



An Exploration into Dyslexic EFL Learners' Reading Comprehension through AI Tools

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ARTICLE INFO:

Received date:

2026.06.07

Accepted date:

2026.07.18

Print ISSN: 2251-7995

Online ISSN: 2676-6876

Keywords:

Artificial Intelligence,
Dyslexia, EFL Learners,
Reading Comprehension,
Speechify, Assistive
Technology



Abstract

This study investigates the efficacy of Speechify, an AI voice assistant, in aiding reading comprehension among adult EFL learners with dyslexia. Using a qualitative research design, this study explored how Speechify influenced perceived reading comprehension, reduced anxiety, and increased motivation over the course of 12 sessions of a reading workshop involving 16 dyslexic EFL learners. The validated Adult Dyslexia Checklist was used to identify participants with moderate-to-severe dyslexic profiles. The semi-structured interviews provided qualitative data and thematic analysis was used to code, organize and identify the themes. The results indicated that the use of Speechify auditory support generally improved dyslexic learners' EFL reading comprehension. The key themes that emerged included the impact of multimodality on student learning and teacher confidence, exploration of identity and agency, and the need for more personalized learning experiences. Findings suggest that AI tools can lower affective filters that complicate language learning for neurodivergent learners, although objective literacy gains were not assessed. The findings suggest that Speechify can be a disruptive, compensatory AI tool in education for those with language-learning difficulties.

Citation: Ebadi, S.; Asadi, M. & Ebadi, S. (2026). An Exploration into Dyslexic EFL Learners' Reading Comprehension through AI Tools. *Journal of English Language Teaching and Learning*, 18 (37), 133-150.

DOI: 10.22034/elt.2026.72883.2875

Introduction

Dyslexia is a neurodevelopmental disorder characterized by core diagnostic difficulties with reading. More specifically, a person with dyslexia will read words more slowly and with greater effort than their peers. This disorder is associated with a cognitive development delay. Furthermore, it is linked with anxiety and stress about academic performance (Buchweitz et al, 2023; Bazen et al, 2023). People with dyslexia often struggle with mispronouncing, misspelling, reading, and writing words, as well as with short- and long-term memory problems, which make it hard for them to find words, memorize objects, and name them (Dimililer & Istek, 2018). Students of foreign languages face various challenges that may be detrimental to academic success. This especially applies to students of English as a Foreign Language (EFL) who take time to adjust to the features of a new system (Lyon et al., 2003; Shaywitz & Shaywitz, 2008). Further, in the English as a foreign language (EFL) context, learners need to keep up with what feels like double the work of acquiring new vocabulary and grammar. This can prove quite a challenge for students with dyslexia (Kormos & Smith, 2017).

Reading comprehension forms a basic component in language learning. It helps in interacting with the text and vocabulary development. Also, through reading comprehension, readers' background knowledge is enhanced. Reading comprehension is an important skill for EFL learners because it affects their communication and academic success. Often, learners with dyslexia face challenges with reading comprehension. This can be seen in English-as-a-Foreign-Language (EFL) contexts. Most children have difficulty reading and understanding. These difficulties are the result of several cognitive and linguistic reasons. One of the main problems faced by dyslexic EFL students is phonological processing (Roitsch & Watson, 2019). Evidence has shown that dyslexic students have difficulty with grapheme-phoneme correspondence, which must be able to read English words (Suárez-Coalla et al., 2020). EFL students with dyslexia factor emotional elements into their reading experiences as well. Students with dyslexia often feel anxious and angry about their difficulties, which can impact their willingness to engage with text (Mohammad, 2022). This emotional burden might create a negative cycle where students shy away from reading activities altogether, and in turn miss out on more practice and improvement (Mohammad, 2022).

Recent AI technological advancements have opened up new opportunities to support dyslexic learners, especially in improving their reading comprehension and overall learning experience. Innovative AI tools, like Speechify, which convert text to speech, allow dyslexics to read in a format that suits them and to engage with the same material. TTS technology use is effective in reducing cognitive load and improving reading fluency in poor and dyslexic learners. This is because these learners can reproducibly read along, with confidence, and process better with TTS. In contexts where English is taught as a foreign language (EFL), learners often encounter unfamiliar words and complex sentences. In such contexts, the audio support provided by TTS tools can be of great help (Kormos et al., 2019). The technical capabilities of these tools are well-documented. However, there is limited research available on the lived experience of adult EFL learners using such technology. These tools help with decoding and comprehension, and support vocabulary learning and retention by strengthening the link between speech and print (Snowling et al., 2020) Moreover, the adaptability of AI

instruments permits tailored learning experiences as it allows students to regulate the pace of their learning while also providing instant feedback. This will help build their confidence while reducing anxiety related to reading (Ooko & Aloka, 2021; Chen, 2023).

What makes this study unique is its investigation of Speechify's various benefits for EFL learners with dyslexia, which are useful for comprehension and emotional well-being. Most earlier studies have focused on general assistive technology use for dyslexia. However, little research has examined the use of Speechify in EFL settings. This study shows how speech software named Speechify, which offers auditory support, can eliminate barriers to reading comprehension for dyslexic learners. Thus, making their reading experience more enjoyable. The phenomenological approach will be followed in this study to explore.

Q1: How does using Speechify impact reading comprehension among dyslexic EFL students?

Q2: How do EFL students with dyslexia perceive the integration of Speechify in their reading comprehension?

Literature Review

Dyslexia, Working Memory, and the Phonological Loop

To comprehend the potential of AI tools, it is crucial to first understand the cognitive architecture of dyslexia. The phonological deficit hypothesis states that dyslexia is due to a disruption in the representation, storage and retrieval of speech sounds. (Kormos, 2017). According to Baddeley's working memory model, a phonological loop holds verbal information. So, there is direct damage to it. In normally developing readers, the phonological loop automatically rehearses and stores words while the central executive extracts meaning. In people with dyslexia, this loop is inefficient. (Baddeley, 2000)

As per cognitive load theory, learning can be impaired due to excessive information received from a learning task than previously learned material or working memory. According to Sweller (2011) For a dyslexic EFL learner, a single sentence could take up all the working memory available. As a result, the student may read the words correctly but may not grasp the meaning. This is an issue of processing capacity and not cleverness.

