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| RESEARCH ARTICLE

Perceptions of Yemeni EFL Students on the Use of AI Tools: Awareness, Frequency, and Preferred Applications

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| ABSTRACT

This study explores Yemeni EFL students' perceptions of using AI tools in their English language learning, focusing on awareness, frequency of use, and preferred applications. AI-powered tools like ChatGPT, Duolingo, and Grammarly offer personalized, interactive learning experiences that are especially valuable in regions with limited educational resources. The research utilized an online survey distributed via WhatsApp to gather data from Yemeni undergraduate students. Results indicate that while many students are familiar with AI tools and use them regularly for tasks such as vocabulary building and grammar checking, barriers like limited internet access and high AI tool costs remain significant. The study highlights the potential benefits of AI tools in accelerating learning, enhancing autonomy, and providing personalized feedback while addressing the need for improved infrastructure and support in under-resourced areas. The findings provide valuable insights for educators, policymakers, and AI developers to enhance the effectiveness and accessibility of AI tools in language learning, particularly in conflict-affected regions like Yemen.

| KEYWORDS

Artificial Intelligence in Education, Digital Literacy, EFL Learning, Language Acquisition, Yemeni Higher Education.

| ARTICLE INFORMATION

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1. Introduction

The rapid advancement of artificial intelligence (AI) has significantly impacted various sectors, including education. AI tools are increasingly integrated into language learning to enhance instruction (Chen, Chen, & Lin, 2020). In the context of English as a foreign language (EFL) education, AI-powered applications offer personalized, interactive, and flexible learning experiences, which are particularly valuable in regions with limited access to high-quality educational resources. AI Tools like Grammarly, Duolingo, and ChatGPT have demonstrated their potential to improve language acquisition by providing real-time feedback, adaptive learning paths, and opportunities for autonomous learning (Rios-Campos et al., 2023; Paek & Kim, 2021).

Student awareness of AI tools in EFL education is crucial for maximizing learning outcomes. Students who understand how to use these tools effectively can enhance their linguistic skills, such as pronunciation and grammar, through real-time feedback and practice in a low-pressure environment (Qiao & Zhao, 2023). Moreover, awareness of AI tools fosters self-regulation, allowing students to set learning goals, monitor their progress, and adapt strategies based on AI feedback—skills essential for developing autonomy and lifelong learning habits (Qiao & Zhao, 2023).

However, challenges such as misconceptions about AI capabilities and potential overreliance on technology must be addressed. Educators need to provide training that helps students critically evaluate AI-generated content and use these AI tools responsibly. Additionally, AI tools have the potential to significantly enhance education in conflict-affected zones like Yemen by addressing the unique challenges faced by students and educators in these environments. For example, AI apps accessed via prevalent mobile devices enable autonomous, personalized learning despite infrastructural challenges.

Despite these potential benefits, AI adoption faces several sociocultural and logistical barriers, like limited AI awareness, insufficient institutional support, and gender norms potentially restricting technology access for females in some areas (Amrani et al., 2023). The implementation of AI in Yemen faces significant barriers. Infrastructure limitations, economic hardships, and social obstacles—such as gender norms that restrict access to technology for female students—complicate the integration of AI tools (Amrani et al., 2023). Even before the ongoing conflict, Yemen's educational institutions struggled with inadequate technological infrastructure, low digital literacy, and a lack of modern learning tools (Amrani et al., 2023). Furthermore, while students may be open to technology-based education, faculty resistance due to traditional teaching practices and limited experience with digital tools presents additional challenges (Amrani et al., 2023). High costs of AI platforms and unreliable internet connectivity further hinder access, particularly for students in rural areas (Aldholay et al., 2018).

Given these distinct socioeconomic and infrastructural challenges, understanding Yemeni EFL students' perceptions and use of AI tools is critical for developing effective strategies to integrate these technologies into the educational system. This study aims to explore how AI can address educational barriers encountered by students in this underserved region, with a particular focus on the impact of demographic factors such as gender, age, and academic level on access to and attitudes toward AI tools.

The findings are expected to provide valuable insights for policymakers, educators, and university leaders, assisting them in overcoming obstacles and leveraging AI to improve language learning outcomes. Additionally, examining AI adoption in Yemen offers an important perspective underrepresented in current research on technology-enhanced language education, with potential implications both globally and locally.

