APPLIED LINGUISTICS

The School of Psychological Sciences & Health

THE PERCEIVED IMPACT OF TRIPLE E-BASED TRAINING ON JORDANIAN UNIVERSITY LECTURERS' AND STUDENTS' PRONUNCIATION TEACHING AND LEARNING PRACTICES

A CASE STUDY OF A JORDANIAN UNIVERSITY

By

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In the Name of Allah, the Most Merciful and Compassionate

"He gives wisdom to whomever He wills. Whoever is given wisdom has been given much good. But none pays heed except those with insight." (Holy Quran 2:269)

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ABSTRACT

This PhD thesis comprises three phases. The first phase investigates the Technological Pedagogical Content Knowledge (TPACK) of Jordanian university lecturers, specifically their understanding of ICT and its effective utilisation in pronunciation instruction. The second phase investigates the perceived impact of TRIPLE E-based training on university lecturers' development of TPACK, with a focus on knowledge and practices related to pronunciation teaching and their influence on students' pronunciation learning. Furthermore, the third phase delves into the perspectives of both lecturers and students to identify barriers and solutions related to the integration of information and communication technology (ICT) in pronunciation teaching and learning.

Drawing on a theoretical framework of TPACK (Mishra & Koehler, 2006; Koehler & Mishra, 2009) and the TRIPLE E framework (Kolb, 2017), this story of development unfolds through a case-study narrative over a bounded timeframe of 10 months. The setting is a public university in the Hashemite Kingdom of Jordan, where the researcher conducted workshops with university lecturers, and six lecturers have been selected as cases to represent the story of developments and changes in practice occurring in line with the delivery and aftermath of this TRIPLE E training-based workshops.

This study used a mixed-method approach for data collection. To examine university lecturers' TPACK knowledge and their use of ICT in pronunciation teaching, 81 lecturers completed a questionnaire, and 12 participants took part in semi-structured interviews. Quantitative data from the questionnaire underwent statistical analysis, while qualitative insights from interviews were thematically analyzed. To evaluate the impact of TRIPLE E workshops, the study conducted 7 individual interviews, 6 classroom observations, and a group interview with 3 lecturers. Additionally, a questionnaire was distributed to 322 university students, and focus group discussions were held with 6 groups, each comprising 4 students. The study also explored barriers and solutions related to ICT integration in pronunciation teaching and learning through focus group discussions with three university lecturers in one group and six groups, each composed of four university students, with the qualitative data analyzed thematically.

The findings of this study showed challenges in the realms of TPACK knowledge and ICT tool accessibility. Approximately one-third of these lecturers expressed a lack of confidence in their ability to select ICT tools and effectively integrate the communicative approach within their teaching methodologies. Moreover, nearly half of the surveyed lecturers reported feelings of inadequacy when it came to the selection of proficient teaching strategies. Notably, the study did not identify any significant differences in these challenges based on gender or the level of teaching experience. Regarding ICT tool accessibility, differences between learning environments were evident. These lecturers enjoyed more extensive access to ICT tools within laboratory settings, in contrast to classroom settings. However, access to specific tools tailored for pronunciation instruction, such as dedicated pronunciation apps and learning tools,

remained limited. Notably, age and teaching experience appeared to influence the extent of access to hardware tools, with the latter cohort benefiting from greater accessibility.

In the context of the TRIPLE E workshops, anticipated benefits are focused on improving the teaching and learning of English pronunciation. These workshops have the potential to enhance lecturers' TPACK knowledge, leading to increased adoption of pronunciation apps and the implementation of student-centered instructional strategies, as opposed to a teacher-centered approach. These changes hold the promise of improving the effectiveness of pronunciation teaching and learning, particularly in the medical field.

Significant changes were noted in the lecturers' specific professional practice of using technology and instructional strategies in their pronunciation teaching. The study suggests that as technology becomes integrated into pronunciation teaching, there is an associated rethinking of practice in other skills or subjects. As such, this supports one of the central arguments for the development of TPACK, in that the introduction of technology to existing conceptualizations of Pedagogical Content Knowledge (PCK) (Shulman, 1986) has demanded that teachers question their existing pedagogy and lay the foundations for development in their practice as a whole (Mishra & Koehler, 2006).

