments to assist students in enhancing their language abilities and sub-skills (Fang et al., 2023; Fitria, 2023; Jin & Kim, 2023). ChatGPT's insightful remarks and feedback can address various language acquisition skills and sub-skills. The learners' overall language ability is the target of this assistance. Learners can easily compose logical and well-structured compositions with the help of ChatGPT's grammatically accurate sentences.

Huang and Tan (2023) state that an AI-powered language learning tool can comprehend human inquiries and offer optimal solutions. In their research, Suh and An (2022) explore the use of GCAI to create a creative learning environment for computational thinking. They use a visual programming environment to generate comics from code, allowing users to unlock their creative potential. Suh and An (2022) showcase how learners can use GCAI to create code and narratives, allowing them to customize and generate content based on computational principles. The uses of Chat AI models in empowering international TESOL students by Gervacio (2023) showed the use of chat generative pre-trained transformer (GPT) models to enhance

academic writing among international TESOL students. The study highlights positive outcomes like improved motivation and creativity and acknowledges limitations like inaccuracies and plagiarism issues (Gervacio, 2023).

GCAI can potentially improve English communication skills for students with mild intellectual impairments. According to the current study, the authors think educators can use GCAI via guided and free conversation types, with guided discussions providing structure and support and free discussions allowing students to lead talks based on their interests. In this study, two styles of conversation will be adopted with generative AI types:

1. **Guided conversation type:** The teacher directs interactions between students with mild IDs and the GCAI. This entails organizing the interaction by asking questions to the AI and following up on the responses. The goal is to provide direction and support to students while enabling meaningful communication opportunities. The teacher chooses specific subjects or suggestions corresponding to the student's learning objectives or interests. The teacher creates questions to spark conversation and encourage student participation in the GCAI. The teacher may offer scaffolding and guidance to help students comprehend and respond to the AI's instructions. Students with mild intellectual disabilities (IDs) benefit from structure and guidance, which allows them to navigate conversations more efficiently. This allows the teacher to personalize the talk to each student's needs and learning goals. Provides language practice and skill improvement opportunities in a structured and friendly atmosphere.
2. **Free conversation type:** Students can initiate and sustain conversations with the GCAI without teacher assistance, promoting independence and self-expression. Students choose themes or suggestions, and the teacher intervenes minimally. This mode promotes autonomy and self-determination for students with modest intellectual disabilities, allowing them to take responsibility for their education. It encourages investigation of varied topics and personalization and develops communication skills like initiative, turn-taking, and expressive language.

Digital Practices for Enhancing English Communication Skills With Mild ID Students

An intellectual disability (ID) is a neurodevelopmental condition that develops in childhood (Savita & Sharma, 2021). It affects the capacity to learn and retain new information, and it also affects everyday behavior such as social skills and hygiene routines (Ishartiwi et al., 2023). People with this condition experience significant limitations with intellectual functioning and developing adaptive skills like social and life skills (Durak et al., 2023). Digital technologies enhance education for children with mild intellectual impairments, particularly improving communication skills. Digital materials integrated into teaching techniques, such as tablet computers and interactive smart boards, dramatically boost the learning skills of students with modest intellectual disabilities in topics like social science (Deveci Topal et al., 2023). These tools provide a safe, inclusive language development and social engagement environment. Educators can use platforms, software programs, and assistive technology to cater to individual needs, promoting inclusive learning environments and improved academic performance (Okaiyeto et al., 2023).

Papanastasiou et al. (2020) investigated using brain-computer interfaces (BCIs) to train and rehabilitate students with neurodevelopmental problems. They explored how BCI devices improve students' attention, working memory, visuospatial, social, imaginative, and emotional skills. The importance of digital intelligence in inclusive educational settings emphasizes its potential to extend educational opportunities for disabled individuals and the need for preventive measures against excessive digital exposure, recommending scientifically based techniques for fostering digital intelligence (Vladimirovna et al., 2020). Another study explored digital intelligence's role in inclusive education, emphasizing its potential for enhancing educational opportunities for disabled individuals. It emphasizes the need for preventive measures against excessive digital exposure and calls for scientifically grounded strategies to promote digital intelligence in the digital age (Gibson et al., 2021).