1.1 Research Questions

Considering these points, the study will address the following research questions:

1. What is the level of awareness among Yemeni EFL students regarding the availability and functions of AI tools in language learning?
2. How frequently do Yemeni EFL students use AI tools to aid their English language learning, and in what contexts?
3. What specific AI tools are most frequently used by Yemeni EFL students, and what are their preferences based on tool features?
4. What are the perceptions of Yemeni EFL students about the benefits and challenges of using AI tools in their language learning journey?

1.2 Significance of the Study

This study holds significance as it aims to augment understanding of AI tool integration within EFL learning environments in Yemen. By identifying possible gaps in students' awareness and use of these tools, the research may furnish valuable insights for educators, curriculum developers, and policymakers, assisting in informed decisions on better supporting student adoption and utilization of AI technologies. Furthermore, by evaluating AI tools' effectiveness from students' perspectives, the study aims to enhance language acquisition strategies, ensuring AI is applied aligning with learners' needs to improve their language learning experience.

1.3 Limitations of the Study

Some limitations of this study should be acknowledged. As a survey-based examination, the research relied on self-reported data from teachers, which may not fully capture the nuanced realities in complex conflict settings. Additionally, the perspectives of other education stakeholders such as teachers, and educators were not incorporated. The cross-sectional nature of the data also precludes determining causality or exploring changes over time. Furthermore, the study was conducted in a single conflict-affected region and findings may not be generalizable to other contexts with varying infrastructure, technologies used, or phases of conflict. Accessing a representative sample of students across Yemen's fragmented landscape presented logistical challenges. While providing valuable insights, more rigorous mixed-methods research addressing these limitations would generate an even fuller understanding of technology's role in conflict-impacted education.

2. Literature Review

Interest in leveraging technology to enhance education has grown significantly in recent years due to technology's potential to improve learning outcomes, increase student engagement, and transform teaching practices. A variety of digital tools have been incorporated into classrooms around the world (Jumman et al., 2024; Vinita & Soni, 2024). In particular, artificial intelligence (AI) technologies show promise for developing key language skills through personalized practice opportunities that complement traditional instruction (Rusmiyanto et al., 2023; Song & Song, 2023; Obari & Lambacher, 2019). However, the accessibility of AI-driven solutions remains a challenge in resource-constrained regions due to financial barriers and ethical considerations surrounding data privacy and digital inclusion. As interest in edtech grows globally, it is important to understand how various technologies are being adopted within different socio-economic contexts to maximize their educational benefits equitably.

As educational institutions worldwide continue expanding technological integration to enhance access to and quality of learning, Yemeni higher education institutions (HEIs) need help adopting such innovations. (Alazam, et al.,2023). The forthcoming literature review synthesizes pertinent research on technology-based education (TBE), artificial intelligence (AI) in education, and e-learning adoption, focusing on potential advantages and challenges within Yemen's educational context. Specifically, it analyzes studies exploring applications of technological tools like AI and e-learning internationally, as well as important lessons, to provide meaningful insights considering limitations to Yemeni HEIs' adoption of educational technologies. Including Yemen's perspective broadens understanding of tech-empowered education in under-resourced settings, an area underrepresented in current literature.

Research on technology-based education (TBE) in Yemeni higher education institutions (HEIs) reveals significant challenges. Amrani et al. (2023) found that while students were open to e-learning, factors like poor infrastructure, limited resources, and low digital literacy among faculty hampered implementation. Al-Azam et al. (2023) also identified obstacles such as insufficient infrastructure, income barriers, and social beliefs inhibiting e-learning adoption. Ahmed and Zaini (2022) noted cultural differences, technology constraints, and lack of supportive education policies as challenges.

Bilal and Syeliya (2022) highlighted that e-learning in Yemen is still in its infancy, emphasizing the need for improved access to technology, motivation, and supportive educational policies. Their study identified critical factors for successful e-learning implementation, suggesting that integrating technology-based strategies can enhance students' learning experiences.

