

# Exploring barriers and facilitators of ICT in English pronunciation instruction: Perspectives from Jordanian tertiary education

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## ABSTRACT

This study examines the barriers and facilitators to integrating ICT in teaching and learning English pronunciation among university lecturers and students. Three female lecturers from a Jordanian government university's Department of Pharmacy, with teaching experience spanning 3 to 10 years, participated, along with six focus groups of male and female students aged 20 to 23 from the Faculty of Pharmacy. Thematic analysis uncovered barriers such as limited ICT access, inadequate training, large class sizes, time constraints, and students' negative attitudes and low ICT skills, alongside facilitators including leadership support, ICT tool accessibility, basic training for students, and consistent ICT integration in assessment and curriculum. Students advocated for lecturer support, mobile device integration, ICT training, smaller class sizes, consistent ICT tool integration, tool accessibility, and specialized pronunciation courses. This study offers fresh insights into understanding perceptions of ICT adoption barriers and facilitators among university lecturers and students, benefiting researchers and policymakers focusing on teacher professional development to enhance ICT integration in English pronunciation teaching and learning at the tertiary level.

**Keywords:** barriers, facilitators, higher education, university lecturers and students, ICT

## INTRODUCTION

The integration of Information and Communication Technology (ICT) in English pronunciation instruction within Jordanian tertiary education presents both significant opportunities and inherent difficulties. As technology advances in educational settings, it becomes essential to understand the barriers and facilitators of ICT integration to enhance teaching practices and student learning outcomes. Technological advancements provide innovative instructional methods and opportunities for students to engage, thus achieving learning objectives more effectively. However, significant obstacles persist, including limited technical support, time constraints, and lack of effective professional development programs (Alghazo, 2020). Furthermore, the rigidity of curricula and the emphasis on traditional teaching methods make it difficult to integrate ICT (Birch & Burnett, 2009). Jordanian students encounter unique linguistic challenges in learning English pronunciation due to the fundamental differences between the Arabic and English phonetic systems and the insufficient emphasis on English pronunciation in classroom settings (Al-Zoubi, 2019).

These challenges require specialized instructional approaches that can be effectively employed by ICT. By examining the specific context of Jordanian tertiary education, this study aims to examine the barriers and facilitators of ICT integration in the teaching of English pronunciation. This context-specific examination will provide valuable insights for policy formulation, institutional practices, and the development of tailored educator training programs. The rationale for focusing on English pronunciation instruction in Jordanian tertiary education is emphasized by the distinct challenges and opportunities present in this context. Jordanian tertiary institutions are faced with unique linguistic and educational challenges that require targeted research to uncover effective strategies for ICT integration.

This study seeks to address the gap in existing literature by providing a comprehensive analysis of these challenges and identifying facilitators that can enhance ICT integration in teaching and learning English pronunciation. The primary aim of this research is to contribute to the development of more effective teaching practices and improved student outcomes in English pronunciation instruction in Jordanian higher education through this focused examination.

By addressing the specific barriers and facilitators of ICT integration in the context of Jordanian tertiary education, this study aims to offer some important insights that can inform strategies to overcome existing obstacles and leverage facilitators for more effective instructional practices. This comprehensive examination of the complexities surrounding ICT integration will ultimately

contribute to the advancement of educational practices in this critical area, ensuring that both educators and students can fully benefit from the potential of ICT in enhancing English pronunciation instruction.

## LITERATURE REVIEW

### Factors Regarding Lectures Barriers to Technology-Integrated Instruction

The integration of ICT in education has been extensively studied, revealing significant obstacles across various contexts. Access to technological resources is a predominant issue globally. George et al. (2023) identified challenges such as inadequate infrastructure, limited access to electricity, and a lack of digital literacy, particularly in rural and underserved areas of Africa. In the Saudi context, Alswilem (2019) highlighted the lack of teacher training, inadequate infrastructure (including labs and classrooms), and a shortage of technological resources (notably computers). Frost et al. (2017) emphasized challenges faced by Canadian educators, including outdated computers and inadequate infrastructure. In the Sri Lankan scenario, Karunakaran and Dhanawardana (2019) reported disparities in the availability of ICT resources among schools, noting significant difficulties for teachers in accessing ICT resources and acquiring necessary ICT skills. Their research also demonstrated that the lack of facilities for computer maintenance and repair, as well as the difficulty of ICT resources, poses significant challenges for teachers incorporating ICT in the teaching-learning process.

These studies provide valuable insights into the critical importance of teacher ICT skills in the effective integration of ICT in education. However, they concentrated on the level of ICT proficiency within their specific contexts. Martens et al. (2020) reported that educational managers in Nigeria cited a lack of access to technology, the internet, and professional development opportunities. Teachers highlighted issues within the classroom environment, including inadequate infrastructure, insufficient resources, and overcrowded classrooms. Very few teachers had access to computers or the internet. Collectively, these studies underscore the global nature of access-related barriers, emphasizing the imperative for improved infrastructure and resources.

Effective ICT integration requires skilled professionals to assist teachers with access, operation, and troubleshooting of ICT resources. Without reliable technical assistance, teachers may hesitate to integrate technology, reducing its use in educational contexts, as highlighted by Windfont (2024). Time constraints also significantly impede ICT integration, as using ICT in teaching demands additional time for lesson preparation, troubleshooting, and professional training. Studies by Alghazo (2020), Lawrence and Tar (2018), and Williams-Miller (2020) emphasized that insufficient time for course duration as a major barrier to ICT integration, a finding corroborated by Alabadi (2019), and Kafyulilo et al. (2016), indicating the need for institutional policies that allocate sufficient time for ICT-related activities.

The lack of ICT training is another prevalent issue, with research by Alabadi (2019), Kennedy (2023), and Bingimlas (2009), and others showing that teachers often lack opportunities for ICT training, hindering their ability to integrate technology into classrooms. Popova et al. (2021) suggested a significant gap in professional development that needs to be addressed. Curriculum inflexibility presents a substantial barrier to ICT integration, as John (2005) identified curriculum rigidity as a tangible obstacle, and Birch and Burnett (2009) noted a misalignment between assessment and ICT integration in higher education. The pressure to cover required topics within limited timeframes worsens this issue, indicating a need for curricular reforms that accommodate ICT integration. Recently, Ansari and Waheed (2024) investigated the impact of the COVID-19 pandemic on higher education, identifying barriers such as insufficient ICT infrastructure, lack of institutional support and expertise, and restricted mobility and accessibility. These challenges exacerbated educational disparities and threatened sustainable development.