Additionally, Gibson et al. (2019) identified design requirements for clinical alternative and augmentative communication (AAC) technologies for adults with MLDs, considering health, physical, and cognitive needs. Experts were optimistic about the app, believing it could improve communication between practitioners and patients. In their study, Yngve et al. (2023) explore using ICT to enhance school engagement among students

with special educational needs. It found that the intervention reduced the need for school modifications and improved attendance by 30%. The most significant benefits were observed in students who did not require specialized assistance. Also, Nepo et al. (2017) published a study, focused on autism and other developmental disabilities, aimed to evaluate the effectiveness of using the iPod Touch® with MyTalk Mobile® software as an AAC technology to improve functional communication abilities in adults with autism spectrum disorder and profound ID. A study involved three adult volunteers and evaluated their autonomous requesting behavior, visual symbol differentiation, and verbal communication. The results showed positive results for the participants (Ladias et al., 2022).

Moreover, A study based on the effectiveness of digital materials for high school students with intellectual disabilities found that technology integration and multimedia applications improved post-test scores. The research at a special education vocational school revealed that students enjoyed computer-based exercises and interactive questions and desired similar applications in other academic disciplines (Deveci Topal et al., 2023). The study of Dhiyaneshwari and Devi (2023) examined the use of digital games for children with intellectual disabilities, highlighting their potential for teaching and enhancing their learning abilities. The authors emphasized the importance of computer-assisted instruction in helping these children understand concepts, succeed academically, and develop skills. The study concluded that real-time digital game-based learning can be more beneficial and supportive. Therefore, using digital technology with this group has a significant impact, specifically on English communication skills.

Liao et al. (2023) explore the use of ChatGPT, a form of generative AI, in English as a second language instruction. They explore its potential to enhance four language abilities for non-native English speakers: listening, speaking, reading, and writing. The research uses various generative AI capabilities, including cross-lingual learning, attention mechanisms, NLP, adaptive learning, and speech recognition. Moreover, in their study, Lamb et al. (2023) emphasize the importance of generative AI frameworks and tools for creating adaptable, student-centered classrooms. They use neurocognitive and psychophysiological data, machine learning, and big data frameworks to understand the connections between learning activities, assessments, and students' cognitive processes.

Although GCAI has potential benefits in educational settings for students with minor intellectual disabilities, challenges remain. These include limited access to technology, concerns about data privacy and security, and the need for customized AI solutions. The intricate nature of AI integration and the need for continuous teacher training further complicate the process. Addressing these issues is crucial to ensure fair access and optimize the effectiveness of AI-driven educational interventions. Numerous academic studies have constantly highlighted the various problems that individuals with mild IDs encounter when engaging in digital practices. These obstacles frequently include difficulties navigating sophisticated digital interfaces (Danker et al., 2023; Rao et al., 2021), understanding digital content (Baxter & Reeves, 2023; Koutheair Khribi, 2022), and efficiently managing digital tools. In the current study, the authors faced some challenges highlighting barriers to access, participation, and comprehension. Despite these limitations, a variety of solutions have evolved through study and practical actions. These solutions include individualized learning approaches that are adapted to individual learning needs, the use of accessible digital platforms with user-friendly interfaces, and the use of specialized assistive tools.

Critical Analysis

Challenges and limitations of utilizing AI in education

AI in education faces challenges such as equity and access, as not all students have the necessary technology or the Internet connectivity to benefit from AI-enhanced learning tools. Data privacy and security are crucial, as AI systems require extensive data collection, and ensuring ethical use is a significant challenge. Additionally, AI systems can reinforce existing biases, as biased data used to train them can perpetuate and exacerbate these biases in education. Addressing these issues is essential for maximizing the effectiveness of AI in education. Below are examples of challenges facing the use of AI in education.

1. **Security and privacy concerns:** AI systems require vast amounts of personal data which raises privacy issues. Student data must be properly secured (Dwivedi et al., 2021).