This study illuminates the developmental journey of university lecturers and students, showcasing the enhancement of their TPACK competencies and pronunciation teaching practices, ultimately leading to improved pronunciation learning for their students. The findings contribute to the understanding, definition, and further exploration of pronunciation teaching practices in the digital age, particularly in higher education. By addressing barriers faced by lecturers and students and facilitators associated with ICT integration, this research sets the stage for future investigations in this area.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS & ABBREVIATIONS

1. **ICTs**: Information and Computer Technologies
2. **CALL**: Computer-Assisted Language Learning
3. **PCK**: Pedagogical Content Knowledge
4. **PPK**: Personal Practical Knowledge
5. **TPACK**: Technological Pedagogical Content Knowledge
6. **TK**: Technological Knowledge
7. **PK**: Pedagogical Knowledge
8. **CK**: Content Knowledge
9. **TPK**: Technological Pedagogical Knowledge
10. **TCK**: Technological Content Knowledge
11. **PCK**: Pedagogical Content Knowledge
12. **TRIPLE E**: Engagement, Enhancement, and Extension
13. **PD**: Professional Development
14. **CPD**: Continuous Professional Development
15. **CMC**: Computer-Mediated Communication
16. **ELF**: English as a Lingua Franca
17. **LFC**: Lingua Franca Core
18. **EMP**: English for Medical Purposes
19. **NNSs**: Non-native Speakers
20. **NSs**: Native Speakers
21. **ISTE**: The International Society for Technology in Education (ISTE) is the foremost organization for teaching technology in the classroom.
22. **RP**: Received Pronunciation
23. **GA**: General American

LIST OF TERMS

- **Pronunciation:** is a necessary part of speaking (oral communication). It involves making the correct sounds of a particular language as well as how the sounds are put together in the flow of speech (Boyer & Boyer, 2002). In this study, it is the students' pronunciation that consists of two components of pronunciation: segmental (sound segments) and suprasegmental (stress, intonation, rhythm).

- **EFL:** English as a Foreign Language is generally used to talk about teaching or learning English in a country where English is not the native language, like Jordan, Japan, Saudi Arabia, and Egypt. The language is spoken only inside the classroom, and speakers continue to speak their language when leaving the classroom (Weaver & Stephanie, 2022)

- **ESL**: English as a Second Language is generally used to talk about teaching or learning English in a country where English is the native language like the UK, America, Australia, and India. The language is spoken outside the classroom.

- **Engagement**: According to Kolb (2017), engagement considers how technology tools are helping the student focus on the learning goals and tasks. It is essential that engagement through technology is time on task, actively focused on learning goals, and allows students to participate in active social learning (co-use/co-engagement*)* (p. 30).

- **Enhancement**: Enhancement considers how technology tools help students develop an understanding of the learning goals that they could not otherwise have achieved…the technology supports co-use, active learning, differentiation, personalization, higher-level thinking skills, and real-world connections in ways that traditional tools could not." (Kolb, 2017, p. 31).

- **Extension:** Extension reflects how well technology creates a bridge between classroom learning and everyday lives. (Kolb, 2017, p. 31).

- **The impact of TRIPLE E workshops:**

According to the Cambridge Online Dictionary (2021), "impact" is defined as a powerful effect that something, especially something new, has on a situation or person" https://dictionary.cambridge.org/dictionary/english/impact?q=IMPACT. In other words, the impact of the TRIPLE E workshops is defined as the powerful effect of the TRIPLE E professional development workshops on university lecturers in Jordan. In this study, the impact is addressed from different aspects: (1) university lecturers' development of TPACK competency; and (2) their adoption of technological tools and instructional strategies in pronunciation teaching practices.

- **ISTE**: The International Society for Technology in Education (ISTE) is the foremost organization for teaching technology in the classroom (www.ISTE.org).

CHAPTER ONE
THE BEGINNING OF THE JOURNEY

1.1 INTRODUCTION

Technology innovation has an ongoing impact on current educational practices (Christensen & Knezek, 2017; Ertmer, 2005; Ross et al., 2010). With the emergence of new technologies, teachers have the opportunity to employ diverse pedagogical techniques that align with their learning goals (Diaz & Bontenbal, 2000; Koehler & Mishra, 2009). While some digital tools incorporate effective pedagogical strategies such as social collaboration, differentiation, and reflection, many tools lack such features (Kolb, 2020). Additionally, even when a tool includes sound pedagogical practices, teachers' support and instructional strategies used in conjunction with the tool remain fundamental components of effective learning with technology (Okojie et al., 2006).

Previous studies (e.g., Montrieux et al., 2015; Okojie et al., 2006) indicated that the type of tools chosen by instructors was not as essential as the instructional strategies developed by the teacher while using the tools. Instead of disregarding efficient teaching methodologies, teachers who use technology effectively can incorporate instructional strategies that enhance learning by leveraging digital resources (Kolb, 2020). Therefore, it is crucial for teachers to view Information and Communication Technology (ICT) as tools that can enhance students' engagement, communication, and collaboration, close achievement gaps, adapt work to individual learning styles, and provide an equitable learning environment (US Department of Education, 2017).

1.2 STATEMENT OF THE PROBLEM

There is a need to shift the focus from the tools used to the knowledge and skills taught or shared, as well as the delivery methods. Teaching has a long history and will continue to evolve alongside technological advancements. Laurillard, (2002) stated that while technology has been present in educational settings for some time, it has significantly transformed the teaching landscape, particularly in higher education. She emphasized that for technology-based devices to be effective, they must be complemented by suitable pedagogical methods. In essence, the effective use of technology in education hinges on the integration of appropriate teaching approaches. The emphasis on personal teaching philosophies, as described by Warschauer as early as 1996, has led to the exploration of new ways to use technology, not solely relying on the latest individual tools but rather adopting what Warschauer termed "personal pedagogies." Consequently, many teachers are incorporating technology into their lessons and designing activities with the goal of meeting objectives and enhancing student learning.