The research highlighted significant losses and ongoing challenges, highlighting the need for strategic interventions to enhance higher education. In the Indonesian context, Siregar et al. (2024) found that inadequate knowledge, perception, confidence, financial constraints, limited student access, and inadequate facilities were the main barriers encountered by EFL pre-service teachers in remote areas. Despite extensive research on these barriers, several gaps remain relevant to the aims of this study. There is a notable lack of context-specific research focusing on Jordanian tertiary education, leaving a void in understanding the unique challenges and opportunities in integrating ICT for pronunciation teaching in this region. Most studies examine barriers from the perspective of educators or administrators, with insufficient attention to the combined perceptions of both lecturers and students, a dual perspective crucial for a comprehensive understanding. Additionally, research often focuses on general ICT integration across various subjects, highlighting the need for interdisciplinary studies specifically in English pronunciation teaching, which has distinct challenges and requirements. There is limited investigation into the direct impact of ICT integration on pronunciation learning outcomes, and while the necessity of ICT training is widely acknowledged, identifying effective professional development for lecturers teaching pronunciation remains underexplored.

Furthermore, there is a lack of longitudinal studies examining the long-term effects of ICT training on teaching practices and student outcomes in pronunciation. The role of cultural and institutional factors in ICT integration is also not sufficiently explored, necessitating research on how these factors influence the adoption and effective use of technology in pronunciation teaching within Jordanian universities.

### Facilitators to Overcome Teachers' Barriers to Technology-Integrated Instruction

Identifying the facilitators of ICT integration in education requires a systematic analysis of existing research. Access to ICT resources is a crucial factor influencing the successful implementation of technology into teaching practices. Studies by Alt (2018), and Lawrence and Tar (2018) emphasized the importance of adequate infrastructure and resources as necessary conditions for effective ICT integration in educational settings. However, despite the recognized significance of access, gaps remain in understanding the specific challenges and solutions in various educational settings.

ICT training is another crucial element in empowering educators to effectively integrate technology into their teaching. Alabadi (2019) recommended reforming university teachers' training to include ICT integration, emphasizing the importance of professional development programs. Al-Madani and Allaafajiy (2014) suggested options such as exchange programs with foreign higher education institutions. Muhametjanova and Cagiltay (2016) highlighted the importance of creating supportive environments and providing in-service training to enhance teachers' ability and confidence in ICT integration.

Technical support and maintenance are essential facilitators, as demonstrated by studies such as Bingimlas (2009), and Almerich et al. (2024). These studies emphasized the importance of training and support, but further exploration is needed to determine the most effective methods for addressing the diverse needs of educators. Addressing time constraints is crucial for overcoming barriers to technology-integrated instruction. Ghavifekr and Rosdy (2015) suggested that schools should allocate more time for teachers, while Racheva and Peytcheva-Forsyth (2024) advocated for flexible teaching schedules and collaboration among educators. However, there is still a gap in understanding how institutional policies and practices can effectively address time constraints and promote sustainable ICT integration.

Developing effective technological strategies is essential for facilitating seamless ICT incorporation. McGee and Diaz (2007) stressed the importance of proactive planning to minimize troubleshooting and challenges, while Goktas et al. (2009) highlighted the need for comprehensive technological strategies. Following the recommendation of Caena and Redecker (2019), lecturers are essential in organizing these programs. However, there is a lack of consensus on the most effective strategies for implementing such plans, indicating a need for further research and practical guidance in this area. It is crucial to foster positive attitudes towards technology among educators in order to promote ICT integration in education.

Studies by Akram et al. (2022), and Rahimi and Yadollahi (2011) demonstrated that positive attitudes significantly enhance instructional practices and student motivation. Bordbar (2010), and Dragon et al. (2012) further emphasized the importance of increasing teachers' competence in technology use to cultivate positive attitudes towards ICT integration. However, more research is needed to explore effective strategies for promoting positive attitudes and fostering educators' confidence in using technology to teach and learn.

In conclusion, a systematic analysis of existing research on barriers and facilitators to ICT integration in education reveals several relevant factors, including access to resources, ICT training, technical support, time constraints, technological planning, and attitudes towards technology. In the context of Jordan, the unique linguistic challenges faced by students learning English pronunciation due to fundamental differences between the Arabic and English phonetic systems and the insufficient emphasis on pronunciation in classroom settings further complicate ICT integration. Although these factors have been extensively studied, there are gaps in understanding the specific challenges and effective solutions in various educational settings. Addressing these gaps is crucial for informing policy and practice and promoting sustainable ICT integration in education, ultimately enhancing language proficiency and communication skills among Jordanians.

### **Purpose of the Study**

Despite the widespread use of ICT in university classrooms, many lecturers still feel inadequately prepared to fully utilize technology for instructional purposes (Livingston & Flores, 2017). The decision to incorporate technological tools into teaching practices is multifaceted and influenced by various factors (Klein et al., 2019). Over the past few decades, ICT has been recognized as a potential tool for enhancing educational opportunities, with the potential to enhance access, relevance, and quality of education (Das, 2019).

The perceptions of university lecturers and students regarding the obstacles they encounter is crucial for providing them with adequate professional training and support (Hammack & Ivey, 2019). Louws et al. (2017) anticipated that teachers with diverse teaching experiences may have different preferences for learning and professional development. Thus, a comprehensive examination of teachers' perceptions regarding the obstacles to integrating ICT is necessary, given the ongoing challenge of effectively integrating pedagogical strategies with technology to enhance learning outcomes (Looi et al., 2015).

Consequently, this study seeks to explore the perceptions of university lecturers and students regarding the barriers and facilitators to incorporating ICT into English pronunciation teaching and learning, thus contributing to a more nuanced understanding of ICT integration in this specific domain. Our study builds upon the foundational work of researchers like Livingston and Flores (2017), and Klein et al. (2019), who explored general ICT integration in education.