Assistive Technology as Cognitive Scaffolding

AT for dyslexia attempts to compensate simple tasks. Nonetheless, modern AI-powered TTS tools work as scaffolding. Thanks to offering double sensory input, they facilitate "bimodal reading". Research shows that bimodal presentation can enhance reading comprehension (the Modality Effect), (Keelor et al., 2020). It can free learners from having to decode text themselves – they can 'outsource' the task to the TTS AI. This, in theory, frees up working memory resources to concentrate on the semantic content of the EFL text. Keelor et al. (2020). AT also improves emotional state apart from cognition. Tools that empower people with independent access to text, such as Speechify, may limit the sense of "public shame" around those disabilities (Wood and colleagues, 2018).

The Challenge of Identification: Checklists vs. Diagnosis

Difficulty obtaining a formal diagnosis poses a serious methodological issue for dyslexia research. Because there is no standardized diagnostic battery for adults in Iran, many dyslexic individuals remain unidentified. Accordingly, a validated checklist is often employed in applied linguistics research.

The Adult Dyslexia Checklist is a widely cited instrument (Vinegrad, 1994). The assessment evaluates several dyslexic idiosyncrasies that may not necessarily be related to reading and writing. These include confusion over left and right, Mayan confusion, organization, and sequencing (Vinegrad, 1994). Numerous validation studies have confirmed that this checklist has good internal consistency (Cronbach's $\alpha > 0.80$) and predictive validity, enabling reliable differentiation between dyslexic and non-dyslexic adults with over 85% accuracy.¹¹ While not a clinical diagnosis, it is widely accepted in research to identify individuals with the "dyslexic phenotype" or "at-risk groups" when clinical assessment is not available.

Dyslexia in EFL Reading Comprehension

Dyslexic students find it difficult to process information, concentrate, and master sensory motor skills. English spelling-to-sound inconsistencies hinder word decoding for dyslexic EFL learners due to orthographic depth (Seymour et al., 2003). As a result, it affects their language acquisition as they have a slower reading rate and understand less (Snowling & Hulme, 2012). Dyslexia is a Problem in the ability to break words down into smaller sounds - phonological awareness (Roitsch & Watson, 2019).

L2 learners deal with the complexities of the target language and phonological differences from their native language. Furthermore, dyslexic learners experience working memory difficulties (Cornoldi et al.), hindering their ability to hold information in mind as they read. As noted by Stevani and Tarigan in 2022, these problems should be the target of the students.

A recent meta-analytic review conducted by Georgiou et al. (2022) finds that children with dyslexia show significantly poorer reading comprehension than their chronological-age peers. However, the differences are weaker than those observed for word reading and spelling. According to the review, comprehension deficits would be greater in less orthographically consistent languages; and when there is a mismatch between groups in vocabulary, suggesting that decoding and oral language skills both contribute to comprehension difficulties. Dyslexic students suffer from anxiety due to their reading problems. According to Abbott-Jones (2021), students with dyslexia exhibit greater academic anxiety than their non-dyslexic counterparts, highlighting the need for interventions addressing both cognitive and emotional challenges.

AI Tools and Dyslexic EFL Learners

Research on AI applications in language learning can inform the integration of AI technology in assisting students with dyslexia in EFL. According to Madhavi et al. (2023), AI tools boost EFL learners' speaking skills and willingness to communicate while learning the English language. According to Fathi et al. (2024), AI-mediated interactions can help lower anxiety levels among EFL learners and support their speaking skills through chatbots and virtual role-playing. Applications such as ELSA Speak that can improve speaking performance and boost confidence should be adapted to the needs of dyslexic learners (Karim et al., 2023). According

to Zhang et al. (2024), AI-speaking assistants can enhance enjoyment and reduce anxiety during foreign-language learning. This is particularly important for students with dyslexia. The favorable impact of AI on learners' attitudes supports Speechify-type tools that create an adaptive learning environment for EFL learners with dyslexia. According to research, the use of AI applications enhances learners' experience and outcomes and addresses the challenges faced by dyslexic learners by increasing enjoyment and reducing anxiety in language learning.

The use of AI technology in reading instruction for EFL learners and dyslexics appears promising. According to Daweli and Mahyoub (2024), AI tools help improve reading-skill competitiveness by providing teaching aids or methods tailored to students' specific needs. These tools, combined with traditional methods, can enhance reading proficiency in EFL contexts. AI may play a role in the diagnosis, intervention and assessment of dyslexia. Studies show that these tools can improve outcomes for dyslexic individuals. As per Yang (2022), the structure of story visual analysis aided by AI has enabled reading comprehension in dyslexic students. Though AI has tons of advantages, there are concerns about its impact and integration in the long-term scheme of things. Daweli and Mahyoub (2024) said we need to strategically blend with the traditional to benefit most. The AI speech evaluation programs are effective, but they have limitations. The feedback is often limited. Besides, it is costly. So, learners with specific needs may not be able to access it easily. According to Li and Zou (2022), these programs improve the chances for speaking practice but are problematic. AI tools can be made accessible to all learners by improving feedback quality and reducing costs.

Methodology

Research Design

Using a qualitative phenomenological design, the present study examined the effects of an AI-powered TTS (text-to-speech) tool, Speechify, on 16 Iranian dyslexic EFL learners during a reading workshop. Data were collected through semi-structured interviews and analyzed thematically to examine participants' experiences. Interviews were conducted with 16 learners to find out how Speechify helped them in enhancing reading comprehension, confidence and motivation. The analysis revealed key themes in Speechify's advantages and disadvantages. With a qualitative approach, participants' experiences with the tool helped clarify the advantages and challenges of using it in educational settings.

Participants and Identification Strategy

The study involved 16 English as a Foreign Language (EFL) learners, including 9 females and 7 males aged 22-34 from a language institute in Iran. Participants' performance on the *Oxford Placement Test* indicated B1 (Intermediate) level, meaning sufficient L2 knowledge by participants of workshop materials, suggesting reading difficulties will arise from decoding/processing, not L2 knowledge. Due to the absence of an official dyslexia assessment in the local context, the adult's dyslexia checklist by Vinegrad (1994) was used to screen the participants, which is a valid research tool to identify dyslexic profiles.