However, many of these efforts have not succeeded in ensuring successful and effective technology use. Frequently, language teachers evaluate the effectiveness of technology integration based on the amount of time the tool is used, rather than considering how the tool can support learning objectives (Kolb, 2017). Furthermore, many teachers enter the profession with limited or no classroom experience. As Bailey and Card (2009) pointed out, most university professors have never received professional development training in teaching or education. Additionally, Alghazo (2020) highlighted that a lack of knowledge of computer technology in pronunciation teaching and learning is one of the barriers to technology integration at the university level.

Indeed, effective teaching of English pronunciation involves a comprehensive consideration of multiple factors, including pedagogical strategies, materials, technology tools, methods of delivery, and learners' needs (Golonka et al., 2014; Freeman et al., 2015). Pedagogical strategies encompass the broader approaches and philosophies guiding teaching, influencing how educators plan and deliver lessons such as communicative approach, error correction, minimal pairs, and contrastive analysis. On the other hand, methods of delivery are the specific techniques and tools used to convey instructional content and engage students such as voice recording and tongue twisters. To successfully integrate technology in the classroom, language teachers must first establish clear learning objectives. They should then carefully select appropriate pedagogical strategies, which define their overall teaching approaches, and technological tools that align with these objectives, thus enhancing the learning process (Kolb, 2020).

To address the need for effective technology integration in pronunciation teaching and learning, this study focuses on the TRIPLE E framework. It consists of three key components: engagement, enhancement, and extension. These components serve as a practical tool to guide teachers in prioritizing learning over technology. The TRIPLE E framework was chosen for this study because it focuses on how technology meets the needs of language learners, evaluates both lesson plans and technological tools, searches for effective learning strategies built into both, and allows for pedagogical strategies to work with technological tools rather than looking at technological tools in isolation. By focusing on the learning goals and employing pedagogical strategies and tools that facilitate engagement, enhance understanding, and extend learning opportunities, teachers can create a learning-centered approach that maximizes the benefits of technology (Kolb, 2020). Implementing this framework

would be highly beneficial for university lecturers, ensuring that the integration of ICT and pedagogical strategies centered on tools is firmly rooted in learning goals and the principles of effective learning practices. Thus, this framework can help university lecturers go beyond merely using technological tools and encourages them to consider how these learning tools can support and enhance the overall learning experience for students.

Moreover, it is important to note that research on ICT tends to be concentrated in western countries, and there is a pressing need to expand our understanding and dissemination of ICT studies in developing countries, including those in the Middle East and North Africa region, including Jordan (Abuhmaid, 2008; Bekele & Menchaca, 2010). Given the increasing political and economic pressure in Jordan to leverage ICT for educational progress (Adaileh & Alshawawreh, 2021), it becomes crucial to gain a deeper understanding of the complexities surrounding ICT integration in higher education within these contexts.

By focusing on Jordan, this study aims to contribute to filling the gaps in the literature and provide valuable insights into effective ICT integration in pronunciation teaching and learning in an Arab Middle Eastern context. Further to this, it can shed light on the potential barriers, facilitators, and best practices that can inform educational policies and practices in Jordan and other similar contexts. By conducting this research in Jordan, it is anticipated that the findings will contribute to expanding our understanding of ICT integration beyond western contexts and promote the dissemination of research on effective technology integration in low-income countries.

Based on the researcher's personal experience of teaching general and medical English courses for over 10 years, it is evident that learners often struggle with English pronunciation when speaking. This issue arises due to the lack of emphasis on

pronunciation instruction in English language teaching classes, which tend to prioritize other language skills such as grammar, reading, and vocabulary (Alghazo, 2015). Specifically, pronunciation skills are frequently neglected in tertiary education, and there is limited attention given to teacher professional learning to support university lecturers in teaching English pronunciation for medical purposes. Compared to other language skills like reading, writing, vocabulary, listening, and grammar, pronunciation receives less focus and is often taught through traditional, book-based, and teacher-centered methods (Cucchiarin et al., 2012).

Importantly, the primary goal for most English Language Learners (ELLs) in the medical field is successful communication with other English speakers. However, the objective of pronunciation instruction should not be to make ELLs sound like native speakers but rather to enable them to master pronunciation that facilitates effective communication (Scarcella & Oxford, 1992). Unfortunately, ELLs do not receive sufficient effective pronunciation instruction to address their pronunciation errors, which can have potentially dangerous consequences in the medical field and may subject students to ridicule from their peers. This issue stems from university lecturers' limited training in pronunciation pedagogy and lack of familiarity with effective pronunciation teaching tools, leading to a lack of confidence in teaching English pronunciation and addressing students' pronunciation errors (Bai & Yuan, 2019; Couper, 2017).