However, our study extends this research by narrowing the focus to English pronunciation instruction. This specific area has been underexplored in previous studies, which often address ICT use in broader contexts without delving into subject-specific applications. Prior research often addresses ICT use in broader contexts without delving into subject-specific applications.

By targeting the integration of technology in teaching English pronunciation, our study uncovers unique barriers and facilitators not apparent in broader studies. By investigating the specific perceptions of both lecturers and students, we offer a comprehensive view of the challenges and opportunities unique to pronunciation teaching, a dual perspective rare in existing literature, which often focuses on either teachers or students but not both.

The findings will aid in designing targeted professional development programs and support mechanisms specifically for English language instructors, and these insights can be generalized to other specialized areas, providing a template for future studies in similarly niche areas.

### **Research Questions**

- Q1** What are the perceived barriers to integrating technology in English pronunciation teaching and learning, as identified by university lecturers and students?

- Q2** What specific factors do university lecturers and students perceive as facilitators in the integration of technology into English pronunciation teaching and learning?

## METHODOLOGY

### Participants

The focus group interviews were conducted by three university lecturers, all females, who were members of the Department of Pharmacy at a Jordanian government university. These lecturers had varying levels of experience, ranging from 3 to 10 years, in teaching, technology-integrated teaching, and mobile-integrated teaching. The lecturers were chosen based on specific criteria, including their years of experience and their involvement in courses supported by ICT instruction. The recruitment process involved sending invitations to all eligible lecturers in the Department of Pharmacy, and those who expressed willingness to participate were selected.

Regarding the students, a total of six focus groups, comprising both male and female participants, were involved in the interviews. These students were enrolled in various classes and academic years within the Faculty of Pharmacy, with ages ranging from 20 to 23 years. The selection of student participants aimed to ensure a representative sample of the broader student population. The recruitment process employed random sampling from different classes and academic years to capture a variety of perspectives. Efforts were made to include students with diverse gender representation, varying levels of academic performance, and different degrees of familiarity with ICT tools. Invitations were sent out, and students who met the selection criteria and consented to participate were included in the focus groups. Both lecturers and students were informed about the voluntary nature of their participation, with assurances of confidentiality and the right to withdraw at any time. Anonymity was maintained throughout the study to protect the identities of the participants.

### Data Collection from the Focus Group Interviews

A series of focus group interviews were conducted involving three lecturers and six student focus groups. These interviews were conducted without strict time limitations, typically lasting between 50 to 60 minutes each. All interviews were conducted in English, which is the primary source of instruction for the lecturers. Each interview session was recorded audio-recorded and then transcribed in full. However, Arabic is the native language of the lecturers.

These verbatim transcripts from both the lecturer and student interviews were then analyzed to explore their perceptions regarding barriers and facilitators related to the integration of ICT in teaching and learning English pronunciation. The interviews were conducted based on the research questions guiding the study. The questions were designed to provide a detailed overview of participants' experiences, perceptions, and suggestions for improvement. Below are the lecturers' questions during the focus group discussions:

1. What is your experience with integrating ICT into your English pronunciation teaching?
2. What obstacles have you encountered when using ICT for teaching English pronunciation?
3. How do you think these obstacles could be overcome?
4. What factors have contributed to your use of ICT in educating pronunciation?
5. How do you observe the impact of ICT on your students' pronunciation?
6. What kinds of support or resources would help you better integrate ICT into your teaching?

Regarding questions for students. They are as follows:

1. Can you share your experiences with using ICT in learning English pronunciation?
2. What difficulties have you encountered when using ICT for pronunciation?
3. How do you think these difficulties could be resolved?
4. Are there any specific tools or resources that have helped you improve your pronunciation using ICT?
5. How has the use of ICT affected your learning in pronunciation classes?
6. What strategies do you employ to improve the use of ICT in pronunciation instruction?

### Data Analysis

The qualitative data analysis approach employed in this research study is a systematic process of thematic analysis using a combination of pre-determined and emergent codes, compatible with the project's interpretative theoretical perspective (Braun & Clarke, 2006). Thematic analysis was chosen for its ability to compress large volumes of original data to examine underlying concepts, providing a "rich and detailed, yet comprehensive account of data" (Braun & Clarke, 2006, p. 5). The analysis began with the transcription of audio-recorded interviews, followed by multiple readings to inform the researchers of the content. The initial codes were based on pre-determined categories and emerging patterns, which were then grouped into potential themes. These themes were analyzed, refined, and clearly defined to ensure they accurately represented the data. A coherent narrative was then developed, combining the themes to provide the results in a structured and meaningful manner. In order to ensure trustworthiness and credibility, multiple researchers independently compiled the data, and discrepancies were resolved through consensus. Member checking was conducted by providing participants with summaries of the findings for verification, and a detailed audit trail documented the coding decisions and theme development. The study adhered to rigorous ethical standards,

including obtaining informed consent, ensuring confidentiality by anonymizing participants' identities, securing data storage, and informing participants of their right to withdraw from the study at any time. The interview questions were intended to be non-invasive and respectful, minimizing any potential risks to participants.

## FINDINGS

### ICT Integration Barriers Hindering Pronunciation Teaching and Learning Practices

The thematic analysis of focus group discussions with university lecturers and students revealed several distinct obstacles to the effective implementation of ICT in English pronunciation teaching and learning at the tertiary level. These obstacles create a multitude of challenges, resulting in the seamless integration of ICT tools and resources into pedagogical activities. The interpretation of these barriers highlights critical obstacles encountered by educators in utilizing technology to enhance pronunciation instruction.

**Barrier 1: Challenges of ICT access:** Among the identified barriers is the issue of inadequate access to necessary technological infrastructure and resources. Lecturers emphasized the difficulty of updating computers and the absence of subscriptions to essential technological platforms as significant challenges. The unavailability of these resources hinders the effective utilization of ICT tools, thus hindering innovative approaches to pronunciation instruction. One lecturer highlighted the challenge, stating:

Lack of resources first of all, and then some websites or some technological sites need subscription, as the case of Rose Medical pronunciation coach, and we do not have that, and this is a big problem when teaching English pronunciation. (UL3)

UL5 identified limited computer availability and unstable internet connections as major barriers to ICT utilisation in pronunciation teaching, impacting access to online resources.