However, some research points to opportunities. For language acquisition, technology has demonstrated value as an informal learning tool among undergraduate students in Yemen. Bin-Hady and Al-Tamimi (2021) conducted a mixed-methods exploration of technology use to enhance English skills among Yemeni learners. The researchers found undergraduates employed four chief tech-based strategies: utilizing social media, accessing websites, networking via online platforms, and drawing inspiration from role models. These approaches meaningfully improved listening, speaking and reading abilities, though vocabulary progress outshined grammar and pronunciation enhancement. The study highlights integrating technology into formal curricula to supplement informal strategies, offering curriculum developers practical insights into bolstering language acquisition at Yemeni universities by leveraging technology inside and outside the classroom. Quiet relatedly, Wagdi et al. (2021) focused on informal learning practices, revealing that Yemeni students employed technology-based strategies to improve their English language skills outside the classroom. This research underscores integrating technology into educational practices to foster independent learning.

Cloud computing presents a potential solution to address many of the challenges facing higher education institutions in Yemen. As Saleh et al. (2018) highlighted, adopting cloud models may enhance educational delivery through scalable and cost-effective virtual resources. The cloud allows universities to circumvent the limitations of physical infrastructure by providing on-demand access to IT solutions remotely. The researchers identified 13 influential factors across technological, organizational, environmental, and individual domains affecting Yemeni universities' cloud adoption. Validation of these factors by IT experts led to a conceptual framework that could support successful cloud implementation. The researchers concluded cloud adoption may help alleviate constraints stemming from financial and technical restrictions in Yemen's education sector by overcoming infrastructural barriers through virtualization.

In a relevant study, Almekhlafi et al.'s (2018) exploratory study of practitioners in Yemeni universities found a high level of awareness of cloud computing's importance. However, universities indicated they would be ready to adopt cloud technologies once key challenges like cost, internet speed, privacy issues, and lack of application knowledge were resolved. Thus, the above-mentioned two studies highlight the cloud's potential value while underscoring obstacles that must be addressed for effective integration in Yemen's higher education context.

E-learning has emerged as a transformative approach, especially in resource-constrained settings like Yemeni universities. Al-Azam et al. (2023) investigated factors influencing e-learning adoption among public universities. Employing the DeLone and McLean

Information Systems Success (D&M ISS) model and the Technology Acceptance Model (TAM), the study surveyed 250 students to examine behavioral intentions toward e-learning. Perceived utility, service quality, information quality, and ICT infrastructure significantly shaped intentions to engage in e-learning. Additionally, user satisfaction and attitude toward e-learning mediated relationships between these factors and intention. The study recommended policymakers focus on improving ICT infrastructure and service quality to foster greater e-learning adoption.

Artificial Intelligence (AI) possesses the potential to revolutionize education systems through addressing individual differences and personalized learning experiences. Al-Hawari and Al-Jamali (2022) examined AI's role in empowering primary students in Yemen. After surveying 26 AI experts, the study found AI could markedly enhance outcomes via smart content, intelligent systems, and customized learning. Recommendations included establishing an AI center within Yemen's Ministry of Education to train educators in AI technologies, as well as introducing awards for students and schools effectively utilizing AI to incentivize innovation and use.

A central challenge in adopting e-learning is guaranteeing alignment with students' needs and existing technological infrastructure. Isaac et al. (2019) explored how compatibility and task-technology fit (TTF) influence successful online learning adoption in Yemeni HEIs. The study applied the DeLone and McLean IS Success Model to evaluate the influence of system, service, and information quality on compatibility with students' requirements. Results indicated compatibility notably impacts user satisfaction and actual usage, subsequently affecting task-technology fit and ultimately performance outcomes. The research emphasized ensuring e-learning tools' compatibility with Yemeni universities' technological and pedagogical environment.

This literature highlights both the potential and the obstacles to integrating technology into Yemen's educational landscape. While AI, e-learning, and cloud computing offer promising solutions, significant gaps remain in understanding how these technologies can be effectively implemented for language acquisition, particularly in under-resourced environments. The current study aims to address these gaps by exploring Yemeni EFL students' perceptions and usage of AI tools, offering insights that can inform more equitable and effective educational strategies.

3. Methodology

An online survey was distributed to collect data on students' awareness and use of AI tools in EFL classrooms in Yemen. The questionnaire was sent via WhatsApp groups to reach students with varying internet access.

3.1 Participants

The participants in this study were Yemeni undergraduate students enrolled in various English language programs who had experience using AI tools for learning. They were selected to ensure diversity in terms of age, gender, English proficiency levels, and university affiliations, capturing a comprehensive view of AI perceptions. A voluntary sampling method was used where students across multiple institutions were invited to participate via online networks and platforms. This approach aimed to gather a wide range of responses representing different perspectives from EFL learners within Yemeni higher education. Diversifying the sample in these dimensions helped provide insights generalizable to the broader population of AI-assisted language learners in Yemen.