Inclusion Criteria

The researchers selected participants who scored between 48 and 67 on the checklist (see Table 1). According to the scoring guidelines, this range indicates "signs consistent with mild to

moderate dyslexia” (Vinegrad, 1994). To ensure their inclusion, preliminary interviews were conducted, during which participants reported a lifelong history of specific reading deficits (e.g., slow reading speed, spelling errors, difficulty with rote memory), consistent with the neurobiological profile of dyslexia (Creswell & Poth, 2018).

Table 1. *Participant Demographics and Screening Profiles*

Participant ID	Age	Gender	Checklist Score	Self-Reported Key Difficulty
P1 - P5	22-26	Mixed	48-55 (Mild)	Decoding speed, Fatigue
P6 - P11	25-30	Mixed	56-62 (Mod.)	Spelling, Working Memory
P12 - P16	28-34	Mixed	63-67 (Mod/Sev)	Anxiety, Avoidance of Text

Before the study, informed consent was obtained from all participants, ensuring that they understood the purpose of the research and their right to withdraw at any time. Confidentiality was maintained throughout the study by anonymizing participant data and securely storing all research materials.

Instructor and AI Expertise

The reading workshop for dyslexic learners was led by a dyslexia expert and an AI expert from Speechify. The instructor implemented evidence-based strategies to address students' reading difficulties, drawing on his experience. Reword this (30 words):

Feeling that the interfering abilities of ‘dyslexics’ are more a feature of teachers than students, and that these negative reactions can be useful tools for investigating classroom teaching practices. By engaging in these learning activities, children benefited from a range of learning instances that facilitated learning at their own pace.

Speechify was integrated into the instructional structure. The instructor taught students how to convert writing to speech using Speechify to improve reading. This way, it reduces anxiety associated with reading problems and fosters meaning. The knowledge of the teacher and the AI specialist contributed to the successful running of the workshop. The workshop offered tools that could help dyslexic learners enhance their reading skills and learning experience.

Intervention: The Reading Workshop

The 12-session workshop used Inside Reading One. A core intervention was integrating Speechify, an AI text-to-speech app. Participants had Speechify (Version 2.5) installed on their devices. The app uses OCR to scan physical text, then uses neural voices (e.g., Gwyneth Paltrow, Snoop Dogg) to convert it into audio with a human tone. Participants actively engaged in a reading activity, switching between speech and natural language. Students followed the text as they listened to it through Speechify. The application emphasizes the ongoing sound, thus allowing the audio and visuals to be in sync. This design speaks to the dual coding needed to support working memory (Keelor & et al. 2020).

The teacher used flashcards for key vocabulary and concepts in the passages to aid understanding. By integrating Speechify, learners can also access a passage that is read aloud,

reducing cognitive load. With the assistance of the facilitator, the group engaged in discussions with each other. The instructor observed these discussions and provided feedback to develop their reading skills. This approach created a dynamic learning environment that catered to dyslexic learners.

Data Collection

The data collection was carried out via the observation of the workshops and in-depth semi-structured interviews. The interview protocol consisted of six open-ended questions that focused on comprehension, anxiety and engagement (in Appendix 2). Inquiries examined the "lived experience" of utilizing the instrument; for instance, "How did using Speechify... impact your understanding?", and "What emotional experiences were you having?"

Instruments

Speechify

Speechify was chosen for this research due to its features that support dyslexic EFL learners (see Fig. 1). When using the software, learners can read more easily. Speechify's main job is to take written text and convert it into spoken words. This means dyslexic learners can listen to text rather than struggle to decode it. Students can listen to lectures instead of just reading to help with comprehension thanks to the use of natural-sounding voices learners get used to how words are pronounced and their intonation.

The settings can be adjusted by the reader as per their choice, like adjusting the speed and highlighting the audio. (See figs 2, 3) This combination hearing and seeing caters to various learning styles and enhances word recognition. Simplified Version (21 words): With the Choice Board learning portal, you can easily access it 24/7. It has a user-friendly interface to get started from anywhere.