**Barrier 2: Lack of effective and useful ICT training:** The lack of effective and relevant ICT training for pronunciation teaching was a significant obstacle that lecturers identified. UL2 emphasized the difficulty of insufficient training courses, which were optional and had low participation rates, stating that making these courses mandatory for all lecturers could address this. UL3 highlighted the inadequacy of current ICT workshops, suggesting a need for more tailored and advanced training that specifically meets the requirements of lecturers in pronunciation. These workshops should focus on providing the latest and most effective technology tools and techniques to enhance their pronunciation teaching. UL3 expressed this sentiment, stating:

In fact, there are limited ICT training courses at the university. They taught us how to establish accounts on Google Scholar and Research Gate, how to create links, and how to set up accounts, but we do not need something like this... We need something new.

**Barrier 3: Class size roadblock:** A large class size was also recognized as a barrier to the effective implementation of ICT in pronunciation teaching. UL3 emphasised the difficulties of managing a large class, providing individual feedback, and maintaining quality education. The need for manageable class sizes was highlighted to ensure students receive individual attention and feedback, which is crucial for effective English pronunciation practice:

One of the obstacles that I encountered was the high number of students in my class. I have 149 students, and if I want to speak with every student, I will not finish, as we have a lecturer in the first semester who will teach 380 students, so how can we evaluate all of these students. (UL3)

UL5 echoed UL3's concerns regarding the difficulties encountered by large class sizes in integrating ICT into pronunciation teaching. She emphasized the difficulty of evaluating and providing feedback to a large number of students in different areas. UL5 advocated for the reduction of class sizes to effectively integrate ICT tools and resources. She believed that smaller class sizes would enable lecturers to provide individualised attention and support, which are essential for successful ICT integration in pronunciation teaching.

**Barrier 4: Lack of time and high workload:** Insufficient time and a considerable amount of effort emerged as key obstacles to the effective use and acceptance of ICT tools in English pronunciation teaching. Lecturers expressed a lack of time to learn and master the diverse range of technologies used in tertiary education, as well as their current teaching duties. The lack of available technologies contributed to the perceived burden on their already overcrowded schedules. Some interviewees pointed out the time-consuming nature of familiarizing themselves with these pronunciation tools through hands-on experience, while UL2 criticized the inadequate time allocated for dedicated ICT training, stating:

The most common constraints that I encountered were time constraints and student level constraints. The time of the lecture was too short to the extent that we were unable to do some extracurricular activities with students. (UL2)

UL3 stated that the integration of ICT tools in pronunciation teaching posed a significant challenge, as she was able to incorporate the tools only to a certain extent within the 4-month teaching period after the TRIPLE E workshop. She indicated that using these tools required more time and effort than traditional methods, as it involved extra planning and preparation for lessons. Similarly, UL5 emphasised the limited time available for university lecturers, which made it difficult to effectively incorporate ICT tools and resources into pronunciation teaching. Furthermore, the reliance on the curriculum further hindered lecturers' ability



to provide comprehensive instructions for using pronunciation tools and resources effectively. Despite these challenges, it is important to note that both UL3 and UL5 recognized the potential benefits of using ICT tools in pronunciation teaching. They acknowledged that these tools could enhance the learning experience and enhance students' pronunciation abilities. However, time constraints and workload pressures caused significant difficulties to their consistent integration.

**Barrier 5: Students' attitudes and low ICT skills:** Students' attitudes and low levels of ICT skills were identified as significant obstacles to the integration of ICT in pronunciation teaching. UL3 emphasized that students' pronunciation level and lack of motivation hindered the effective implementation of ICT in pronunciation teaching. These obstacles may be attributed to students feeling overwhelmed by technology, finding it difficult to use, or not recognizing its value in their pronunciation learning. She said:

One of the barriers that I encountered was students' levels. Students do not have the willingness to learn by themselves. They are not enthusiastic about learning pronunciation. They have a lack of interest in the subject and a belief that pronunciation is not important. (UL3)

UL2 reported that students' low proficiency in using technology, particularly with websites, resulted in a significant obstacle to effective integration. These factors contribute to negative attitudes, a lack of motivation, and difficulties in engaging with technology, hindering lecturers from incorporating ICT into their pronunciation practice.

### Student Barriers to Learning English Pronunciation with ICT Tools

When considering the barriers faced by university students in learning English pronunciation and integrating ICT tools, three main challenges emerged from their perspectives:

**Barrier 1: Limited accessibility or poor network connection:** The university students shared common concerns regarding technological constraints that hindered the effective implementation of ICT tools in pronunciation learning. The major issues they encountered included limited accessibility and poor internet connection, both in classrooms and at home, which hindered their access to online resources and made the learning process difficult. It is essential to provide adequate and affordable internet facilities to ensure successful ICT integration in pronunciation learning. Although the department provided some technology, students had varying perceptions of accessibility. Specifically, students in FG 4 and 5 frequently cited unstable internet connections as a significant obstacle to learning English pronunciation, both inside and outside the classroom.

US2 in FG5 highlighted the fact that the issue of poor internet connectivity is not unique to a single student but rather a common problem faced by many students, especially those who do not have access to fibre internet at home.

Yes, as you are aware of the situation in Jordan, some students may encounter internet connection problems [...] because not all students have fibre internet. The internet connection is too slow, and the audio keeps cutting out. It makes it difficult to hear the correct pronunciation. (US2 FG5)

US2 and US3 in FG3 and 4 raised issues regarding accessing the tools both inside and outside the university due to the lack of infrastructure and poor internet connection within the classroom setting.