3.2 Survey Design

The survey used in this study was designed to gather data on Yemeni undergraduate students' perspectives on AI-assisted English language learning. A structured questionnaire was developed with clear, objective-aligned questions organized in a logical flow. It began with participant demographics and then inquired about AI tool utilization and perceived impact on language acquisition. Both multiple-choice and Likert scale questions were employed to quantify opinions while allowing for qualitative insights. The design aimed to maximize response rates and accurately collect both numeric and descriptive data from a diversified sample of EFL learners, thereby ensuring comprehensive and meaningful findings.

3.3 Pilot Testing and Refinement

The questionnaire was pilot-tested with Yemeni students and educational experts before full implementation. This piloting allowed for evaluation of the clarity, relevance and reliability of the questions. Feedback from the pilot was used to refine any items that were deemed unclear or ambiguous, strengthening the overall validity and quality of the questionnaire.

3.4 Data Collection

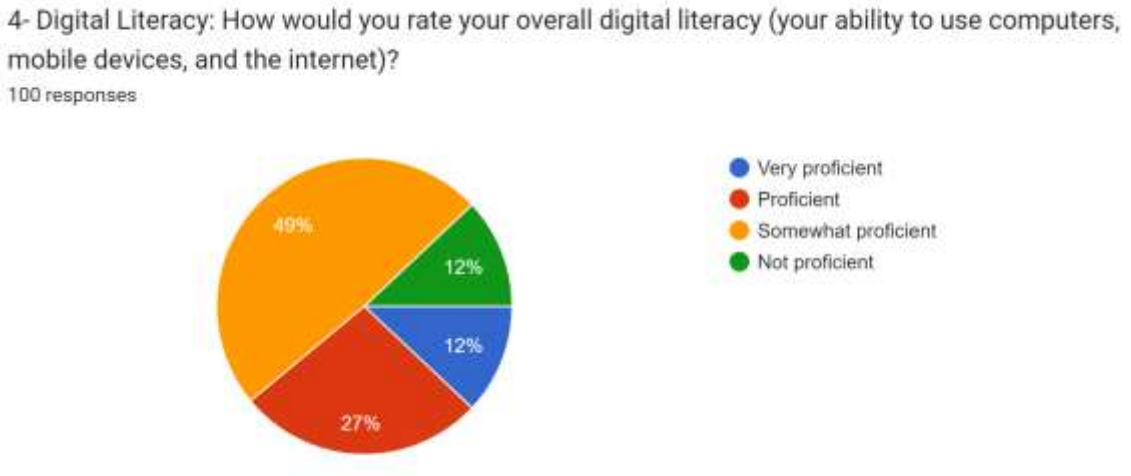
Data collection involved voluntary participation with informed consent received upfront. The survey was distributed anonymously through WhatsApp groups to assure respondents' confidentiality while facilitating widespread access, especially for those in remote locations. Leveraging WhatsApp's extensive usage allowed the questionnaire to reach a diverse demographic. Moreover, anonymity served to minimize potential biases and encourage frank feedback from participants. This approach aimed to collect a representative dataset encompassing varied perspectives across Yemeni EFL learners.

3.5 Data Analysis

Quantitative data from closed questions was analyzed using descriptive and inferential statistics to identify patterns between demographics and AI use. Qualitative data from open questions underwent thematic analysis to extract common themes around challenges and perceptions. This comprehensive analysis yielded an understanding of current AI adoption and effectiveness in Yemeni EFL classrooms.