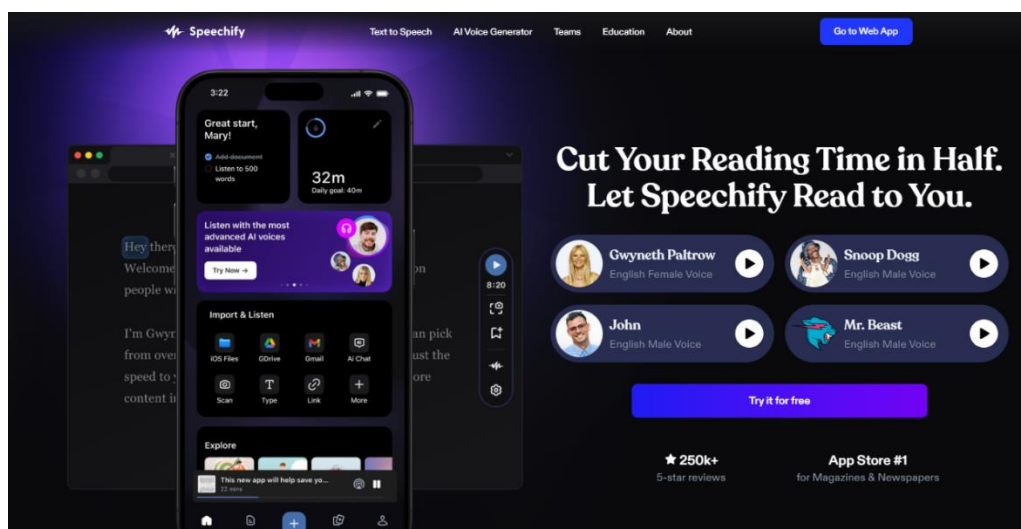


Fig. 1. Integration of Speechify into the reading comprehension

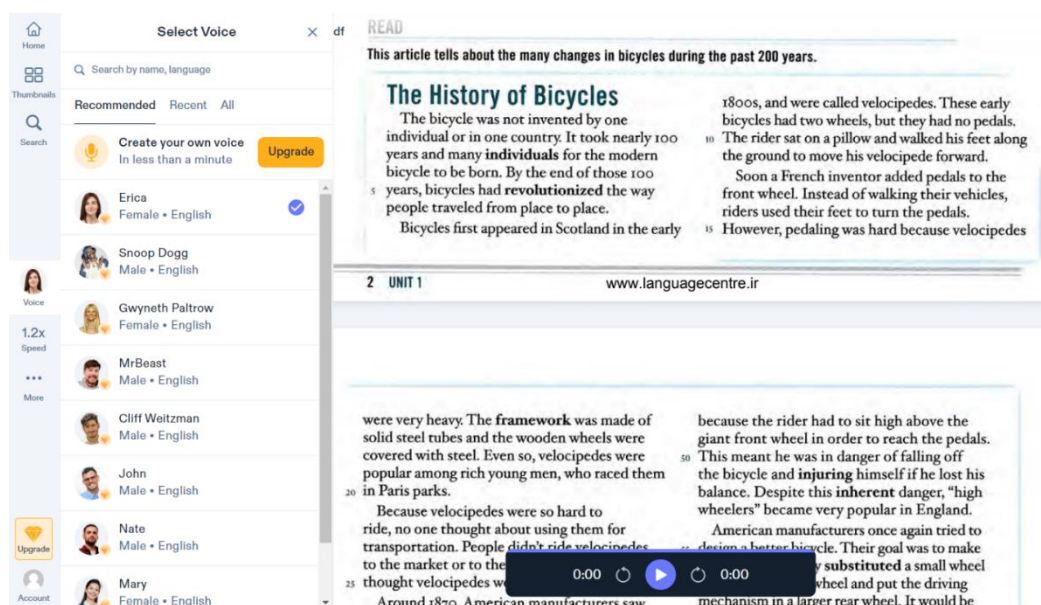


Fig. 2 .The reading interface of Speechify, displaying a text passage with synchronized highlighted text (a word or sentence is highlighted in blue as it is being read aloud)

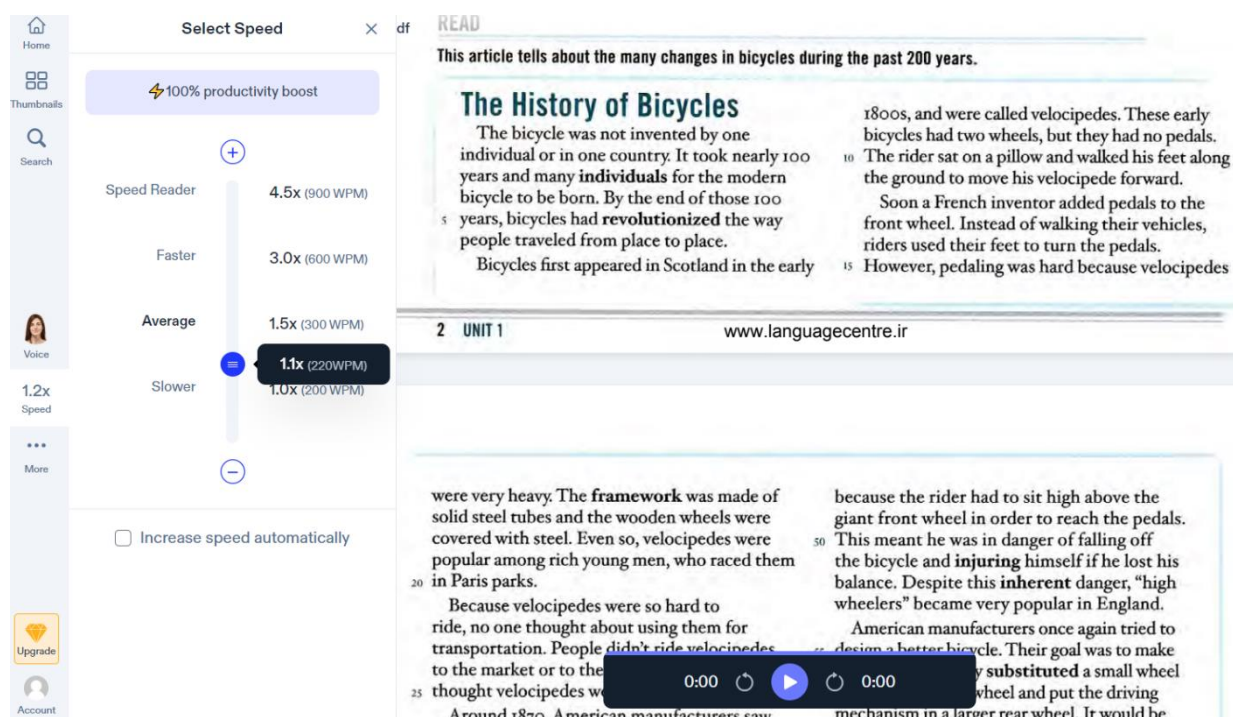


Fig. 3. Customizable settings in Speechify, including a selection of natural-sounding voices and adjustable reading speeds, enhance the reading experience for learners.

Semi-Structured Interviews

An interview protocol was designed for this study, based on students' use of Speechify for AI-assisted reading comprehension. An interview guide was developed in accordance with qualitative research benchmarks. An instructor will also test the guide. Supplemental feedback helped refine the guide before the interviews. Sixteen EFL students with dyslexia were interviewed using a semi-structured format to gather their views on integrating Speechify into reading. The purpose of this interview was to elicit qualitative data that complemented the study's quantitative results. The protocol consisted of six open-ended questions regarding students' perceptions of AI use in reading comprehension. Interviews conducted in English were audio-recorded (with permission) before transcription and analysis using NVivo. Member checking helped ensure credibility by allowing participants to verify their responses. Systematic analysis of the data using NVivo produced themes relevant to students' experiences. According to Dörnyei (2007), the credibility was further validated through member checking by utilizing Speechify AI to assure accurate reflection of participants' views.

Procedure

The evidence-based instructional strategies for dyslexic EFL learners were utilized by an instructor during the reading workshop. The process started with pre-reading activities that helped activate students' prior knowledge and introduced key vocabulary using multisensory techniques and visual aids from the book *Inside Reading 1*. While reading, we introduce Speechify in my notes, allowing users to listen to their notes as they read. Using Speechify as their reading tool, students monitored along with the text while listening. After learning the passages, the learners discussed various things in groups. This also allowed for feedback from the instructor. The instructor created a warm atmosphere and acknowledged progress to enhance learners' confidence. This structure met the needs of dyslexic learners to advance their reading.