I struggled with using the tools for pronunciation because my internet connection is very slow, and it takes time to load the videos and hear the correct pronunciation even though we paid for this" (US2). "The new pronunciation tools are great resources for learning, but the internet connection is always an issue, even though it is a part of our tuition fees and we paid for that, but we do not have internet. (US2)

**Barrier 2: Inconsistent integration of ICT in assessment:** The comments made by US1, US2, and US4 in FG 5 highlighted the issues and difficulties that university students are facing with the integration of ICT tools in pronunciation learning assessments. They expressed dissatisfaction with the inconsistent integration of ICT tools by their lecturers and the lack of emphasis on pronunciation in the assessment process. They also highlighted the use of assessment methods, such as multiple-choice questions, that do not effectively measure or enhance their pronunciation skills. These responses indicate a desire for more structured and comprehensive assessment practices that align with students' desired outcomes in pronunciation learning. The feedback suggests that the lecturers' implementation of assessments using ICT tools may not have fully addressed the students' concerns and expectations regarding pronunciation assessment. It is evident that students value the incorporation of ICT tools but seek more consistent integration and meaningful assessment methods that actively engage them in developing their pronunciation skills. The following are their responses:

Yes, there are some barriers, as pronunciation is not included in our assessment. It is challenging to know if I am making improvements in this area without formal feedback. (US1, FG 5)

I feel like there is not enough attention given to pronunciation during the assessment process. I know that I need to work on my pronunciation, but it is not a priority in the class. (US2, FG5)

Some teachers use multiple choice questions, and we just choose the correct answer without learning any pronunciation. We need to use more tools in pronunciation learning. (US4, FG5)

**Barrier 3: Lack of time and high workload:** Insufficient time and a high workload emerged as major barriers to incorporating pronunciation apps and learning tools for university students. They found it challenging to allocate time for using new tools amidst

their academic commitments, hindering their progress in pronunciation improvement. To further illustrate this issue, the following quotes from participants were shared:

Yes, lack of time, as when I use my mobile phone for studying, it takes a lot of time using these tools to check for pronunciation in the medical field. It can be tough to find a spare moment to try out new tools and incorporate them into my study routine. (US2, FG3)

They are great tools for pronunciation learning, but the problem is that we do not have enough time to use these tools. I am often limited by time. Time is always a limiting factor. (US4, FG5)

Addressing these barriers requires strategic interventions to enhance technological accessibility, streamline assessment practices, and mitigate time constraints, fostering an environment conducive to the seamless integration of ICT tools for pronunciation enhancement.

### ICT Integration Solutions to Enhance Pronunciation Teaching and Learning Practices

University lecturers and students have identified several solutions to enhance the integration of ICT in pronunciation teaching. University lecturers have proposed four solutions based on their focus group discussions, while students have suggested seven solutions. Below are the solutions proposed by university lecturer:

**Solution 1: Leadership support and lecturers' effort:** Leadership support and lecturer effort are indeed crucial for the successful integration of ICT tools into pronunciation teaching. This solution is justified in recognizing that significant change in ICT integration cannot occur unless there is a strong push from university leadership and a willingness among lecturers to embrace change. Without leadership support, including the provision of necessary resources, training, and assessment practices, the successful integration of ICT tools into pronunciation teaching becomes challenging. Similarly, lecturers need to be open to adopting new teaching methods and technologies, with their perspectives and input valued in decision-making processes. By emphasizing the importance of leadership support and lecturer effort, this section highlights the critical role they play in driving effective ICT integration. Their collaboration and commitment are essential for bringing about meaningful changes in pronunciation teaching practices. The support from university leadership and IT departments encompasses various aspects, including providing necessary resources such as computers, tablets, software, and a stable Wi-Fi connection, offering ICT training courses, and establishing appropriate assessment practices. Lecturers emphasized the value of support from university leadership, highlighting the need for their perspectives to be considered, encouragement to integrate ICT, and enjoyment of teaching with technology.

For instance, UL2 suggested implementing professional development-based competitions and rewards to motivate student engagement:

We need the university to provide classes with more computers and tablets connected with Wi-Fi connection to give the ability to students to use their smart devices or mobile phones to look for new knowledge and pronunciation through using the new technological tools that we put on e-learning.

UL3 highlighted the vital role of the IT department and university leadership in providing technical assistance for ICT tools in pronunciation teaching. The availability of equipment, software, and resources without barriers is essential for seamless integration. UL3 stressed the importance of prompt maintenance and troubleshooting to prevent disruptions in the teaching and learning process:

The IT department and university leadership must ensure that we have the necessary technical assistance and prompt maintenance to avoid any disruptions in our teaching and learning process.

UL5 emphasized the crucial role of individual lecturers in integrating ICT tools into pronunciation teaching. This includes designing meaningful activities that leverage technology, fostering independent student exploration through the use of ICT tools, and seeking support from relevant departments, such as the IT department, for technical assistance and software access.

The university should equip classrooms with more technological resources, including computers and tablets with reliable Wi-Fi, enabling students to use their devices to explore pronunciation tools we introduce through e-learning.

**Solution 2: Accessible and affordable ICT tools:** Accessible and affordable ICT tools are crucial for successful technology integration in pronunciation teaching. University lecturers stressed the importance of easy access to a range of affordable tools to create an engaging learning environment.

UL2 and UL3 highlighted the usability and availability of these tools as key factors in effective pronunciation teaching, enhancing student engagement, and facilitating learning. UL2 mentioned the effectiveness of simple, free tools:

Yes, to enhance ICT integration when teaching and learning English pronunciation inside and beyond the borders of the classroom, the most effective and easiest way was to use simple tools for students, such as YouGlish and other websites that needed subscriptions, but they did not like that one because they needed something free of charge" (UL2)

Similarly, UL3 noted the preference of students for free tools, particularly in specialized fields:

Students are not willing to pay for websites; they are looking for free tools that enhance their pronunciation in the medical field. (UL3)

UL5 emphasized the necessity of a reliable and high-speed internet connection to avoid disruptions and the importance of having a budget for paid websites. She suggested ensuring the tools can be downloaded and used on mobile phones or laptops:

The university should ensure that tools are accessible on mobile phones or laptops, providing flexibility for students to access pronunciation resources on various devices, especially when laptops are not readily available. (UL5)

**Solution 3: Providing basic ICT training courses for students:** Providing basic ICT training courses for students is another crucial solution that can enhance their integration of pronunciation tools in the learning process. Lecturers highlighted the importance of effective ICT training courses, especially for students lacking proficiency in this area.

For instance, UL2 and UL5 recommended at least two training courses to enhance students' ICT skills and achieve the minimum level of proficiency required for using technology effectively in pronunciation teaching and learning.