2. **Bias and fairness:** AI models can reflect and even amplify the biases of their training data, disadvantaging some groups. Ensuring fair, unbiased systems is challenging (Jobin et al., 2019).
3. **Inflexibility:** Current AI is focused on narrow, well-defined tasks. Flexibly adapting to open-ended, multifaceted education needs is still limited (Zairul et al., 2023).
4. **Teacher workload:** Integrating AI may initially increase teacher workload for training, support etc. Effective implementations require addressing this challenge (Thompson et al., 2023).
5. **Accessibility:** Ensuring AI tools are accessible to all students, including those with disabilities, from varying economic backgrounds etc. can be difficult (Amponsah & Bekele, 2023) .
6. **Overreliance:** Teachers must avoid replacing their own expertise and judgment with AI recommendations. Systems need oversight to avoid potential harm (Dieterle et al., 2024).
7. **Evaluation challenges:** Rigorously evaluating long term learning impacts of AI remains difficult, limiting understanding of its effectiveness (Sari, 2024).

To effectively use AI tools in education for individuals with severe intellectual disabilities, a multi-faceted approach is needed. The design should prioritize accessibility and adaptability, creating intuitive interfaces and compatibility with assistive technologies. Comprehensive training for educators is also crucial for effective implementation and troubleshooting. Continuous monitoring and evaluation are also necessary to identify and address challenges, ensuring the AI tools remain responsive to evolving needs.

English language learning unique challenges to ID students

Students with mild intellectual disabilities often face unique challenges in English language learning compared to their typical developing peers. Some specific challenges they may encounter include:

1. **Deficits in language and communication skills:** Students with mild intellectual disabilities typically have weaknesses in receptive and expressive language abilities that can hinder their acquisition of a second language like English (Dorney et al., 2021). This includes poor vocabulary, grammatical errors, difficulty with fluency, etc.
2. **Challenges with phonological processing:** Sounding out phonemes and remembering letter combinations are harder for these students due to weaker decoding skills. This makes learning to read and spell English words more difficult (Tarigan et al., 2023).
3. **Limitations in working memory:** Short-term memory deficits mean they struggle more with remembering new vocabulary words, verb conjugations, pronunciation of unfamiliar words, and retaining instructions (Teng & Cui, 2024).
4. Youssif et al. (2024) examined differences in self-efficacy between teachers of students with intellectual disabilities compared to those teaching students with autism spectrum disorder. Their results showed that while both groups of teachers felt self-efficacious overall, teachers of students with autism reported significantly higher self-efficacy than those working with students with intellectual disabilities. This highlights potential areas for additional professional learning and support to further increase the self-confidence of teachers serving students with diverse needs and disabilities.
5. According to recent research, teachers play an important role in facilitating inclusive education (Kundu & Bairagya, 2021). However, their confidence levels and perceptions toward inclusion vary depending on factors such as training and experience teaching students with disabilities (Alhumaid et al., 2022). This study provides valuable insights into teachers' perceptions toward inclusive education for students with hearing impairments in Nepal. The results indicating teachers have positive perceptions of inclusive education but lack confidence in their abilities to teach students with hearing impairments are noteworthy. This highlights an area where additional support and training could help foster more inclusive learning environments.

In conclusion, providing appropriate accommodations, visual supports, repetition and hands-on learning can help address these unique English language learning challenges.

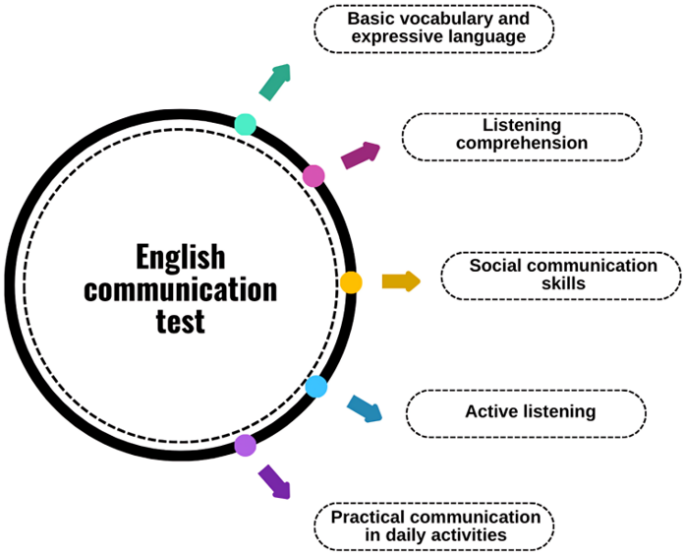

Figure 1. Dimensions of the English communication test (Source: Authors)

METHODS

Design of the Study

The researchers used the quasi-experimental approach to identify the effectiveness of using generative conversation based on AI to improve English communication skills among students with mild intellectual disabilities. The students were divided into two groups. The first group communicated with AI in a guided conversation type, and the second group communicated with AI in a free conversation type.