1.3 MY JOURNEY IN TEACHING AND TECHNOLOGY

Throughout my educational journey across various academic levels, technology has consistently played a significant role from primary to postgraduate studies, even if it came slightly later than it does for today's "digital natives" (Prensky, 2001). When I

started primary school at the age of five, I was introduced to chalkboards and colour televisions. As I progressed through grammar school, computers came onto the scene, more suited to novelty and gaming than anything purposeful at this stage. Even when I reached Al-Albayt University as an English and literature major, everything was still handwritten—notes, assignments, and exams. I, too, as a student, wrote most of my work in notebooks and on scraps of paper stored in desk drawers.

After that, I started my career as an EFL teacher in secondary schools in Jordan for two years, where I strove to employ technology with my students. To compensate for the shortage of facilities in the school, I borrowed my uncle's laptop, being able to integrate ICT inside the classroom. Then, a new journey to Malaysia started, where I travelled across the oceans, undertook a postgraduate degree at Kaddeh UUM University, and chose Applied Linguistics as my main subject.

During lessons, I would take my university students out on the streets to create short films. We recorded videos in restaurants, where they played different roles such as waiters, waitresses, cashiers, and customers. They also went shopping, attempting to name as many of the items and sections as they could. Furthermore, I maximised the use of social media platforms as a way to keep students engaged and boost their learning environment, preventing boredom. The use of social media boosted students' vocabulary, enhanced their pronunciation accuracy, and raised their confidence in their capability to speak English through self-recorded videos, which they shared with other students.

And then, another journey started to Turkey, where I embarked on a full-time CELTA course, focusing on a combination of English language teaching, methods of teaching, and the use of technology. This course provided specific materials, giving my lessons a depth of substance and new ways of engaging students with the subject matter.

As an EFL and ESP lecturer, my motivation was to enhance students' learning goals, and I found a new sense of purpose and satisfaction in combining elements of language and discipline-specific work in an environment that aligned with that motivation.

Teaching EFL and ESP has given me a professional identity that I could be proud of and a craft that I could hone and develop. To do so might necessitate further knowledge, I felt, so I undertook doctoral studies at the University of Strathclyde. Now, coming to the end of a research journey that has lasted over three years, there are unforgettable memories of how I finished this thesis. Armed with my Dell laptop E5530, which I fixed more than three times and stored all the documentation on, I retreated to my parent's holiday home in a town called Almanshyah on the north side of Jordan. There, sitting in my room, I wrote, reflected, wrote, and reflected some more for several weeks. There too, less than 5 miles from where I first encountered chalkboards and color televisions, I reflected on the words of T.S. Eliot that:

" The end of all our exploring will be to arrive where we started and know the place for the first time" (1943, pp. 143–145).

1.4 RATIONALE OF THE STUDY

Based on the above literature review of the knowledge base of pronunciation teaching as well as of ICT integration, the use of technology in pronunciation teaching is not so much about the tools that are used but rather the knowledge and skills being taught and shared, and the pedagogy and strategies used to deliver them. Furthermore, given the limited number of studies investigating how university lecturers incorporate their course learning into ICT integration (e.g., Sifakis & Saugari, 2005; Saitos, 2011; Saito & Van Poeteren's, 2013; Jenkins, 2005), the case was made for the inclusion of observations as one of the data sources to supplement the survey and interview data.

Thus, a gap in the implementation of teacher education in CALL into pronunciation teaching, particularly in the context of higher education, which is the domain in which I am primarily interested, was identified.

Further to the above, the majority of research into the field of ICT integration into pronunciation teaching and learning in tertiary education has focused on western countries (e.g., the UK and USA), leaving a lack of knowledge and evidence in the Middle East context. Direct evidence from Jordan is also limited and tends to be very small scale, relying on only one or two data collection methods. Accordingly, Alghazo (2020) asserted in his recent study that urgent steps should be taken to offer training courses for both lecturers and students to develop their expertise in using computer technology for learning and teaching English pronunciation. Therefore, it is important to provide university lecturers with effective training and more time for practice so that they can more fluently and confidently embrace the potential of ICT tools in pronunciation teaching practices.

Therefore, the TRIPLE E framework was proposed to guide the CALL intervention conducted in the present study to understand ways of teaching pronunciation with technology that are not dependent upon the latest phase of individual tools but rather on what Warschauer, as early as 1996, described as personal philosophies of teaching, where pedagogy is at the centre. Kolb (2017) stated that the TRIPLE E rubrics will "…assist teachers to plan for technology use based on good instructional strategies" (p. 5).