UL2 suggested a combined obligatory course that addresses both ICT skills and pronunciation teaching, specifically targeting students who lack basic technological proficiency:

There should be a compulsory course that combines both ICT skills and pronunciation teaching, aimed particularly at those students who struggle with basic technology skills. This will ensure they are not left behind in their learning process. (UL2)

Similarly, UL3 stressed the significance of mandatory ICT courses for all students, focusing on fundamental skills and knowledge before they commence their majors:

Before students start their major courses, it is essential they complete mandatory ICT training. This will equip them with the necessary skills to utilize technology effectively in their studies, including pronunciation learning. (UL3)

Although some students are heavy users of technology, it is evident from the lecturers' perceptions how much students need to be trained in terms of technology literacy. UL5 highlighted the gap in students' digital skills and emphasized the need for targeted training:

We often assume students are tech-savvy, but many lack the foundational skills needed for academic purposes. Mandatory ICT training will bridge this gap and ensure all students can benefit from digital tools in their learning. (UL5)

It is suggested that while digital skills are important, they should not be the sole focus of educational programs. Instead, a holistic approach that considers both digital skills and pronunciation learning should be adopted to ensure students receive a well-rounded education. This approach will help students to not only become proficient in using technology but also to apply these skills effectively in their pronunciation learning.

**Solution 4: Consistent integration of ICT in assessment and curriculum:** University lecturers highlighted the importance of standardization in ICT integration for pronunciation teaching. This involves applying consistent standards and evaluation methods to ensure a structured and objective learning experience.

For instance, UL2 emphasized the necessity of a unified evaluation method and accent, assessing all students with the same criteria and standards:

Yes, to enhance ICT integration, all the staff should apply the same standards and the same evaluation for pronunciation; the way of evaluation should be unified for all students and the accent used in the classroom. (UL2)

UL3 suggested maximizing the use of e-learning tools to enhance extracurricular activities for students when learning English pronunciation. This approach would ensure that students have continuous access to pronunciation practice beyond the classroom, promoting a more comprehensive learning experience:

We should maximize the use of e-learning tools to provide students with opportunities to practice pronunciation beyond the classroom. This will help them to improve their skills through continuous learning activities. (UL3)

UL5 emphasized the need for consistent integration of ICT tools in assessment and curriculum to enhance students' proficiency in pronunciation learning. A continuous approach is recommended to ensure students are well-equipped to utilize ICT effectively:

It is crucial to consistently integrate ICT tools into both assessment and curriculum. This will not only improve students' pronunciation skills but also ensure they are adept at using technology in their learning. (UL5)

### Regarding Solutions to ICT Integration as Perceived by University Students, They Proposed Seven Solutions

**Solution 1: The importance of university lecturers' support:** Most participants perceived the support they received from their lecturers as crucial for ICT integration in pronunciation learning. This support encompasses assistance in accessing technology resources, providing guidance on using new tools, and fostering a conducive learning environment.



US3 in Focus Group 5 expressed the need for lecturers to provide assistance in accessing technology resources, even suggesting that lecturers could bring their own personal Wi-Fi to connect devices in the classroom. While this suggestion highlights the students' desire for a supportive learning environment, it might be impractical and place a financial burden on lecturers:

Yes, support from the teachers, as the teacher brings his personal Wi-Fi to connect our devices and guide us to use the new tools for pronunciation learning as we do not have an internet connection, even though we paid for that, but I have never seen an internet connection or connected my mobile phone. (US3)

US4 emphasized the benefits of standardizing the use of ICT tools, noting that this can enhance their pronunciation learning:

I hope all teachers meet and decide to use the same tools that my teacher used this semester for pronunciation. This can enhance our pronunciation learning performance in the medical field. (US4)

Similarly, US1 stressed that university lecturers should encourage students to use new ICT tools to enhance their pronunciation learning and provide them with the necessary guidance and support:

Lecturers should encourage us to use new ICT tools to improve our pronunciation and provide guidance on how to use these tools effectively. (US1)

These responses illustrate that students value the support and encouragement from their lecturers in integrating ICT tools for pronunciation learning. They see their lecturers as key facilitators in navigating and effectively utilizing these tools.

**Solution2: Integration of mobile devices in pronunciation learning:** Incorporating mobile devices into pronunciation learning has emerged as a popular solution among university students, providing them with greater access to technology and flexibility in their learning process. This approach is particularly relevant in regions like Jordan, where students face challenges such as unstable internet connections and limited resources, making mobile devices a crucial resource for their pronunciation learning journey. Mobile apps, available on tablets and smartphones, have become preferred tools for some students over traditional devices like laptops and PCs due to their convenience and accessibility.

US2 highlighted the importance of considering students' needs and preferences when selecting and implementing ICT tools, emphasizing the potential benefits of using mobile apps to enhance pronunciation learning:

Incorporating mobile devices into pronunciation learning offers flexibility, accessibility, and improved skills through practice and feedback. University lecturers can leverage this potential to enhance students' pronunciation studies and promote greater success.

**Solution 3: Importance of free ICT training courses for pronunciation learning:** Focus Group 4 (FG4) expressed a strong desire for free ICT training courses specifically tailored to pronunciation learning. They emphasized the need for training in using ICT tools effectively to enhance pronunciation improvement. This highlights the potential necessity for specialized workshops focusing on utilizing pronunciation apps and learning tools for pronunciation practice. The insight underscores the importance of moving beyond general ICT training to develop targeted programs that equip students with the skills and knowledge to effectively utilize technology for improving their pronunciation skills. Whether the responsibility of providing such training lies with individual lecturers or the university as a whole is a significant consideration that requires attention. Additionally, the alignment between students' interest in receiving free ICT training courses and lecturers' recognition of the lack of effective and relevant ICT training in pronunciation teaching is noteworthy.

US2 emphasized the importance of addressing students' needs and concerns regarding the integration of technology in pronunciation learning, highlighting the leadership's responsibility to provide effective training programs. They stated:

Yes, yes, you gave workshops for teachers, but as students, we need some ICT training courses that provide us with the ability to use these tools effectively and enhance our pronunciation studies. (US2)

US3, in the same group, suggested offering ICT training courses for learners during the vacation period between the two semester holidays.

US4 proposed the idea of providing private ICT training courses modeled after those found in Western universities, offering students a structured and comprehensive approach to developing their ICT skills for pronunciation learning. In summary, the emphasis placed by Focus Group 4 on ICT training courses underscores their significance in improving the integration of technology tools for pronunciation learning. While this perspective was prominent in FG4, it was not mentioned by other groups, suggesting variations in the perceived importance of such training across different student cohorts.

