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## Developing AI-Powered Language Learning Tools for Diverse Student Populations: Accessibility and Inclusivity in Language Acquisition

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### Abstract

Artificial intelligence is changing how students learn languages by making instruction more adaptive, interactive, and personalized. For diverse student populations, including learners with disabilities, multilingual learners, rural students, low-income learners, and students with different cultural backgrounds, AI-powered language learning tools can reduce barriers that often limit access to effective language instruction. However, these tools can also deepen inequality if they are designed without attention to accessibility, inclusivity, privacy, bias, and teacher support. This article examines how AI-powered language learning tools can be developed to support inclusive language acquisition. It argues that effective tools should be built on Universal Design for Learning, culturally responsive pedagogy, ethical AI principles, multilingual support, assistive technology features, and human-centered implementation. The article concludes that AI should not replace teachers but should function as a supportive learning partner that expands access, strengthens feedback, and respects learner diversity.

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**Keywords:** artificial intelligence, language learning, accessibility, inclusivity, diverse learners, language acquisition, educational technology

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### Introduction

Language learning is not the same experience for every student. A student learning English as a second language in an urban classroom may face different challenges from a student in a rural school with limited internet access. A learner with hearing impairment, dyslexia, visual impairment, speech difficulty, or attention-related learning needs may require different supports from a learner who simply needs more vocabulary practice. Similarly,

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students from multilingual homes may bring rich linguistic resources into the classroom, but traditional language learning materials often treat them as deficient rather than capable.

Artificial intelligence offers new possibilities for addressing these differences. AI-powered tools can provide instant feedback, translate content, adjust difficulty levels, recognize speech, generate practice activities, support pronunciation, and personalize learning pathways. In language education, recent developments in AI chatbots, automated writing feedback, speech recognition, and adaptive learning systems have created new spaces for interaction and practice (Godwin-Jones, 2023). These tools can help students practice reading, writing, listening, and speaking beyond the limits of the classroom.

However, the promise of AI must be approached carefully. UNESCO emphasizes that AI in education should be guided by a human-centered vision that protects learners, supports teachers, and promotes equity rather than simply introducing technology for its own sake (Miao & Holmes, 2023). Similarly, the OECD notes that AI can support adaptation and inclusion, but it also raises concerns about access, bias, teacher training, and fairness (Varsik, 2024). Therefore, the central question is not simply whether AI can improve language learning, but how AI-powered language learning tools can be designed to include learners who have often been underserved by conventional education systems.

### **Conceptualizing AI-Powered Language Learning Tools**

AI-powered language learning tools refer to digital systems that use artificial intelligence to support language acquisition. These tools may include intelligent tutoring systems, AI writing assistants, pronunciation coaches, speech-to-text applications, text-to-speech readers, chatbots, adaptive vocabulary platforms, automated translation tools, and personalized reading comprehension systems. Unlike static digital resources, AI-powered tools can respond to learner input and modify instruction based on learner performance.

Holmes, Bialik, and Fadel (2019) describe AI in education as having the potential to provide personalized learning, intelligent feedback, and data-informed support for students and teachers. In language learning, this means that AI can help identify where a student struggles, such as vocabulary, grammar, pronunciation, fluency, listening comprehension, or sentence organization. It can then offer targeted activities and feedback.

For example, an AI-powered English reading tool may notice that a learner repeatedly misunderstands inferential questions. The system can then provide simpler examples, vocabulary support, visual clues, and gradually more complex texts. A pronunciation tool may detect difficulty with certain sounds and provide repeated practice. A writing assistant may help students revise grammar, sentence structure, and coherence while still encouraging independent thinking.

### **The Need for Accessibility and Inclusivity**

Accessibility means that all students, including those with disabilities or learning differences, can use and benefit from a learning tool. Inclusivity goes further by ensuring that the tool respects and supports learners' identities, cultures, languages, abilities, and contexts. A tool may be technically accessible but still not inclusive if it ignores local languages, uses culturally biased examples, or assumes that all learners have high-speed internet and modern devices.

The Universal Design for Learning framework is useful here because it encourages educators and designers to remove barriers before they appear. CAST explains that UDL provides concrete guidelines for ensuring that learners can access and participate in meaningful and challenging learning opportunities (CAST, 2024). In AI-powered language learning, this means designing tools that offer multiple ways to access content, express understanding, and stay engaged.