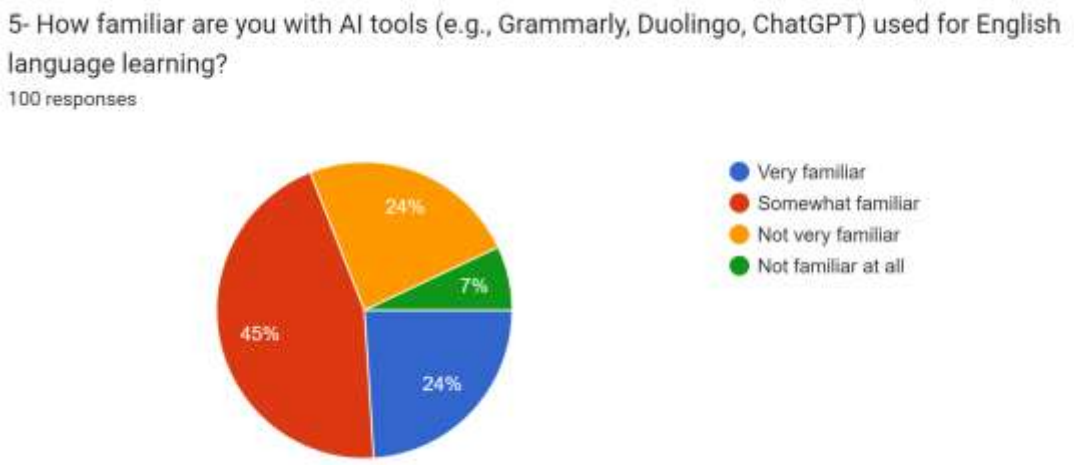
4. Results

The sample consisted primarily of male respondents aged 21-23, comprising over 50%of the participants, suggesting a predominance of students in their middle undergraduate years. Younger students aged 18-20 represented 19% of the sample, while those aged 27 and older constituted only 7%, indicating higher technology adoption among younger digital natives. The majority were fourth-year students (46%), followed by third-years (30%), first-years (8%), and second-years (10%), highlighting greater exposure to academic resources for upper-level undergraduates. Regarding digital proficiency, nearly 50% of the respondents rated themselves as somewhat proficient in digital skills, while 27% considered themselves proficient. However, 12% rated themselves as very proficient, and another 12% as not proficient, emphasizing a need for enhanced support to fully utilize AI applications.



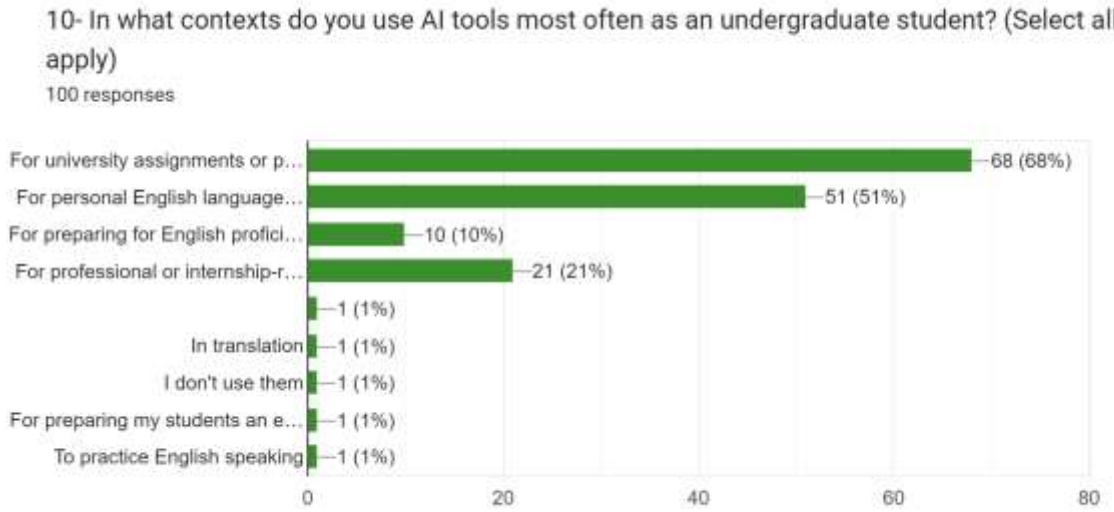
RSQ1 What is the level of awareness among Yemeni EFL students regarding the availability and functions of AI tools in language learning?

The survey revealed varying levels of familiarity with AI tools among the respondents. Most students reported being somewhat familiar (45%) or very familiar (24%), but nearly a quarter were not very familiar (24%), and some were completely unfamiliar (7%). The most recognized AI tools included ChatGPT (61%) and Duolingo (58%), while Grammarly had awareness among 30% of respondents, reflecting their widespread promotion and use. Lesser-known AI tools like Elsa Speak, QuillBot, and Poe had recognition rates of 28%, 5%, and 6%, respectively. Most students learned about AI tools through online advertisements/social media (52%) or classmates/friends (40%), while 24% discovered them via university instructors, underscoring the influence of digital marketing, social learning, and academic environments on awareness.