**Solution 4: Importance of reducing class sizes for effective ICT integration:** University students have proposed reducing class sizes as a solution to facilitate effective ICT integration in pronunciation learning, enabling better monitoring and support for students' progress and engagement with technology tools.

FG3, represented by US3, emphasized the need to minimize the number of students in the classroom to achieve this goal. Similarly, FG4, represented by US2 and US5, stressed the positive impact of reducing class sizes on enhancing the integration of technology in pronunciation learning.

Reducing class sizes could be a good solution for enhancing the new tools in pronunciation learning, as it would allow lecturers to give more attention to each student and provide more support for using technology. (US2, FG4)

Smaller class sizes could provide more opportunities for students to use technology for pronunciation learning and receive feedback from lecturers. (US5, FG4)

In summary, university students expressed concerns about large class sizes and highlighted them as a barrier to the effective integration of ICT tools in pronunciation learning. They emphasized the challenges of managing many students, providing individual feedback, and maintaining the quality of education. Recommending the reduction of class sizes as a solution aligns with their goal of facilitating effective ICT integration in pronunciation teaching. Both university lecturers and students share concerns about large class sizes hindering the integration of ICT tools. They recognize the importance of providing individualized attention and support to students for effective pronunciation practice. While the lecturers mentioned the need for manageable class sizes to ensure student engagement and feedback, the students echoed the same sentiment, emphasizing the difficulties of managing a large number of students in terms of individualized learning experiences.

**Solution 5: Importance of consistent integrating ICT tools into curriculum and assessment:** University students proposed incorporating ICT tools into the curriculum and assessment process to enhance their pronunciation skills. US2 and US3 emphasised the need for consistent and structured integration, including the use of oral assessments. US1 and US4 expressed a strong desire to continue using the new pronunciation apps and learning tools in their pronunciation learning. Below are some responses:

I hope all lecturers will meet and decide to use the same tools that my lecturer used this semester... I think this can enhance the integration of the new tools and our pronunciation learning. (US1, FG3)

If my assignments are submitted orally, then I will check to see how every word is pronounced using ICT tools, and then my direction will totally change as I will say to myself, I have to pronounce it correctly. (US3, FG3)

US2 (FG 4) suggested homework that promotes the use of new tools for pronunciation improvement. US5 (FG 3) advocated for including pronunciation in the curriculum and assessment, including final exams. US4 (FG 5) emphasised integrating ICT tools throughout the entire bachelor's degree study and incorporating pronunciation into the assessment criteria for increased motivation.

**Solution 6: Accessibility of ICT tools in pronunciation learning:** University students highlighted the accessibility and usefulness of ICT tools for pronunciation learning, expressing motivation and enthusiasm towards their integration. Specifically, US3 in FG3 emphasized the benefits of these tools in specialised fields like medicine, where accurate pronunciation of terminology is crucial. She highlighted how these tools have been valuable in helping students correctly pronounce challenging medical terms. Furthermore, students stressed the importance of choosing appropriate ICT tools for pronunciation learning, as the effectiveness of these tools greatly influences their progress. They emphasized the need for careful evaluation of tools, particularly in specialised fields like medicine, to maximize the learning experience.

For instance, US2 in FG3 and FG5 highlighted the superiority of YouGlish over other tools due to its focused approach without distractions. US2 in FG5 emphasized the benefits of YouGlish for self-assessment, repetition, reinforcement, and self-monitoring, indicating its practicality and functionality. Additionally, other students in FG5 acknowledged the usefulness of new tools like YouGlish and Rose Medical for providing feedback and facilitating pronunciation practice, especially in their respective fields of study. These responses underscore the potential of new pronunciation apps and learning tools to enhance university students' pronunciation skills. By providing valuable feedback, increasing motivation, and promoting active engagement, these tools contribute to improved pronunciation performance. Their integration into pronunciation teaching offers a practical solution to support students in developing accurate pronunciation skills both inside and outside the classroom.

**Solution 7: The desire for having a preparatory year programme and a course in pronunciation:** Most participants in the focus groups expressed a desire for a preparatory year programme and a dedicated course in pronunciation. US3 from FG 3 acknowledged the benefits of such programmes in enhancing pronunciation skills and stressed the importance of a holistic language learning approach that includes pronunciation courses to prepare students for academic success.

US1 and US2 from FG 5 expressed the importance of having a course dedicated solely to pronunciation, as they consider it a crucial aspect of language learning. They pointed out that a general English course may not provide sufficient attention to pronunciation, and therefore a more specialised course would be more effective in developing their skills, saying:

It is enough to have a course in English that focuses on the way of pronouncing words, not a general English course, from the 10th grade. (US1, level 5)

I think having a specific course dedicated to pronunciation would be very helpful. (US2, level 5)

The participants unanimously expressed their desire for the introduction of a preparatory year programme and pronunciation courses to enhance their pronunciation and English language skills. Recognising English as the medium of instruction, they emphasised the potential benefits of these programmes in providing a solid foundation and refining their pronunciation abilities. They emphasised the importance of specialised training and the positive impact it would have on their confidence, communication, and overall English proficiency. The participants firmly believed that the implementation of such programmes

would effectively address their pronunciation needs and contribute significantly to their success in English language learning. Below are some responses:

Even though we are in an Arabian university, and we speak Arabic, at least having something like a preparatory year programme that would be great and include some pronunciation courses. (US5, FG 4)

It is very important for the first year to have a preparatory year programme and a dedicated course in pronunciation would help us to feel more comfortable with the language and help communicate with teachers. (US5, FG 5)

In summary, students expressed the belief that the implementation of a preparatory year programme and dedicated pronunciation courses would have a positive impact on ICT integration and improve their pronunciation learning outcomes.

## DISCUSSIONS

This study contributes to the existing literature by examining the challenges and potential opportunities for integrating ICT tools into pronunciation teaching and learning at a Jordanian university. Building upon previous research, which has highlighted the importance of ICT in education (Al-Mamary, 2022; BECTA, 2004; Bingimlas, 2009; Mumtaz, 2000), our findings shed light on the specific barriers and solutions within the context of pronunciation instruction. Consistent with prior studies, our research identifies barriers such as limited accessibility, inadequate infrastructure, and insufficient training for both lecturers and students (Alabadi, 2019; Mumtaz, 2000; Suárez-Rodríguez et al., 2018). Additionally, large class sizes, high workloads, and inconsistent integration in assessments appear to be significant challenges, reflecting the findings from previous research (BECTA, 2004; Bingimlas, 2009; Galanouli & McNair, 2001).