Data Analysis

We used Braun and Clarke's (2006) reflexive thematic analysis to analyze the interview transcripts. The process involved six phases, which are familiarization of data, generating initial codes, searching for themes, reviewing themes, defining themes, and producing the report (Braun & Clarke, 2006). The analysis was inductive, meaning that at the beginning, themes were extracted from the data rather than data being fitted into a coding frame. To ensure rigor, member checking was employed, with participants reviewing a summary of the findings for accuracy with respect to their experiences

It had four stages or steps. To preserve the integrity of the data and the experiences of the participants, the researchers transcribed audio recordings verbatim. After this, they read the transcripts several times to familiarize themselves with the data and note down first impressions and themes. When coding, the transcripts of the conversations were studied line by line, key features were noted, and a relevant code was assigned, with codes updated as new ideas emerged. In the end, the researchers grouped the codes into broader themes that captured patterns in the data. They were then refined to ensure no overlap between themes, so the themes reflected participants' experiences with the Speechify tool. Through thematic analysis, the

qualitative data were systematically explored, yielding insights into participants' perspectives on using AI tools for reading comprehension. Furthermore, this analysis lends credibility to findings on the use of assistive technologies by learners with dyslexia.

Findings

The thematic analysis of semi-structured interviews with 16 EFL students with dyslexia demonstrates profound changes in the participants' reading abilities, emotional expressions and engagement. The experience of the reading process changed due to AI intervention, even though the biological deficits in dyslexia remained. The analysis revealed that students found the Speechify AI tool useful in various ways. Students identified cognitive and affective benefits while reading and comprehending the NAEP text. Table 2 summarizes the codes and examples from participants' replies.

Table 2. *The theme of students' perception of "Speechify" integration*

Theme	Code	Examples
Improved Reading Comprehension & Cognitive Offloading	Comprehension Gain; Auditory Scaffolding	1. "Using Speechify helped me understand the passages better because I could hear the words while reading along." (Participant 3) 2. "I noticed I could answer questions more accurately after listening to the text." (Participant 8)
Affective Transformation (Anxiety & Confidence)	Anxiety Reduction; Confidence Boost	1. "Listening to Speechify made me less anxious about reading in front of others." (Participant 9) 2. "I felt more confident reading aloud in class after practicing with Speechify." (Participant 12) 3. "Hearing the text read helped me believe I could improve my reading skills." (Participant 6)
Multisensory Learning & Memory Support	Dual Coding (See + Hear); Retention Enhancement	1. "The combination of listening and seeing the text helped me remember the information." (Participant 2) 2. "I liked using flashcards along with Speechify; it made learning more fun." (Participant 15)
Enhanced Engagement	Active Participation; Interactive Learning	1. "I was more willing to join discussions because I understood the material better." (Participant 11) 2. "The workshop felt more interactive when I could listen and read simultaneously." (Participant 7)
Learner Autonomy & Personalized Experience	Tailored Pacing; Control over Learning	1. "I appreciated that I could use Speechify at my own pace, which helped me learn better." (Participant 10) 2. "The way the workshop was set up made me feel like my needs were understood." (Participant 4)

Theme 1: Mitigation of Cognitive Overload and Enhanced Comprehension

There was a notable improvement in reading comprehension among participants who reported that they could "skip" decoding. As Participant 3 explained, being able to hear the words when reading along helped in understanding. This finding supports Cognitive Load Theory, which states that since the decoding was handled by the AI, the participant's working memory was no longer overloaded by reading mechanics. The comprehension gain was thus seen as freeing cognitive space for meaning-making. Participant 8 confirmed this, saying that the sounds should be used more often because they helped him answer the question correctly. The reason being the question helped perform a task.

Theme 2: Affective Transformation; Anxiety Reduction and Increased Confidence

The most crucial takeaway, perhaps, was the emotional effect of the AI intervention, especially because many dyslexic adults experience trauma from their reading failures. Many users have said that Speechify made reading less stressful. Participant 14 indicated that instead of hating reading, it has been made “less stressful”. Participant 9 stated that they felt less anxious about other people reading.

The user-testing indicated that Speechify developed a non-judgmental feedback loop. Unlike a human teacher who might correct errors, which can lead to feelings of shame, the AI provided the correct model instead, thereby lowering the affective filter and creating a more favorable psychological state for language acquisition. This lowering of anxiety resulted in an increase in confidence. Participant 12 reported an improvement in confidence when reading aloud. According to Participant 6, the tool facilitated the belief in one's ability to improve. The reduction of anxiety is one of the essential conditions for the use of metacognitive reading strategies.

Theme 3: Multisensory Reinforcement and Memory Support

According to the participants, the memory was better when the presentation was bimodal (auditory plus visual). Participant 2 said that listening and seeing the text helped with remembering information. Participant 15 found Speechify useful with flashcards. According to theorists, this shows the power of multisensory learning, with the sound providing a phonological model (engaged using the phonological loop) and the text being processed by the visuospatial sketchpad. The coordination of these inputs reinforces neural pathways involved in word recognition, which may help with long-term orthographic mapping.

Theme 4: Enhanced Engagement

As a result of integrating Speechify into the class, students became more engaged and reported participating more in class. Participant 11 stated that a better understanding increased eagerness to join discussions. Additionally, Participant 7 acknowledged that the workshop was more interactive, with audio-visual teamwork. As a nutshell, the incorporation of these support mechanisms in particular should make the learning experience more engaging.

Theme 5: Learner Autonomy and Personalized Pacing

The ability to control the speed of the AI voice was well appreciated as a personalized learning experience offered by Speechify. The slow processing speeds of dyslexics vary widely, often making the audio in the average classroom either too fast (overloading) or too slow (causing attention to drift). Participant 10 liked being able to learn at their own pace, and participant 4 insisted that their specific needs were understood. The AI tool permitted learners to fine-tune the input according to their working memory capacity, which encouraged learners to feel more in control of their learning as agents of self-regulated learning.