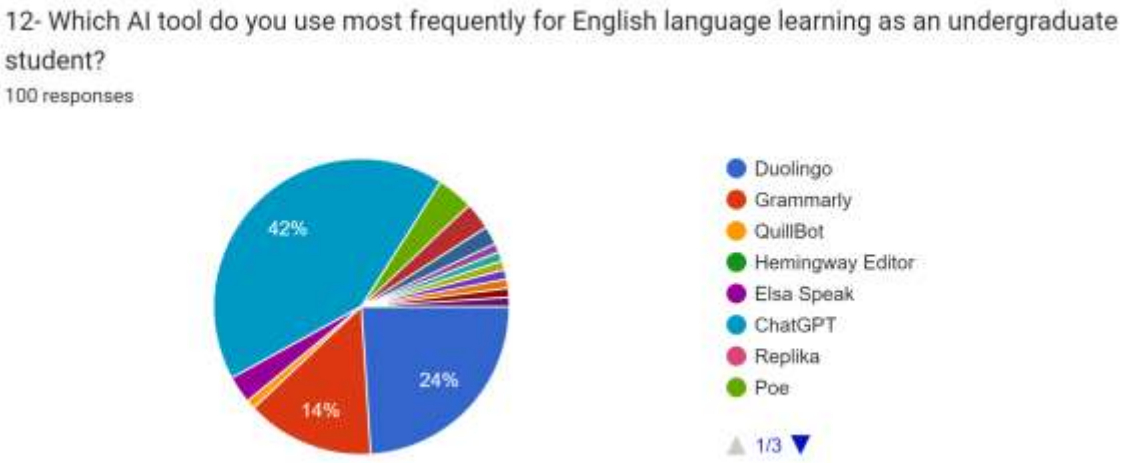


RSQ2 How frequently do Yemeni EFL students use AI tools to aid their English language learning, and in what contexts?

The survey provided useful insights into how students use AI tools for English learning. About a third of the participants used AI tools daily or weekly, while 12% used them monthly and 19% rarely. The most common activities were vocabulary building (60%), pronunciation practice (42%), writing assistance (39%), and grammar checking (38%). Students predominantly used AI tools for university assignments/projects (68%) and personal language improvement (51%), though 21% used them professionally. Duration of use tended to be brief (37% under 10 mins) or moderate (38% 10-30 mins), though 18% used AI tools 30-60 mins and 7% over 60 mins, likely for more substantial tasks. These findings help characterize how AI tools currently support students' language learning activities, needs and contexts.



RSQ3 What specific AI tools are most frequently used, and what are their preferences based on tool features?
The results reveal several insights into the AI tools most frequently used by undergraduate students for English language learning. ChatGPT emerged as the most popular AI tool, used by 42% of respondents, followed by Duolingo (24%) and Grammarly (14%). Less frequently used AI tools include QuillBot, Elsa Speak, and Poe, while other options like Replika and Hemingway Editor had no significant usage. In terms of features, students find a wide range of language exercises (36 responses), voice recognition and pronunciation help (33), instant feedback and corrections (30), and a user-friendly interface (35) particularly valuable. When it comes to reasons for preferring one tool over another, ease of use (66%) is the most important factor, followed by effectiveness in improving English skills (51%), cost (26%), and accessibility (23%).