However, our study also provides new insights by highlighting the importance of leadership support, ICT training, and consistent integration in curriculum and assessment as possible solutions. These findings suggest that the role of leadership in creating an environment conducive to ICT integration (Alghazo, 2020; Ghavifekr & Rosdy, 2015; Rani & Kant, 2016). Furthermore, our study highlights the importance of comprehensive professional development for both lecturers and students, aligning with previous research advocating for ongoing training and support (Adams, 2005; Alghazo, 2020; Zhao & Song, 2021). By addressing these barriers and leveraging these solutions, institutions can maximize the impact of ICT tools on student learning outcomes, as suggested by previous studies (Golanka et al., 2014; Hsu & Ching, 2019; Koehler & Mishra, 2009).

The theoretical implications of our findings contribute to several existing frameworks. Firstly, the Technology Acceptance Model (TAM) is extended by showing how leadership support and consistent ICT integration can influence both teachers' and students' acceptance of new technologies. Our findings suggest that leadership and systematic training can enhance perceived ease of use and perceived usefulness, which are central to TAM (Davis, 1989).

Secondly, the study provides insights into the framework of teacher beliefs and technology integration (Ertmer, 2005). By addressing both first-order barriers (e.g., resources, training) and second-order barriers (e.g., beliefs about teaching and learning), our research underscores the importance of shaping positive teacher beliefs about the efficacy of ICT tools in enhancing pronunciation skills. This is critical in transitioning from traditional teaching methods to technology-enhanced language instruction.

Thirdly, the research contributes to the theoretical discourse on student engagement in language learning. Our findings align with the Self-Determination Theory (Deci & Ryan, 2012) by demonstrating that ICT tools, when effectively integrated, can fulfill students' psychological needs for autonomy, competence, and relatedness. This can enhance intrinsic motivation and engagement in pronunciation learning, which are vital for achieving higher language proficiency.

Furthermore, the unique cultural, institutional, and educational context of Jordan significantly affects the barriers and facilitators identified in this study. Cultural factors, such as attitudes towards technology and language learning, contribute to the acceptance and effective use of ICT tools. Institutional factors, such as the availability of resources, administrative support, and existing infrastructure, also contribute to the integration process. The educational system's emphasis on traditional teaching methods over innovative approaches further complicates the adoption of ICT in pronunciation instruction.

For instance, in Jordan, there may be a stronger reliance on face-to-face instruction and a slower acceptance of digital learning tools due to cultural preferences and familiarity with conventional methods. Institutional constraints, such as limited funding for ICT infrastructure and professional development, exacerbate these challenges. Additionally, educational policies and curricula that do not prioritize technology integration hinder the seamless adoption of ICT tools in language learning.

These contextual factors must be considered when applying our findings to other settings. While the challenges and solutions identified may be applicable to other Middle Eastern countries with similar cultural and institutional characteristics, variations in local contexts necessitate tailored approaches. For example, countries with more advanced ICT infrastructure or different educational priorities might experience different barriers and facilitators. Therefore, further research should explore the specific contextual factors in various regions to develop more nuanced and effective strategies for ICT integration.

In summary, this study not only identifies practical barriers and solutions for ICT integration in pronunciation instruction but also situates these findings within broader theoretical frameworks and the specific context of Jordan. This highlights the conceptual significance of our work and offers a foundation for future research to build upon, ultimately contributing to the enhancement of English language proficiency and preparing students for success in a globalized, technology-driven world.

## IMPLICATIONS AND CONCLUSIONS

In conclusion, this study significantly advances our understanding of pronunciation instruction and learning by providing valuable insights into the challenges and potential remedies associated with incorporating ICT tools. Through a thorough examination of the landscape, we have uncovered the complex dynamics involved in leveraging technology to enhance pronunciation skills.

Our study illuminates the myriad issues faced by educators and learners when integrating ICT resources into pronunciation instruction, ranging from technological barriers to insufficient teacher preparation and resistance to change. Addressing these challenges is paramount to developing effective approaches for improving pronunciation teaching and learning outcomes.

Moreover, our findings present promising opportunities for overcoming these difficulties and maximizing the benefits of ICT integration. Institutions can foster an environment conducive to successful technology use in pronunciation education by surmounting obstacles, offering comprehensive training, and fostering collaboration among stakeholders. This entails not only technical support and infrastructure but also pedagogical guidance and a culture of innovation.

Comprehensive training is essential for empowering educators to effectively utilize technology in teaching pronunciation. Such training should encompass both technical skills and pedagogical concepts, equipping teachers with the necessary tools to enhance student learning outcomes through technology.

Furthermore, promoting collaboration among various stakeholders, including educators, school leaders, IT specialists, and curriculum designers, is crucial for effectively integrating ICT tools into pronunciation instruction and skill acquisition. By leveraging collective expertise, resources, and proven strategies, stakeholders can collaborate to overcome barriers and achieve significant improvements in educational practices.

Reflecting on the broader implications, the findings of this study contribute to the overarching goal of enhancing English language proficiency and preparing students for success in a globalized, technology-driven world. As English increasingly becomes the lingua franca of international communication, improving pronunciation is vital for effective global interactions and professional opportunities.

Researchers and educators play a pivotal role in driving innovation and change in language education. By continuously exploring and integrating advanced technological tools, they can push the boundaries of traditional teaching methods and create more dynamic, engaging, and effective learning environments. The importance of continued research and collaboration cannot be overstated, as it fosters the sharing of best practices, the development of new pedagogical strategies, and the identification of emerging challenges and solutions.

Ultimately, this study highlights the transformative potential of ICT tools in language education. By addressing the identified barriers and implementing the suggested solutions, educational institutions can significantly enhance pronunciation instruction, thereby contributing to the broader educational objective of preparing students to thrive in an interconnected, digital world. Continued research and collaboration in this area will be crucial to sustaining and advancing these gains, ensuring that language education keeps pace with technological advancements and evolving global demands.

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