Participants

The study participants consisted of 12 students with mild intellectual disabilities, who were divided into two groups: 6 students who communicated with AI in a guided conversation type, and 6 students who communicated with AI in a free conversation type. They were randomly selected from intellectual education institutes and classrooms attached to general education schools.

Study Tools

The test

The study utilized an English communication test, a valuable tool for evaluating and improving the language skills of individuals with mild intellectual disabilities. This facilitates their integration into mainstream educational and social environments. Initially, the experiment was conducted on a pilot sample to ensure the test's validity and reliability. This pilot sample consisted of 30 students with mild intellectual disabilities randomly selected from intellectual education institutes and classes attached to general education schools. Moreover, this test was prepared to identify the effect of using AI in the guided and free conversation types to improve the English language communication skills of students with mild intellectual disabilities. The test consists of 5 dimensions as they are shown in **Figure 1** and each includes several statements, so the final total is 25. These dimensions are, as follows:

1. **Basic vocabulary and expressive language:** This lesson focuses on basic vocabulary and helps students express themselves clearly in daily situations. It includes five phrases.
2. **Listening comprehension:** This section includes five phrases and refers to developing the ability to understand and follow oral instructions, conversations, and classroom discussions.
3. **Social communication skills:** This program involves teaching appropriate social interactions, such as greetings, exchanging roles, and expressing feelings, to facilitate positive relationships with peers and includes five phrases.

Table 1. Correlation coefficients between the scores of the test statements and the total score of each dimension

Basic vocabulary and expressive language	Correlation coefficient	Listening comprehension	Correlation coefficient	Social communication skills	Correlation coefficient	Active listening	Correlation coefficient	Practical communication in daily activities
1	**0.487	6	**0.590	11	**0.562	16	**0.522	21
2	**0.513	7	*0.395	12	**0.498	17	**0.465	22
3	*0.360	8	**0.588	13	**0.516	18	**0.502	23
4	*0.415	9	**0.506	14	**0.466	19	**0.517	24
5	**0.468	10	**0.495	15	**0.501	20	**0.488	25

Notes. ** Significant at the 0.01 level; * Significant at the 0.05 level

4. **Active listening:** This section involves encouraging the skill of active listening, which includes focusing on the speaker, understanding the message, and responding appropriately. It also includes five phrases.
5. **Practical communication in daily activities:** This test includes five phrases and emphasizes communication skills related to daily tasks, such as shopping, ordering food, or asking for help, to enhance independence.

Psychometric properties of the test

Validity of the test: Test validity was calculated in two ways: overall test validity and internal consistency validity.

First–Expert review: To verify the validity of the test, it was initially presented to 13 experts who are professors specializing in special education, psychology, education, the English language, and translation. They were asked to provide their opinions and observations on the test regarding the relevance of each statement to its corresponding dimension, the overall relationship of the dimensions within the test, the clarity and correctness of the language used, and any suggestions for modifications, such as deletion, addition, or rephrasing. Some items were revised and rephrased according to the experts' feedback. The final version of the test consisted of 25 statements across five dimensions.

Second–Internal consistency validity: The internal consistency of the test items was verified using the Pearson correlation coefficient to calculate the correlation between each statement's score and the corresponding dimension's score. This was done to ensure the coherence and homogeneity of the statements within each dimension. The correlation coefficients are presented in **Table 1**.

It is clear from **Table 1** that the correlation coefficients between the scores of the test phrases and the total score of the dimension to which the phrase belongs are positive and statistically significant at the 0.01 level, except for phrase no. 3 and phrase no 4 in the basic vocabulary and expressive language dimension and phrase no. 2 in the listening comprehension dimension, which are significant at the 0.05 level. This confirms the consistency and homogeneity of each dimension's expressions.

It is clear from **Table 2** that the correlation coefficients between the dimension scores and the test's total score are all positive and statistically significant correlation coefficients at the 0.01 level, confirming the test dimensions' consistency and homogeneity.