Discussion

According to [Abbott-Jones \(2021\)](#), the “social and emotional barriers” in higher education for dyslexics are similar. Furthermore, it highlights that dyslexics can suffer from increased anxiety. The current study's finding that Speechifies (with the add-on function) can reduce

reading anxiety suggests that the AI tool can likely minimize this specific issue, for which Abbott-Jones (2021) reported that reading tasks engender an anxiety response.

Moreover, the data indicate that AI tools not only soothe students' anxiety but also encourage emotional states conducive to learning. The concept of "Foreign Language Enjoyment" proposed by Dewaele & Li (2018) can be used to describe participants in this study. This decrease in anxiety and improved enjoyment gives students a positive boost that will positively affect their learning, as they will be able to engage more with their learning (Jelani et al., 2020; Dewaele & Li, 2018).

According to the literature on assistive technology, the usage of Speechify leads to improved self-efficacy and emotional well-being (Mussini & Russo, 2023; Hillesund et al., 2022). Study anxiety can greatly negatively affect academic performance (Aksoy & Akkoç, 2019). In this way, students learn to interact with texts. This supportive environment encourages risk-taking and proactive approaches to second language acquisition (Dizon & Tang, 2020), thereby developing the agency and motivation essential to success (Zou, 2023).

The results specifically indicate that the naturalistic qualities of AI voices aid comprehension of syntax and reading. The meta-analysis conducted by Wood et al. (2018) supports this view, as the results showed positive outcomes on reading comprehension. In the past, robotic voices imposed a cognitive load on learners, forcing them to work hard to decode the machine. In contrast, contemporary artificial intelligence voices have natural prosody (rhythm and intonation), which, according to Keelor et al. (2020) and Wood et al. (2018), allows the learner to focus on content rather than delivery.

This is a sign of the next new generation of tools, as "cognitive prosthetics," rather than "assistive gadgets (ph)." Speechify aids in bridging gaps in phonemic and decoding skills. This kind of multimodal support can alleviate learners' need for mechanical decoding, allowing them to focus on meaning construction (Bonifacci et al., 2022). As a result, listening while reading helps significantly improve reading comprehension.

According to the findings of this research on "multisensory reinforcement", a move towards Universal Design for Learning (UDL) can be evident. Colomé et al. (2023) and Nasrudin et al. (2018) advocate using technology to create an inclusive learning environment. According to Mohammad (2022), the application of AI-based solutions in EFL contexts can help with academic success and advance equity. By tackling the specific issues faced by such learners will improve learning outcomes and create a supportive environment (Martin & Collie, 2019; Syal & Torppa, 2019). When students learn using such technologies, their confidence level rises. As a result, they become more persistent in their learning task (Mudra & McKinnon, 2022). Therefore, technology should be used to create an inclusive learning experience.

Pedagogical Implications

This study of AI Tools for people with dyslexia underscores the need for increased awareness and training among educators regarding dyslexia. By focusing on professional development that emphasizes inclusive education and the use of assistive technology, the learning environment can be made more equitable. Results support the use of AI products, such as

Speechify, to improve the reading experience of dyslexic students. With the rise of technology in education, tools are becoming a must in classrooms and halls so as to support learning

Limitations and Future Research

This study was not without some limitations. Having only 16 people supports the result, though the sample size can be a bit limited. Moreover, the limited number of sessions (12), the effect on reading and general skills after prolonged use of Speechify is unclear. AI tools like Speechify should include continuous research in future studies with larger sample sizes. It should also include research over longer durations. Longitudinal research could advance our understanding of how AI language tools could help dyslexic learners by examining their effective use.

References

- Abbott-Jones, A. (2021). A quantitative study identifying the prevalence of anxiety in dyslexic students in higher education. *Research Journal of Education*, (71), 42-55. <https://doi.org/10.32861/rje.71.42.55>
- Aksoy, N. and Akkoç, M. (2019). Intercultural sensitivity levels and cultural difference perceptions of physicians and nurses. *Florence Nightingale Journal of Nursing*. <https://doi.org/10.26650/fnjin18002>
- Bacon, D. R. (2016). Reporting actual and perceived student learning in education research. *Journal of Marketing Education*, 38(1), 3–6. <https://doi.org/10.1177/0273475316628819>
- Baddeley, A. D. (2000). The episodic buffer: A new component of working memory? *Trends in Cognitive Sciences*, 4(11), 417–423. [https://doi.org/10.1016/s1364-6613\(00\)01538-2](https://doi.org/10.1016/s1364-6613(00)01538-2)
- Bazen, L., de Bree, E. H., van den Boer, M., & de Jong, P. F. (2023). Perceived negative consequences of dyslexia: The influence of person and environmental factors. *Annals of Dyslexia*, 73(2), 214-234. <https://doi.org/10.1007/s11881-022-00274-0>
- Bonifacci, P., Colombini, E., Marzocchi, M., Tobia, V., & Desideri, L. (2022). Text-to-speech applications to reduce mind wandering in students with dyslexia. *Journal of Computer Assisted Learning*, 38(2), 440–454. <https://doi.org/10.1111/jcal.12627>
- Br. Chalmpe, M., & Vlachos, F. (2025). Are there distinct subtypes of developmental dyslexia? *Frontiers in Behavioral Neuroscience*, 18, 1512892. <https://doi.org/10.3389/fnbeh.2024.1512892>
- Brady, S. (2020). A 2020 perspective on research findings on alphabetics (phoneme awareness and phonics): Implications for instruction. *The Reading League Journal*, 1(3), 20–28
- Brantlinger, E., Jimenez, R., Klingner, J., Pugach, M., & Richardson, V. (2005). Qualitative studies in special education. *Exceptional Children*, 71(2), 195–207. <https://doi.org/10.1177/001440290507100205>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Buchweitz, A., de Azeredo, L. A., Esper, N. B., Dalfovo, N. P., Picoli, F., da Cunha, F. S., & Grassi-Oliveira, R. (2023). Developmental dyslexia and the stress of reading: A social stress study of neuroendocrine response in children. *Mind, Brain, and Education*, 17(4), 312-323. <https://doi.org/10.1111/mbe.12361>
- Chen, B. (2023). Effective strategies that improve the reading abilities of children with dyslexia. *Lecture Notes in Education Psychology and Public Media*, 22(1), 270-276. <https://doi.org/10.54254/2753-7048/22/20230323>
- Colomé, À., Peña, M., & González-Gómez, B. (2023). Proactive control of attention in math-anxious individuals. *Psychological Research*, 87(5), 1484-1490. <https://doi.org/10.1007/s00426-022-01750-3>
- Cornoldi, C., Rivella, C., Montesano, L., & Toffalini, E. (2022). Difficulties of young adults with dyslexia in reading and writing numbers. *Journal of Learning Disabilities*, 55(4), 338-348. <https://doi.org/10.1177/00222194211037061>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
- Daweli, T. W., & Mahyoub, R. A. M. (2024). Exploring EFL learners' perspectives on using AI tools and their impacts in reading instruction: An exploratory study. *Arab World English Journal (AWEJ) Special Issue on CALL*, 10, 160-171. <https://doi.org/10.24093/awej/call10.11>