1.5 AIMS AND RESEARCH QUESTIONS

Given the overall significance of pronunciation in the medical field and the lack of both empirical, classroom-based research on pronunciation teaching and learning and teacher training research in this area, the purpose of this mixed-methods case study is to

investigate the Technological Pedagogical and Content Knowledge (TPACK) of Jordanian university lecturers and their utilization of ICT in teaching English pronunciation at the university level. It also aims to examine how variables such as gender, teaching experience, age, and the knowledge (TK and PK) and frequency of using hardware and software tools impact the integration of ICT into their teaching practices. It also investigates the perceived impact of the TRIPLE E training-based workshops as the second phase of the study on both university lecturers and students in pronunciation teaching and learning through integrating ICT and instructional strategies that meet engagement, enhancement, and extension criteria into their pronunciation practices.

Further to this, this study casts another light on the barriers and facilitators of ICT integration in teaching English pronunciation as perceived by university lecturers and their students. Based on the research objectives outlined above, the following research questions have been formulated around the research requirements and needs. The research questions were arranged into three main categories, including the university lecturers' TPACK knowledge when teaching English pronunciation, the benefits of the TIPLE E workshops on both teachers and students, and barriers to and facilitators of ICT integration in pronunciation teaching and learning. The following are the research questions considered worthy of further investigation:

RQ1. What TPACK knowledge do Jordanian university lecturers have about ICT in teaching English pronunciation at the university level?

RQ2. What are the perceived impacts of the TRIPLE E workshops on university lecturers and students when teaching and learning English pronunciation?

RQ3. What do university lecturers and university students perceive as barriers and solutions to the integration of ICT in teaching and learning English pronunciation at the university level?

This is particularly salient in the context of pronunciation, which is considered a life and death matter in the health sciences since hundreds, if not thousands, of words and expressions are very similar but significantly different. For example, "hemoptysis" /hiːˈmɒptɪsɪs/ which means spitting or coughing up blood, is mispronounced as "haematemesis" /hiːməˈtɛmɪsɪs/ which means vomiting of blood as the result of a bleeding ulcer. Another example is "haemorrhage" /ˈhem(ə)rɪdʒ/ which means an occasion when blood flows out of an injured organ inside someone's body rather than out of their body through a cut in the skin, and "haemorrhoids" /ˈheməˌrɔɪdz/ which means painful swollen areas around your anus. Thus, poor pronunciation of medical terms and misunderstandings in emergencies can compromise care, causing longer waits, undue suffering, or even inappropriate treatment. Therefore, good pronunciation is crucial in the medical field, but it is often neglected in university teaching classrooms.

Further to the above, many doctors and medical students move to different countries to take advantage of training and/or medical career opportunities. Telegraph columnist Allison Pearson claimed that "the UK's health service is the only one in the EU that is heavily dependent" on foreign clinical staff, as in March 2019, a percentage of 28% of doctors in English hospitals and community health services were foreign nationals (Fullfacts, 2019). The number of foreign nationals in English- native-speaking countries could be higher, like in New Zealand (42.4%), Ireland (42.3%), Australia (32.1%), the United States (25.0%), and Canada (24.0%) (Statista, 2020). Hence, if a medical professional need to speak English at work, it is indispensable that he or she acquire knowledge of phonetics and phonology. This might prevent him or her from

putting patients at risk and ultimately getting into trouble. Any problems with English pronunciation can negatively affect medical professionals' confidence and career opportunities. As a result of their poor English skills, European Union (EU) doctors have been banned from practicing medicine and treating British patients under new UK-wide plans (BBC, 2015.) Finally, medical professional staff and lecturers at Jordanian universities need English pronunciation coaching courses as the majority of them do not have enough knowledge, experience, skills, and training in teaching English pronunciation, and they do not seem to make effective use of technology due to insufficient software and hardware facilities and trainers.

Therefore, there is a pressing need for comprehensive coaching that is both thorough and targeted. This kind of training should include all components of English pronunciation, such as intonation, stress rhythm, connected speech, consonant sounds, and vowel sounds. This training will help university lecturers and give them the chance to master each component; the result will be clear and smooth pronunciation, correct use of stress and rhythm, improvement of listening skills, conversation skills, and self-awareness, and a good rate and volume of speaking. Thus, it is essential to mention that the use of technology in general and pronunciation software should be covered in training workshops for university lecturers since most English language classes do not provide enough effective pronunciation teaching. Consequently, many English language learners have an ongoing struggle with pronunciation errors. Thus, the integration of technology in teaching English pronunciation can increase students' and lecturers' confidence, enhance the quality of English pronunciation instruction, and eliminate all kinds of fear of not being able to pronounce English sounds, words, sentences, and phrases clearly and smoothly.