Test reliability: The reliability of the test scores and their sub-dimensions was verified using Cronbach's alpha reliability coefficient, and **Table 3** shows the reliability coefficients.

It is clear from **Table 3** that the test and its sub-dimensions have good and statistically acceptable reliability coefficients, confirming their validity in the current study.

Table 2. Correlation coefficients between the dimensions scores and the total test score

Dimensions	Correlation coefficients
Basic vocabulary and expressive language	**0.523
Listening comprehension	**0.477
Social communication skills	**0.552
Active listening	**0.522
Practical communication in daily activities	**0.597

Note. ** Significant at the 0.01 level

Table 3. Cronbach's alpha reliability coefficients for the test dimensions and its total score

Dimensions	Reliability coefficient (Cronbach's alpha)
Basic vocabulary and expressive language	0.670
Listening comprehension	0.686
Social communication skills	0.702
Active listening	0.847
Practical communication in daily activities	0.798
Basic vocabulary and expressive language	0.812
Total scores	0.812

Table 4. Significance of the differences between the average ranks of the two groups' scores in the pre-test

Dimensions	Group	Number	Rank mean	Total ranks	Value U	Value Z	Level of significance
Total scores	First experimental group	6	6.83	41.000	16.00	0.331	0.741
	Second experimental group	6	6.17	37.000			

The intervention

The intervention was conducted on the study sample, which consisted of 12 students with mild intellectual disabilities, for three months with two weekly classes. These students were divided into two groups: Six students communicated with AI in a guided conversation style, where the teacher directed the students to communicate with AI tools (ChatGPT) on topics specified by the teacher. The other six students communicated with AI in a free conversation style, engaging in open conversations with AI tools (ChatGPT) without specific guidance from the teacher but on the same topic. They were randomly selected from intellectual education institutes and intellectual education classes attached to general education schools. The equivalence was achieved between the two groups, with the age range being 10–13 years and IQ scores ranging from 55–70. It was also verified that the two groups were equal in English communication skills, as their pre-test scores were equal, and the differences between them in these skills were not statistically significant, as is apparent in **Table 4**.

It is clear from **Table 4** that there are no statistically significant differences between the mean levels of students in the two groups. The value of (u) was not statistically significant, as the level of significance was 0.741, which confirms the equality of the two groups in communication skills.

Steps of the intervention:

1. The teacher selected a topic from the curriculum and students' IEP goals for each session.
2. Students in both groups received an initial ChatGPT orientation session. During sessions, students interacted one-on-one with ChatGPT via their handheld devices while the teacher observed, assisted with comprehension, and provided prompts/feedback as needed.
3. The pre-test was applied to both groups.
4. Weekly sessions were set for each group so that the application is applied to each student in an individual independent session.
5. For the first group, free discussions with the ChatGPT language model in each weekly session, a specific topic is determined within the study unit and the teacher leaves the students to communicate with ChatGPT application on his hand-held device. The teacher's role is to supervise and monitor each student individually in a private session that lasts between 15–20 minutes for each student without intervention except when necessary.

6. For the second group, the guided conversation with the ChatGPT language model, the teacher prepares the elements and titles of the conversation and leaves the students to interact with each other, then the individual sessions begin for each student individually while communicating with the ChatGPT language model. In this stage, the teacher's role is to guide and direct the student while providing continuous support and assistance, specifically learning support (scaffolding) and participation with him during the speech, as each session for each student also takes between 15–20 minutes.
7. After completing the weekly sessions, which lasted about three months, the post-test was applied to both groups.

Data Collection Procedures

This study focuses on the pre-posttest, an assessment tool designed to evaluate the English communication skills of children with modest intellectual disabilities. The data collection process is standardized and follows ethical guidelines. Participants are given clear instructions to ensure informed consent and create a pleasant testing atmosphere. The pre-test phase constructs a baseline measure of participants' English communication ability, including vocabulary, grammar, pronunciation, fluency, and comprehension. The post-test phase replicates the pre-test method to assess any observable changes or gains in participants' English communication skills. Participants are closely monitored and supervised throughout both testing periods to resolve issues or challenges. By following thorough data collection protocols, this study ensures the integrity and reliability of the acquired data, allowing for robust analysis and meaningful interpretation of the results.