- Dewaele, J. and Li, C. (2018). Foreign language enjoyment and anxiety: associations with general and domain-specific English achievement. *Chinese Journal of Applied Linguistics*, 45(1), 32-48. <https://doi.org/10.1515/cjal-2022-0104>
- Dimililer, C., & Istek, E. (2018). Experiences of a dyslexic child in an English as a foreign language class. *Quality & Quantity*, 52(Suppl 2), 1391-1398. <https://doi.org/10.1007/s11135-018-0730-9>
- Dizon, G. and Tang, D. (2020). Intelligent personal assistants for autonomous second language learning: an investigation of Alexa. *The JALT Call Journal*, 16(2), 107-120. <https://doi.org/10.29140/jaltcall.v16n2.273>
- Dörnyei, Z. (2007). *Research methods in applied linguistics: Quantitative, qualitative, and mixed methodologies*. Oxford University Press.
- Fathi, J., Rahimi, M., & Derakhshan, A. (2024). Improving EFL learners' speaking skills and willingness to communicate via artificial intelligence-mediated interactions. *System*, 121, 103254. <https://doi.org/10.1016/j.system.2024.103254>
- Georgiou, G. K., Martinez, D., Vieira, A. P. A., et al. (2022). A meta-analytic review of comprehension deficits in students with dyslexia. *Annals of Dyslexia*, 72, 204–248. <https://doi.org/10.1007/s11881-021-00244-y>
- Gholamian, B., Shokrolahi, M., & Maleki, S. (2025). Prevalence of developmental dyslexia among primary school children in Iran: A systematic review and meta-analysis. *Research in Developmental Disabilities*, 125, 104231. <https://doi.org/10.1016/j.ridd.2022.104231>
- Hillesund, T., Schilhab, T., & Mangen, A. (2022). Text materialities, affordances, and the embodied turn in the study of reading. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.827058>
- Huang, Y. C., & Liao, Y. H. (2022). The effects of text-to-speech on reading comprehension and reading motivation for students with reading difficulties: A systematic review. *Journal of Educational Technology & Society*, 25(3), 40-53.
- Jelani, S., Muhamad, M., & Manaf, U. (2020). The understanding of mainstream teachers on the implementation of the semi-inclusive program in the curriculum for special education (dyslexia). *International Journal of Academic Research in Business and Social Sciences*, 10(10). <https://doi.org/10.6007/ijarbss/v10-i10/8044>
- Karim, S. A., Hamzah, A. Q. S., Anjani, N. M., Prianti, J., & Sihole, I. G. (2023). Promoting EFL students' speaking performance through ELSA Speak: An artificial intelligence in English language learning. *Journal of Languages and Language Teaching*, 11(4), 655. <https://doi.org/10.33394/jollt.v11i4.8958>
- Keelor, J., Creaghead, N. A., Silbert, N., & Horowitz-Kraus, T. (2020). Text-to-speech technology: Enhancing reading comprehension for students with reading difficulty. *Assistive Technology Outcomes and Benefits*, 14(1), 16–35.
- Kormos, J. (2017). The effects of specific learning difficulties on processes of multilingual language development. *Annual Review of Applied Linguistics*, 37, 30–44. <https://doi.org/10.1017/S026719051700006X>
- Kormos, J., & Smith, A. M. (2023). *Teaching languages to students with specific learning differences* (Vol. 18). Channel View Publications.
- Kormos, J., Babuder, M., & Pižorn, K. (2019). The role of low-level first language skills in second language reading, reading-while-listening and listening performance: a study of young dyslexic and non-dyslexic language learners. *Applied Linguistics*, 40(5), 834-858. <https://doi.org/10.1093/applin/amy028>
- Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon.