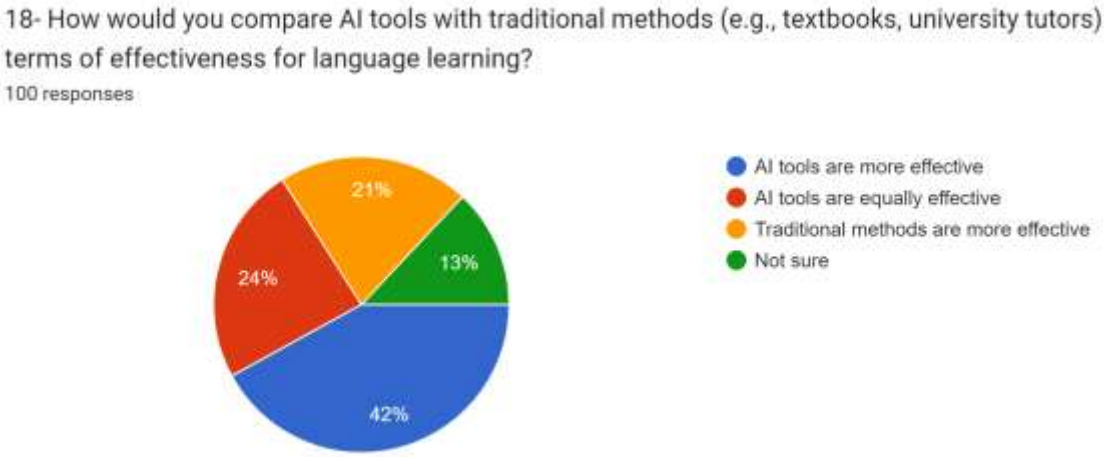


RSQ 4 What are the perceptions of the benefits and challenges of using AI tools?
The results from Section 5 provide a balanced view of how AI tools are perceived in terms of benefits and challenges by university students learning English. A significant portion of respondents believe that AI tools have positively impacted their English language skills, with 43% indicating moderate improvement and 24% reporting great improvement. This suggests that most students perceive some level of benefit from AI in language learning, though there is still a sizeable group (25% slightly improved, 8% not improved) who feel the impact is limited.

In terms of perceived benefits, the most commonly cited advantage is a faster learning pace (47%), followed by personalized learning experiences (39%) and convenience and flexibility (33%). These features highlight the efficiency of AI tools in offering tailored and flexible learning pathways, which are particularly appealing in a university setting. Immediate feedback was also noted by 28% of students, suggesting that timely corrections from AI can support skill development.

However, challenges remain. Limited access to the internet or devices was the most frequently mentioned challenge (46%), reflecting infrastructural and accessibility issues. Other concerns include needing help understanding the AI tools (29%) and the high costs of premium features (29%), which may create barriers to wider adoption. The lack of human interaction (26%) further emphasizes the need to balance AI with traditional methods.

When comparing AI tools with traditional methods, 42% found AI to be more effective, though a considerable number (21%) still prefer traditional approaches and 24% view both as equally effective. This split indicates that while AI is gaining traction, it may complement rather than fully replace traditional methods.



The overall satisfaction responses show that most students have a positive view of AI tools for English language learning. 27% are very satisfied, and 36% are satisfied, indicating a strong approval for these tools. 33% remain neutral, which suggests that while they do not have strong positive or negative opinions, they may see room for improvement. Only 1% were dissatisfied, and 3% very dissatisfied, highlighting that negative experiences with AI tools are minimal. Overall, this suggests that AI tools are generally well-received, but further enhancement could be made to increase satisfaction, especially among neutral users.

5. Discussion

The survey provided valuable insights into how Yemeni English language learners engage with AI tools. The familiarity levels reported with ChatGPT and Duolingo align with studies by Rusmiyanto et al. (2023) and Song & Song (2023) noting the successful introduction of AI-assisted learning potentials. However, around a quarter of respondents' lack of awareness regarding other AI tools points to a need for more comprehensive education on options available, highlighting the importance of targeted initiatives as emphasized in research by Alazam et al. (2023) on challenges Yemeni universities face in effective tech adoption. This gap in full understanding despite high baseline familiarity with major AI tools is consistent with literature by Rusmiyanto et al., Song & Song, and AlAzam et al. calling for focused support to broaden comprehension across diverse learners, examining the integration of innovations into educational contexts. Overall, the findings shed light on both the successful utilization of prominent AI applications and the remaining opportunities to maximize benefits for all students through accessible, informed usage.

While social media and word-of-mouth aided in sharing information about AI tools, the more modest role of universities points to the potential for increased institutional efforts to raise awareness. This aligns with research by Amrani et al. (2023) and Al-Azam et al. (2023) identifying challenges Yemeni higher education faces in adopting technologies due to insufficient support.

The prevalent daily/weekly usage reinforces how integral AI has become important for academic work. Targeting key skills like vocabulary, grammar, and pronunciation through tools reflects perceived learning benefits, consistent with prior studies by Bin-Hady and Al-Tamimi (2021) and Wagdi et al. (2021) documenting technology-enhanced skill development via informal methods. Notably, brief average sessions advantageously allow busy student schedules to incorporate quick practice opportunities while juggling responsibilities aligned with institutional demands, as explored in the literature.