RESULTS AND DISCUSSION

Results

The main aim of the current study is to identify the effect of GCAI on English communication skills among students with modest intellectual impairments. The results show significant improvements in vocabulary acquisition, grammatical accuracy, pronunciation clarity, fluency, and comprehension. The personalized method used in the pre-posttest, which considers the target demographic's learning needs and cognitive capacities, was successful. The use of GCAI technology made adaptive testing easier, making the assessment both demanding and supportive. The study contributes to the larger discourse on inclusive education and linguistic development, highlighting the impact of intervention strategies on improving English communication skills in students with mild intellectual disabilities. This study investigates the effectiveness of GCAI in helping students with mild intellectual disabilities improve their English communication skills to answer the following research questions:

To answer the first research question, what is the effect of active practice for students with mild mental disabilities (directed type) with communication tools based on generative AI on improving their English communication skills?

It is clear from **Table 5** there are statistically significant differences between the average ranks of the grades of the students of the first group that relied on a guided conversation in the pre-and post-applications of the English language communication skills test in favor of the post-application, as we note that all dimensions and the total score of the test are significant at the level of 0. 01 This indicates an improvement in the communication skills of this category of students after applying generative conversation with AI. It is noted that the size of the effect, whether for the dimensions or the total score, is large, which indicates the impact of the used method in improving these skills among this sample of students.

To answer the second research question, what is the effect of active practice for students with mild mental disabilities (free type) with communication tools based on generative AI on improving their English communication skills? The researchers calculated the significance of the differences using the Wilcoxon test to compare the average ranks of the related groups, and the results are shown in **Table 2**.

It is clear from **Table 6** that there are statistically significant differences between the average ranks of the grades of the second group students in the pre- and post-applications on the English communication skills test in favor of the post-application, as we note that all dimensions and the total score of the test are

Table 5. Significance of the differences between the average ranks of the scores of the first experimental group of students with mild intellectual disabilities in the pre- and post-applications on the English communication skills test

Measurement	Dimensions	Ranks	Number	Average rank	Ranks total	Value Z	Effect sizes	Significance level
Pre/post	Basic vocabulary and expressive language	Negative	0	0.00	0.00	2.94	0.82	0.01
		Positive	11	6.00	66.00			
		Zero	1					
Pre/post	Listening comprehension	Negative	0	0.00	0.00	2.87	0.83	0.01
		Positive	10	5.50	55.00			
		Zero	2					
Pre/post	Social communication	negative	0	0.00	0.00	2.95	0.85	0.01
		Positive	11	6.00	66.00			
		Zero	1					
Pre/post	Active listening	Negative	0	0.00	0.00	3.07	0.88	0.01
		Positive	12	6.50	78.00			
		Zero	0					
Pre/post	Practical communication in daily activities	Negative	0	0.00	0.00	3.08	0.89	0.01
		Positive	12	6.50	78.00			
		Zero	0					
Pre/post	Total score for the test	Negative	0	0.00	0.00	2.80	0.80	0.01
		Positive	10	5.50	55.00			
		Zero	2					

Table 6. Significance of the differences between the average ranks of the scores of the second experimental group of students with mild intellectual disabilities in the pre- and post-applications on the English communication skills test

Measurement	Dimensions	Ranks	Number	Average rank	Ranks total	Value Z	Effect sizes	Significance level
Pre/post	Basic vocabulary and expressive language	Negative	0	1.00	1.00	2.86	0.82	0.01
		Positive	11	6.50	65.00			
		Zero	1					
Pre/post	Listening comprehension	Negative	0	0.00	0.00	2.94	0.84	0.01
		Positive	10	6.00	66.00			
		Zero	2					
Pre/post	Social communication	negative	0	1.00	0.00	1.99	0.57	0.05
		Positive	11	4.00	66.00			
		Zero	1					
Pre/post	Active listening	Negative	0	0.00	0.00	2.96	0.85	0.01
		Positive	12	6.00	78.00			
		Zero	0					
Pre/post	Practical communication in daily activities	Negative	0	0.00	0.00	2.95	0.85	0.01
		Positive	12	6.00	78.00			
		Zero	0					
Pre/post	Total score for the test	Negative	0	0.00	0.00	2.81	0.81	0.01
		Positive	10	5.50	55.00			
		Zero	2					

significant at the 0.01 level except the communication skills dimension. Social communication, which was statistically significant at the 0.05 level, indicated improved communication skills after applying generative conversation with AI. The researchers with the second experimental group used the free conversation system, which relied on the students themselves to conduct the conversation without guidance. It is also note that the size of the effect, whether for the dimensions or the total score, is large, which indicates the impact of the method used in improving these skills among this sample of students.