- Leslie, R. (2025). 'Oh, what does dyslexia do?': a qualitative investigation of ableist microaggressions towards Australian dyslexic children in primary school. *Disability & Society*, 40(10), 2870–2895. <https://doi.org/10.1080/09687599.2025.2455556>
- Li, M., & Zou, B. (2022). Using artificial intelligence technology as a tutor for EFL speaking practice. In Castledown Publishers eBooks (pp. 82–100). <https://doi.org/10.29140/9781914291012-5>
- Lyon, G. R., Shaywitz, S. E., & Shaywitz, B. A. (2003). A definition of dyslexia. *Annals of Dyslexia*, 53(1), 1-14. <https://doi.org/10.1007/s11881-003-0001-9>
- Madhavi, E., Sivapurapu, L., Koppula, V. K., Rani, P. B. E., & Sreehari, V. (2023). Developing learners' English-speaking skills using ICT and AI tools. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, 32(2), 142–153. <https://doi.org/10.37934/araset.32.2.142153>
- Martin, A. and Collie, R. (2019). Teacher–student relationships and students' engagement in high school: does the number of negative and positive relationships with teachers matter? *Journal of Educational Psychology*, 111(5), 861-876. <https://doi.org/10.1037/edu0000317>
- Mohammad, Z. (2022). Investigating teachers of English knowledge and awareness of dyslexia: a case study in primary Iraqi schools. *Arab World English Journal*, 13(4), 341-354. <https://doi.org/10.24093/awej/vol13no4.22>
- Mudra, H. and Mckinnon, T. (2022). Reading anxiety of EFL learners in Indonesian rural schools: a quantitative study. *LLT Journal a Journal on Language and Language Teaching*, 25(2), 739-753. <https://doi.org/10.24071/llt.v25i2.5221>
- Mussini, E. and Russo, F. (2023). Reduction of anticipatory brain activity in anxious people and regulatory effect of response-related feedback. *Psychophysiology*, 60(2). <https://doi.org/10.1111/psyp.14166>
- Nasrudin, N., Junid, R., Rahim, S., Mohamed, Z., Azmi, A., & Abdullah, I. (2018). Interactive mobile apps (cinta 2.0) for dyslexia's children Malay language therapy tool: focus on Malay language. *International Journal of Engineering & Technology*, 7(4.33), 510. <https://doi.org/10.14419/ijet.v7i4.33.28165>
- Ooko, P. and Aloka, P. (2021). Using selected Behaviour modification practices to enhance reinforcement of reading abilities among dyslexic learners in Kenya. *African Journal of Disability*, 10. <https://doi.org/10.4102/ajod.v10i0.707>
- Pan, M., Guo, K., & Lai, C. (2025). Using artificial intelligence chatbots to support English-as-a-foreign language students' self-regulated reading. *RELC Journal*. <https://doi.org/10.1177/003368822412640>
- Pouretamad, H. R., Khatibi, A., Zarei, M., & Shahgholi, M. (2014). Psychometric properties of the Persian version of adult dyslexia checklist and adult reading checklist. *Psychological Achievements*, 21(2), 255–268.
- Roitsch, J. and Watson, S. (2019). An overview of dyslexia: definition, characteristics, assessment, identification, and intervention. *Science Journal of Education*, 7(4), 81. <https://doi.org/10.11648/j.sjedu.20190704.11>
- Seymour, P. H. K., Aro, M., & Erskine, J. M. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology*, 94(2), 143-174. <https://doi.org/10.1348/000712603321661859>
- Shaywitz, S. E., & Shaywitz, B. A. (2008). Paying attention to reading: The neurobiology of reading and dyslexia. *Development and Psychopathology*, 20(4), 1329-1349. <https://doi.org/10.1017/S0954579408000631>

- Snowling, M. J., & Hulme, C. (2012). Annual Research Review: The nature and classification of reading disorders—a commentary on proposals for DSM-5. *Journal of Child Psychology and Psychiatry*, 53(5), 593-607. <https://doi.org/10.1111/j.1469-7610.2011.02495.x>
- Snowling, M., Hayiou-Thomas, M., Nash, H., & Hulme, C. (2020). Dyslexia and developmental language disorder: comorbid disorders with distinct effects on reading comprehension. *Journal of Child Psychology and Psychiatry*, 61(6), 672-680. <https://doi.org/10.1111/jcpp.13140>
- Stagg, S., Eaton, E., & Sjöblom, A. (2018). Self-efficacy in undergraduate students with dyslexia: a mixed methods investigation. *British Journal of Special Education*, 45(1), 26-42. <https://doi.org/10.1111/1467-8578.12200>
- Stark, Z., Snowling, M. J., & Hulme, C. (2025). Validation and reliability of the Dyslexia Adult Checklist. *Dyslexia*, 31(1), e1797. <https://doi.org/10.1002/dys.1797>
- Stevani, M., & Tarigan, K. E. (2022). Need analysis of dyslexia students in English reading comprehension instructions. *JEELS (Journal of English Education and Linguistics Studies)*, 9(2), 327–352. <https://doi.org/10.30762/jeels.v9i2.520>
- Suárez-Coalla, P., Martínez-García, C., & Carnota, A. (2020). Reading in English as a foreign language by spanish children with dyslexia. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.00019>
- Sweller, J. (2011). Cognitive load theory. Springer. <https://doi.org/10.1007/978-1-4419-8126-4>
- Syal, S. and Torppa, M. (2019). Task-avoidant Behaviour and dyslexia: a follow-up from grade 2 to age 20. *Dyslexia*, 25(4), 374-389. <https://doi.org/10.1002/dys.1627>
- Vinegrad, M. (1994). A revised adult dyslexia checklist. *Educare*, 48, 21–23.
- Wood, S. G., Moxley, J. H., Tighe, E. L., & Wagner, R. K. (2018). Does use of text-to-speech and related read-aloud tools improve reading comprehension for students with reading disabilities? A meta-analysis. *Journal of Learning Disabilities*, 51(1), 73–84. <https://doi.org/10.1177/0022219416688170>
- Yang, H. (2022). Effect of story structure instruction based on visual analysis on reading comprehension intervention for dyslexic students. *Computational Intelligence and Neuroscience*, 2022, 1–8. <https://doi.org/10.1155/2022/9479709>
- Zhang, C., Meng, Y., & Ma, X. (2024). *Artificial intelligence in EFL speaking: Impact on enjoyment, anxiety, and willingness to communicate* [Preprint]. SSRN. <https://ssrn.com/abstract=4671736>
- Zou, B., Du, Y., Wang, Z., Chen, J., & Zhang, W. (2023). An Investigation into Artificial Intelligence Speech Evaluation Programs with Automatic Feedback for Developing EFL Learners' Speaking Skills. *Sage Open*, 13(3). <https://doi.org/10.1177/21582440231193818>
- Zou, M. (2023). Dyslexia and artificial intelligence. BERA Blog. <https://www.bera.ac.uk/blog/dyslexia-and-artificial-intelligence>

Appendix

Appendix 1

A Revised Adult Dyslexia Checklist

<https://drive.google.com/file/d/1kVmkpOKZ8X-9S79IFg2htWPIIf2IygKF/view?usp=sharing>

Appendix 2

Interview Questions

1. Can you describe some of the specific challenges you face when reading in English and how these challenges have impacted your learning experience?
 2. How did using Speechify during the reading workshop affect your understanding of the passages? Did you find it helpful in improving your reading comprehension? Please explain.
 3. What emotions did you experience while using Speechify? Did it help reduce any anxiety or frustration you typically feel when reading?
 4. In what ways did the use of Speechify influence your motivation and engagement in the reading workshop? Did you feel more inclined to participate in discussions or activities?
 5. How do you feel about the multisensory approach used in the workshop (combining auditory support from Speechify with visual aids and group discussions)? Did this approach cater to your learning style?
 6. After completing the reading workshop, how do you perceive your reading skills have changed? Do you feel more confident in your reading abilities, and if so, how has this affected your overall learning experience?
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