1.6 STRUCTURE OF THE THESIS

This thesis is organized into seven chapters, followed by references and appendices. Chapter One discusses the background of the study and introduces the research problem, my journey in teaching and learning and presents the rationale and aims of the study. In the subsequent chapter, Chapter Two, a comprehensive literature review is presented, delving into various aspects of pronunciation within the medical field. The chapter begins with an introductory overview, setting the stage for the subsequent exploration. It then discusses the significance of pronunciation in the medical domain, emphasising its crucial importance in healthcare settings. The chapter thoroughly examines pronunciation teaching and learning practices, which encompass the methods, techniques, and activities teachers use in the classroom for pronunciation instruction. These practices influence a teacher's educational philosophy, classroom atmosphere, and instructional approach. Furthermore, it delves into the necessity of specialised teacher training in pronunciation, particularly in the challenging context of the medical field. Additionally, the chapter explores pronunciation approaches, techniques, and strategies used by university lecturers, finely tuned to enhance content delivery, classroom management, and student engagement. These strategies are adaptable to students' needs, learning objectives, and available resources. Lastly, the chapter considers models of technology integration, examining potential obstacles and facilitators when incorporating ICT.

In Chapter Three, I provide details of the mixed-methods design that includes both quantitative and qualitative methods. This chapter describes the sampling process and introduces the participants. It also presents the TRIPLE E workshops and lists the materials used for data collection, along with the data collection procedures and methods used for data analysis. Additionally, the chapter discusses the ethical

considerations of the research in detail. Chapters Four to Six present the combined findings and discussions of this study.

Chapter Four presents the results of the questionnaires and interviews regarding the TPACK knowledge of university lecturers in teaching English pronunciation, followed by discussions and their relation to the literature. Chapter Five investigates the perceived impacts of the TRIPLE E training-based workshops on both university lecturers and students in terms of teaching and learning English pronunciation. It assesses and understands how these workshops have influenced and affected the lecturers and students in their ability to teach and learn English pronunciation effectively. The impact, in this case, may include changes in teaching practices, and improvements in pronunciation skills. The chapter presents the results of interviews, classroom observations, focus groups, and questionnaires in relation to the literature. Chapter Six delves into the perceived barriers and solutions as identified by university lecturers and students, as well as their relationship to the relevant literature. Chapter Seven provides an overarching discussion of the thesis findings, discusses the theoretical and pedagogical implications, outlines the limitations of this study, and suggests directions for further research.

CHAPTER TWO
LITERATURE REVIEW

2.1 OVERVIEW

This chapter delves into the literature that underpins and informs the genesis of this study, expanding on areas briefly touched upon in the previous chapter. The review traces my journey towards establishing a solid theoretical foundation for this study. I draw upon Kolb's TRIPLE E framework (2017) and Mishra and Koehler's TPACK (2006) framework to enhance the knowledge of university lecturers in pronunciation teaching practices in the classroom. Emphasis is placed on the significance of pronunciation as a crucial aspect in the medical field and the various teaching practices associated with it. Additionally, approaches, techniques, and strategies in teaching and learning English pronunciation, as well as the role of Computer-Assisted Language Learning (CALL) and Computer-Assisted Pronunciation Training (CAPT), are introduced. The review also encompasses theories and models of technology integration, including TAM, TIM, TPACK, SAMR, and the TRIPLE E framework, which provide guidance for professional development workshops targeting university lecturers. Moreover, barriers and enablers to the integration of ICT are discussed, aiming to provide university lecturers with access to ICT tools and technical support through adequate training.

2.2 PRONUNCIATION AS A LIFE AND DEATH MATTER IN THE MEDICAL FIELD

Medicine is one of the most important human activities, in which precise and accurate communication plays a significant role and its absence would lead to disastrous consequences. Specifically, poor communication is considered the leading cause of

medical errors, encompassing patient-physician communication, physician-physician communication, nurse-patient communication, physician-nurse communication, and communication between interacting healthcare organisations (Murphy & Dunn, 2010; Shahid & Thomas, 2018). Therefore, improving communication skills is essential in the medical field, as statistics indicate that 80% of serious medical errors result from miscommunication between caregivers (Joint Commission, 2018).

Accurate speech production, including the pronunciation and articulation of medical terminology, diagnosis, instructions, procedures, and drugs, is crucial for healthcare professionals (Cameron, 1998). Poor pronunciation can lead to miscommunication and serious consequences. It seems almost unbelievable, but according to Makary and Daniel (2016), medical errors could be the third leading cause of death in the USA, after heart disease and cancer. A recent study conducted by Johns Hopkins Medicine in San Francisco and eight other institutions in America asserted that more than 250,000 people die each year in the US due to medical errors, with other reports suggesting the number may be even higher, exceeding 440,000. Consequently, many researchers argue that improving communication skills among healthcare providers can reduce patient injuries from medical errors by 30%, with effective communication being a critical factor in providing safe patient care (Shahid and Thomas, 2018). A study by the Joint Commission (2018), which reviewed 936 sentinel events, revealed that miscommunication in the medical setting was the root cause of over 70% of serious medical errors.