To answer the third research question, what is the effect of the difference between the two types of active practice for students with mild mental disabilities (directed type and free type) with communication tools based on generative AI on improving English communication skills? The researcher calculated the significance of the differences using the Mann-Whitney test for independent samples for the two research groups, as shown in **Table 7**.

Table 7. Significance of the differences between the average ranks of the scores of the first and second experimental groups of students with mild intellectual disabilities on the English language communication skills test in the post-test

Dimensions	Experimental group	Number	Average rank	Ranks total	Value U	Value Z	Effect sizes	Significance level
Basic vocabulary and expressive language	The first	6	9.42	56.50	0.50	2.86	0.82	0.01
	The second	6	3.58	21.50				
Listening comprehension	The first	6	8.75	52.50	4.50	2.19	0.63	0.05
	The second	6	4.25	25.50				
Social communication skills	The first	6	9.17	55.00	2.00	2.59	0.74	0.01
	The second	6	3.83	23.00				
Active listening	The first	6	9.08	54.50	2.50	2.53	0.72	0.05
	The second	6	3.92	23.50				
Practical communication in daily activities	The first	6	8.75	52.50	4.50	2.22	0.85	0.05
	The second	6	4.25	25.50				
Total score for the test	The first	6	9.33	56.00	1.00	2.74	0.81	0.01
	The second	6	3.67	22.00				

It is clear from **Table 7** there are statistically significant differences between the average ranks of students' grades in the first experimental group that studied with the directed conversation system and the second experimental group that studied with the free conversation system in favor of the first group that studied with the directed conversation system. We note that all dimensions and the total score of the test were Statistically significant, as the basic vocabulary and expressive language dimension, the social communication skills dimension, and the total test score were significant at the 0.01 level, while the listening comprehension dimension, the active listening dimension, and the practical communication in daily activities dimension were statistically significant at the 0.05 level, which indicates There were differences in the used conversation system. The differences were in favor of directed conversation. Moreover, it is noted that the size of the effect, whether for the dimensions or the total score, is large, which indicates the impact of the method used in improving these skills among this sample of students.

Discussion

The previous presentation of the study results confirmed the effectiveness of using the generative conversation method with AI in developing English communication skills among students with mild intellectual disabilities, whether the conversation was directed or free. Moreover, these results align with some educational theories like constructivism, connectivism, situated learning, and cognitive load theory. This will be clear in the following paragraphs that include the discussion of the research questions results.

Based on the results of the first research question, which confirmed the effectiveness of using guided conversation in developing English communication and dialogue among, the students' received instructions on how to conduct a dialogue before starting the conversation and training in it. The researchers also guided the students using AI during the dialogue and conversation. They assisted the students during the dialogue, which helped them acquire these skills. This confirms that the use of AI helps this category of students with disabilities to acquire many skills related to communication and dialogue and to conduct a full conversation in the English language, and this was confirmed by (Carolus et al., 2023; Weng & Chiu, 2023). Many studies have also confirmed the effectiveness of using AI in developing various skills among students with mild intellectual disabilities, including English communication skills that the current study proved (Lamb et al., 2023; Liao et al., 2023; Suh & An, 2022).

The use of generative AI in guided conversations improved English communication skills, aligning with Situated Learning principles. The AI provided a contextually relevant, engaging environment for students to practice language skills. The results also support social constructivist theory, suggesting that learners acquire skills more effectively when provided with direct guidance, particularly for students with mild mental disabilities. The results of the second research question confirmed that the students in the second experimental group acquired English communication skills using the free conversation type, which relied on the students themselves without guidance or assistance, as all the details were explained in the beginning. They were trained in conversation and dialogue using AI applications, and then the students themselves

through dialogue, discussion, and communication. This also indicates the effectiveness of using AI applications in developing these skills among this category of students. These results are aligned with many studies (Aldosari, 2020; Gervacio, 2023; Suh & An, 2022) that have also indicated the effectiveness of technological programs and applications, including applications of AI in teaching and training students with disabilities, including those with mild intellectual disabilities (Deveci Topal et al., 2023; Okaiyeto et al., 2023).