Furthermore, the preference for certain AI tools like the most used ChatGPT mirrors conclusions by Al-Hawari and Al-Jamali (2022) who observed effective personalized learning through AI-driven platforms. Strong valuation of features such as immediate feedback and voice recognition underscores students' demand for all-encompassing learning environments addressing diverse abilities, echoing the importance of seamless usability and impact highlighted in prior work. This emphasis on ease of use and helpfulness as driving technology adoption reinforces the significance previous studies such as Al-Hawari and Al-Jamali placed on these determinants of digital assimilation into academic contexts.

The survey findings indicate that a majority of students experienced enhancement in language skills from using AI tools, with 43% seeing moderate improvement and 24% reporting significant gains. This aligns with research by Al-Azam et al. (2023) emphasizing how perceived utility and quality influence digital engagement. The benefits of accelerated learning pace and tailored experiences reflect AI's potential to revolutionize language education through individualized instruction highlighted more broadly in the literature.

However, challenges reported such as constrained internet access and difficulties navigating AI applications echo previous work identifying barriers to Yemeni technology adoption. Specifically, research by Al-Azam et al. (2023) underscored the need for advanced ICT infrastructure facilitating effective e-learning. The observation that 42% view AI as more impactful than traditional methods compared to 21% still preferring conventional approaches suggests AI may be best positioned to complement rather than entirely replace established pedagogies, echoing calls in the literature for prudently integrating new technologies into existing frameworks. This balance reflects ongoing discussions around optimally evolving educational solutions.

In conclusion, the survey findings demonstrate a promising outlook towards AI tools amongst Yemeni EFL students. However, opportunities remain to optimize user experience and broaden inclusion. Targeting such issues, as evidenced by the results, may help turn impartial opinions favorable and shrink further the small dissatisfied proportion. Aligning with research emphasis on nuanced educational solutions catered for restricted resource environments, continuing progress in these areas holds the potential to advance technical integration in Yemeni education. The study signifies AI presents nascent but growing support, requiring ongoing refinement to maximize benefits and outcomes for all learners, working within local realities. With judicious guidance, such digital augmentations may open avenues to bolster equitable, impactful teaching for Yemeni students in the years to come. The findings and implications discussed in this section provide a roadmap for developing AI tools that are more accessible, culturally relevant, and pedagogically effective in underserved regions like Yemen. By addressing challenges related to infrastructure, cultural inclusivity, affordability, and faculty training, AI developers can create tools that promote equity, autonomy,

and improved language learning outcomes. These insights have the potential to guide the development of AI-driven educational solutions that not only meet the needs of Yemeni students but also serve as models for similar contexts globally.

6. Conclusion

This study has provided valuable insights into Yemeni university students' adoption and use of AI tools to support English language learning. The findings show significant portions regularly employ applications such as ChatGPT, Grammarly, and Duolingo for skills including vocabulary, pronunciation, writing and grammar development, primarily for academic purposes but also for personal improvement.

However, challenges to wider AI adoption were uncovered, such as infrastructure limitations, sociocultural barriers and lack of educator training restricting dissemination. Addressing these through offline functionality, localized content sensitive to cultural dynamics, and cost-effective models could markedly strengthen AI's impact and reach.

The importance of inclusive, customized AI tools catered to underserved learners is underscored. Additionally, self-regulation features and feedback refinement further empower autonomous language development. Collaborations between technologists, pedagogues and policymakers are crucial to ensuring alignment with educational goals within local economic and technical realities.

By responding to unique challenges, AI designers have an opportunity to develop more equitable, accessible and impactful language solutions - not only for Yemeni students but learners in other under-resourced communities worldwide. With diligent design informed by each context's needs, technology holds promise to enhance inclusion and learner experiences globally.

Future research has significant opportunities to advance the understanding of AI-enabled education in conflict-affected settings. Longitudinal studies exploring AI's long-term impact on learning outcomes across various academic subjects, not just English, could generate more robust evidence compared to cross-sectional designs. Gaining insights from instructors regarding AI adoption challenges, including barriers related to gender, digital literacy, and sociocultural factors, will also be important for inclusive integration. Examinations of how AI can support students with low connectivity or digital skills, potentially through offline or low-bandwidth solutions, may elucidate ways to expand access. There is also a need for comparative investigations of AI's role across different conflict regions, development levels and socioeconomic groups.

Statements and Declarations

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