For diverse student populations, accessibility and inclusivity may require features such as audio narration, captions, adjustable font sizes, screen-reader compatibility, multilingual instructions, offline access, low-bandwidth options, dyslexia-friendly layouts, culturally familiar examples, speech alternatives, and flexible assessment formats. Without these features, AI tools may benefit already privileged students while leaving behind those who need support most.

### **Designing for Learners with Disabilities**

AI-powered language tools can support learners with disabilities when accessibility is built into the design from the beginning. For learners with visual impairments, tools should work

with screen readers, provide text-to-speech support, include keyboard navigation, and avoid relying only on images or color-coded instructions. For learners with hearing impairments, listening activities should include captions, transcripts, visual sound cues, and alternative tasks. For learners with dyslexia, tools should offer readable fonts, spacing options, audio support, chunked text, and reduced visual clutter.

AI can also support students with speech and communication difficulties. Speech recognition tools can provide pronunciation practice, but they must be trained on diverse accents and speech patterns. If a speech recognition system only understands dominant accents, it may unfairly mark students from different linguistic backgrounds as incorrect. This is especially important in countries and regions where English or another target language is spoken with local accents.

Recent reviews on AI and inclusive education suggest that AI can improve accessibility and personalization, especially when used to support learners with disabilities, but they also warn that design quality and implementation matter greatly (Melo-López et al., 2025). Therefore, developers must test tools with real users from diverse ability groups, not only with ideal users in controlled environments.

### **Supporting Multilingual and Culturally Diverse Learners**

Many language learners are not monolingual beginners. They may already speak two or more languages at home or in their communities. An inclusive AI-powered language learning tool should recognize multilingualism as a strength. It should allow students to connect new language knowledge with their existing linguistic resources.

For example, a learner who speaks Igbo, Yoruba, Hausa, Spanish, Arabic, Hindi, or Mandarin should not be treated as linguistically empty because they are learning English or French. AI tools can support this by offering bilingual glossaries, translation support, contrastive grammar explanations, culturally relevant reading passages, and examples from different societies.

Culturally responsive content is especially important. If all reading passages, names, idioms, and examples come from one cultural background, learners from other backgrounds may

feel excluded. Inclusive AI tools should therefore include diverse names, settings, family structures, school experiences, local realities, and communication styles. This does not mean lowering academic standards. It means making learning meaningful by connecting language instruction to learners' lived experiences.

### **Personalization Without Isolation**

One major advantage of AI is personalization. AI tools can adjust text difficulty, recommend practice tasks, provide immediate feedback, and allow students to learn at their own pace. This can be especially helpful in classrooms where students have different levels of language proficiency.

However, personalization should not isolate learners. Language is social. Students need interaction, negotiation of meaning, conversation, peer learning, and teacher guidance. Vygotsky's sociocultural theory emphasizes that learning develops through social interaction and support from more knowledgeable others (Vygotsky, 1978). In language acquisition, this means that AI should not become a replacement for human communication. Instead, it should prepare students for richer interaction.

For instance, an AI chatbot may help a shy learner practice basic conversation before speaking in class. An adaptive vocabulary app may help students prepare for group reading. A writing assistant may help students revise drafts before teacher feedback. In each case, AI supports participation rather than replacing it.

### **Ethical Issues: Bias, Privacy, and Data Protection**

AI-powered language learning tools depend heavily on data. They may collect information about student performance, voice recordings, writing samples, reading speed, errors, learning preferences, and interaction patterns. This raises serious ethical questions. Who owns the data? How is it stored? Can it be shared? Can it be used to label students unfairly?

UNESCO's guidance on generative AI in education stresses the need for regulation, privacy protection, age-appropriate use, transparency, and human oversight (Miao & Holmes, 2023). These issues are especially important when AI tools are used with children and young

learners. Students should not be exposed to unsafe data practices simply because a tool appears innovative.

Bias is another major concern. AI systems may reproduce stereotypes or unfairly evaluate learners based on accent, dialect, grammar variety, disability, race, gender, or cultural background. For example, an automated writing tool may wrongly penalize students who use World Englishes or local varieties of English. A pronunciation tool may favor native-speaker accents while ignoring intelligibility. Inclusive design must therefore ask: Whose language is being treated as correct? Whose accent is being treated as acceptable? Whose culture is being centered?