Based on the research findings, a strong connection can be made to connectivism. The free-type generative AI conversation, by allowing students to engage in open-ended interactions, fostered a networked learning environment. This aligns with the connectivism theory that learning occurs through networks and connections. The significant improvement in social communication skills suggests that the students were able to actively construct their knowledge through these interconnected experiences, demonstrating the effectiveness of a student-driven and network-based approach to language learning. The results of the third research question also confirmed the presence of statistically significant differences between the first experimental group of students who studied with the directed conversation type and the second experimental group that studied with the free conversation type in favor of the first experimental group that studied with the directed conversation type. This indicates that directed conversation was more influential in teaching and training these students to develop their English communication skills through free conversation. However, the latter also helped develop the communication skills of the students of the second group, it was not at the same level as the guided conversation. Perhaps the reason for this is that students with mild intellectual disabilities need someone to guide them. He helps them by explaining the instructions and procedures and how to conduct the conversation in a way that suits their abilities and aptitudes and in a manner that suits them. Some of the questions that these students were unable to understand were translated during the conversation. Then the space was left for them afterward to conduct the dialogue and conversation they could understand. The researchers assisted whenever students needed it.

Despite the importance of pre-preparation for the learners in both groups, which took place before starting to provide all students with the opportunity to converse with the linguistic model of AI, which was emphasized by Ausubel's theory of meaningful learning, the students of the first group excelled in conversation over the students of the second group, and this confirms It is important that students with mild mental disabilities need guidance and continuous support during the learning process, as well as providing continuous feedback and hints. Moreover, the current research results confirm that students with mild intellectual disabilities need someone to provide them with support and modern technological applications that help them in learning, training, and acquiring the skills they need (Deveci Topal et al., 2023); the best of which in our current era is AI, as AI promises the applications and methods it contains to suit all ages and all groups of people (Ng & Chan, 2024). The most powerful programs help educate and train students with disabilities, including those with mild intellectual disabilities, as well as train them in various skills, whether life, educational, or professional skills (Jin & Kim, 2023). This is what has been confirmed and indicated by many studies that used AI with this category of students and noted what the current study proved in developing their various skills (Olga Tzirides et al., 2023; Wynn & Wang, 2023; Yang & Chen, 2023). The current study compares directed and free conversation systems, revealing that directed conversation reduces cognitive load in students with mild mental disabilities. This aligns with the cognitive load theory, which suggests minimizing cognitive load can enhance learning. The structured approach was found to be more effective in improving English communication skills, as it offered clear guidance and scaffolding, enabling students to gradually build their language skills. Considering the previous results, emphasis must be placed on directing the attention of those responsible for designing curricula, specifically those related to students with mild mental disabilities, to the necessity of integrating AI tools into the education process, specifically practicing the activities provided by large linguistic models and the characteristics and features they contain that mimic the capabilities of a human expert and even surpass him. To provide the opportunity to provide continuous support and feedback to students, it must also be emphasized that there is guidance and guidance by the teacher during the learning process, which is related to the use and integration of technology in education before starting to provide the opportunity for learners to research, explore and investigate, which leaves an effective impact on the targeted learning outcomes.

CONCLUSION

The study reveals that guided conversations with AI significantly improve English communication skills among individuals with modest intellectual disabilities. This suggests the need for structured support to enhance understanding and engagement in English communication activities. Personalized AI applications targeting the educational needs of students with impairments could significantly enhance the effectiveness of educational interventions. Additionally, the current study suggests that incorporating AI tools into educational environments could help students with modest intellectual disabilities. The study also suggests analyzing the characteristics of AI applications that contribute to improving learning results, such as adaptive feedback, customized learning paths, and interactive communication tactics. Overall, the study highlights the potential of AI technology in assisting language development for individuals with modest intellectual disabilities. However, further research is needed to understand the mechanisms behind the efficacy of guided discussions with AI in enhancing language proficiency. The long-term consequences of integrating AI technology into special education programs should be examined, with longitudinal studies evaluating the long-term viability of learning progress and examining if early enhancements in other English skills lead to wider academic and social benefits.

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