In the case of Jordan, the use of English in the clinical setting is driven by the presence of medical staff from different countries who may not be Arabic speakers, despite the majority of Jordanians speaking Arabic. King Hussein Cancer Centre in Jordan, one of the leading cancer treatment centres in the Middle East, employs both

English and Arabic as the norm (Alsubaiai, 2019). From a socioeconomic perspective, proficiency in the English language is increasingly a prerequisite in the job market in Jordan and Saudi Arabia (Alsubaiai, 2019; Hamdan & Hatab, 2009), which further complicates teaching practices for students and educational institutions.

English is extensively used in the field of medicine, and the number of people interested in learning English for healthcare purposes has quadrupled. Consequently, educational institutions have developed specific programs to meet the growing needs of medical students in various countries around the world. According to a recent trustworthy media report, foreign experts constitute a significant portion of Saudi Arabia's healthcare workforce, with 66.6% of the 42,768 doctors serving in public hospitals across the Kingdom being expatriates (Alsubaiai, 2019). This trend of utilizing English in medical contexts and the presence of foreign medical professionals is a phenomenon observed in numerous countries worldwide. For example, the increased use of English for healthcare communication is a global trend. In many countries, the demand for English proficiency among healthcare professionals has risen due to diverse patient populations and international collaboration in medical research and practice (Molina and Kasper, 2019). While specific studies may vary by location, the overarching trend of English's significance in the healthcare field remains evident.

In Jordan, numerous international humanitarian and non-humanitarian organizations have entered the country's economic field. These organisations, which are run by international individuals for whom English serves as the medium of communication, require qualified applicants who have a strong command of the English language. This demand is further increased by the requirement for applicants to possess knowledge of the context and regional-related issues, such as the Syrian crisis, facilitate communication in both Arabic and English, and report on field activities to the

organisations. Medical professionals with insufficient English proficiency may miss out on significant benefits, such as higher salaries in international organisations, opportunities to work in Gulf countries and elsewhere, participation in medical training, seminars, workshops, and attendance at international medical events, as most of these events and communications are likely conducted in English.

According to Jordanian Medical Association (JMA) President Hashem Abu Hassan (2015), the desire to earn higher salaries and improve living standards is among the factors motivating Jordanian doctors to leave the Kingdom and seek employment elsewhere. Specialised, general, and consultant Jordanian doctors represent the primary need for hospitals in Gulf countries, and some of them pursue specialisation in certain medical fields in Europe, where a variety of medical jobs are available (Noghai, 2014). Therefore, for university students in the medical field to be successful, they need proper and effective instruction from university lecturers.

2.3 PRONUNCIATION TEACHING AND LEARNING PRACTICES

Pronunciation teaching and learning practices encompass a wide array of methods, techniques, and activities that teachers employ in the classroom for pronunciation instruction. These practices significantly shape a teacher's educational philosophy, influences the classroom atmosphere, and determine the instructional approach. They involve a diverse of elements, including lecture-based teaching, hands-on activities, technology use, classroom management, and assessment methods (Baker, 2014; Pennington, 2021).

Furthermore, it is important to note that pronunciation instruction has been shown to be effective in improving learners' speaking skills (Darcy, 2018; Derwing & Munro, 2015; Derwing et al., 1998; Lee et al., 2015; Levis, 2018) and plays a crucial role in developing their intelligibility (being easily understood), comprehensibility

(being easy to understand), and accuracy in the classroom setting (Gordon & Darcy, 2016; Gordon, 2021; Levis, 2018; Ruellot, 2011; Trofimovich et al., 2009). This instruction is particularly effective when ESL/EFL learners are explicitly aware of the linguistic features of the second language (L2) (Kennedy & Trofimovich, 2010), focusing on both segmental and suprasegmental features that enhance intelligibility (Hahn, 2004; Munro & Derwing, 2006). However, English pronunciation teaching has become a contentious issue and is often neglected compared to other skills in ESL/EFL classrooms (Derwing & Munro, 2005; Gilbert, 2010; Foote et al., 2016).

The conflict surrounding pronunciation teaching has primarily revolved around its effectiveness and how to teach it effectively (Saito, 2011). However, previous research on pronunciation teaching has not adequately explored teachers' cognition and practices, as teachers make instructional choices based on their own knowledge, beliefs, and attitudes (Buss, 2015; Yagiz, 2018). In light of this, Alghazo (2016) pointed out the lack of clear understanding of pronunciation teaching practices inside the classroom. Existing studies in this area heavily rely on teacher and student input, providing insights into what the teaching is like, but without proper classroom observation to explore how pronunciation instruction is actually conducted in different contexts worldwide.

Despite numerous assertions from authors and a wealth of research findings emphasising the importance of pronunciation in developing intelligibility, comprehensibility, and accuracy, it has often been neglected in second language (L2) classrooms. Those interested in teaching English pronunciation are well aware of what is referred to as "the Cinderella metaphor" (Levis, 2018). Pronunciation is said to suffer from "the Cinderella syndrome" or the "refined in silence" syndrome, indicating that it is commonly kept hidden from students and receives less attention compared to other aspects of language programmes (Celce-Murcia et al., 1996).