### **Teacher Roles in AI-Supported Language Learning**

Teachers remain central to inclusive AI-supported language education. AI can provide practice, feedback, and adaptive pathways, but teachers interpret learner needs, provide emotional support, build classroom community, and make ethical decisions. AI tools should therefore be designed to strengthen teacher agency rather than reduce teachers to supervisors of software.

Teachers need training to understand what AI tools can and cannot do. They should know how to review AI feedback, identify bias, protect student privacy, and integrate AI activities into meaningful lessons. The OECD highlights teacher training as a major requirement for equitable AI implementation in education (Varsik, 2024). Without teacher preparation, even well-designed tools may be poorly used.

For example, a teacher may use AI-generated reading passages but still need to check whether the content is age-appropriate, culturally sensitive, accurate, and aligned with curriculum goals. A teacher may allow students to use AI writing support but still teach planning, argument development, grammar awareness, and independent revision. The goal is not to make students dependent on AI but to use AI as a scaffold for deeper learning.

### **Principles for Developing Inclusive AI Language Learning Tools**

Developers, educators, policymakers, and researchers should follow several principles when designing AI-powered language learning tools for diverse student populations.

First, tools should be designed using Universal Design for Learning. This means providing multiple ways for students to access content, practice skills, and demonstrate learning (CAST, 2024).

Second, tools should support multilingual learners by recognizing home languages as assets. Translation, bilingual scaffolds, and culturally relevant examples should be included where appropriate.

Third, accessibility should be built into the first version of the tool, not added later. Features such as captions, transcripts, screen-reader compatibility, adjustable text, audio support, and keyboard navigation should be standard.

Fourth, AI systems should be tested with diverse learners. Developers should include students with disabilities, students from different linguistic communities, rural learners, low-income learners, and students using low-cost devices.

Fifth, tools should protect privacy and minimize unnecessary data collection. Students and schools should understand what data is collected and how it is used.

Sixth, AI feedback should be explainable. Students should not only see that an answer is wrong; they should understand why it is wrong and how to improve.

Seventh, tools should support teachers. Dashboards should provide useful insights without overwhelming teachers or reducing students to scores.

Finally, AI tools should promote confidence and participation. Language learning can be emotionally sensitive because students may fear making mistakes. Inclusive AI should create safe opportunities for practice while encouraging real communication.

## **Challenges in Implementation**

Despite its promise, AI-powered language learning faces several challenges. The first is the digital divide. Many students do not have reliable internet, modern devices, or quiet spaces for online learning. If AI tools require expensive devices or constant internet access, they may exclude the very students they are meant to support.

The second challenge is language coverage. Many AI systems perform better in globally dominant languages than in less-resourced languages. This can disadvantage learners whose home languages are underrepresented in training data.

The third challenge is overdependence. Students may rely on AI to generate answers rather than develop their own language skills. Teachers must therefore design tasks that require thinking, speaking, collaboration, and reflection.

The fourth challenge is assessment fairness. If AI is used to evaluate writing, speaking, or reading comprehension, schools must ensure that the tool does not unfairly penalize accents, dialects, disabilities, or culturally different ways of expression.

The fifth challenge is sustainability. Schools may adopt AI tools quickly but fail to provide training, maintenance, evaluation, or local adaptation. Inclusive AI requires continuous review, not one-time adoption.

## **Conclusion**

AI-powered language learning tools can play a valuable role in making language acquisition more accessible and inclusive for diverse student populations. They can personalize learning, provide immediate feedback, support multilingual learners, assist students with disabilities, and expand opportunities for practice. However, these benefits are not automatic. AI tools must be intentionally designed to reduce barriers, respect learner diversity, protect student data, and support teachers.

The future of AI in language education should not be built around replacing human teachers or standardizing all learners into one model of language proficiency. Rather, it should be built around widening participation. When guided by Universal Design for Learning, ethical AI principles, culturally responsive pedagogy, and strong teacher involvement, AI-powered language learning tools can help create classrooms where more students are able to access language, use language, and see themselves as capable communicators.

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