While some authors, such as McCrocklin (2015), Seyedabadi et al. (2015), and Marks and Leba (2011), continue to use this metaphor, alternative metaphors have also been employed to convey the same idea. For example, Gilbert (2010) considers pronunciation teaching an "orphan" and a "neglected aspect," while Seyedabadi et al. (2015) describe it as "the poor relation of the English language education world," and Moghaddam et al. (2012) liken it to "the lost ring of the chain." These metaphors highlight the perception that pronunciation is often treated poorly within the language-teaching community (Levis, 2018). This lack of focus on pronunciation teaching has caused it to fall behind other language skills. One possible explanation for this is the lack of suitable materials and methodologies for teaching and learning pronunciation (Darcy, 2018). Despite decades of research highlighting these issues, they continue to persist.

Further supporting the notion of pronunciation being neglected, a significant amount of previous research has relied on questionnaires and interviews as the primary methods for investigating teachers' perceptions of teaching English pronunciation. For instance, Macdonald (2002) conducted interviews with English language teachers who expressed reluctance to teach pronunciation due to the lack of institutional resources and expertise in evaluating and providing feedback on students' pronunciation skills. According to Darcy et al. (2012), teachers often find themselves without clear guidelines and faced with conflicting purposes and practices when it comes to pronunciation instruction. The lack of a well-established systematic approach to deciding what, when, and how to teach pronunciation is evident.

One common challenge is deciding whether to focus on segmental or suprasegmental aspects of pronunciation (Derwing et al., 1998; Jenner, 1989; Prator, 1971; Zielinski, 2008). Baker's study (2011) revealed that teachers who received

TESOL training with a pronunciation pedagogy course prioritised the teaching of suprasegmental features, such as stress, rhythm, and intonation, in their lessons. However, many of these teachers still lacked confidence in teaching other components of English pronunciation. Other researchers (e.g., Breitkreutz et al.,2001; Foote et al., 2013; Wahid & Sulong, 2013) found that some teachers in L2 classrooms primarily focused on segmental features like consonants and vowels, perceiving suprasegmental aspects as challenging to teach.

The literature acknowledges that pronunciation is widely recognised as one of the most challenging areas to teach for ESL/EFL instructors (Baker, 2011; Foote et al., 2011; Macdonald, 2002; Setter & Jenkins, 2005). Baker (2011) identified various reasons that hinder teachers from teaching pronunciation effectively, including a lack of confidence, the absence of a systematic approach to addressing pronunciation, and uncertainty about which aspects of pronunciation to teach and how to use textbooks and materials effectively in the classroom. Insufficient training in pronunciation during language teacher education programmes (Baker, 2014; Foote et al., 2011; Gilakjani, 2011; Murphy, 2014) exacerbates these complexities and challenges, leading to a lack of knowledge and low confidence among teachers.

Despite the reported significant improvements from various studies, Darcy (2018) asserts that pronunciation instruction continues to be undervalued in language programmes and teacher training curricula. In this field, intelligibility holds greater importance than achieving native-like pronunciation (Levis, 2018). Consequently, experts in the field have called for specialised training in pronunciation pedagogy within language teacher preparation programmes (Derwing & Munro, 2005; Foote et al., 2011; Foote et al., 2016; Henderson et al., 2015) to address the deficiency in English pronunciation instruction in language classrooms. However, few studies have examined

the impact of such training on teachers' knowledge and classroom practices (Burri & Baker, 2020). Therefore, it is essential for university lecturers at Jordanian universities to receive training that equips them with the necessary knowledge to effectively teach English pronunciation both inside and outside the classroom, considering that "adult English language learners are hungry for pronunciation instruction that helps them "crack the code" of speaking intelligible English" (Echelbergert et al., 2018, p. 214).

2.4 THE NEED FOR TEACHER TRAINING IN PRONUNCIATION

The importance of teaching and preparing EFL and ESL teachers in pronunciation teaching cannot be overstated since Alghazo (2020) asserted that L2 pronunciation is gaining growing interest and attention from authors and teachers in both ESL and EFL contexts. Its role in empowering the success of the whole teaching process leads to the increasing confidence and successful implementation of future generations that are skilled, educated, and culturally aware (Couper, 2017; Huensch, 2019). According to Darcy et al. (2021), a critical component for improving successful training is outlining clear principles for teaching English pronunciation. Thus, research has started to explore which methods and pedagogical choices work and why. For instance, studies of teacher cognition (Baker, 2014; Baker & Burri, 2016) highlighted the connection between teachers' use of pronunciation techniques and their training in pronunciation pedagogy; they also emphasised the fact that teachers wish for more training in pronunciation pedagogy. Thus, as stated by Gandara et al. (2005, p. 12), the more competent teachers feel, the more successfully they teach".

According to Avalos (2011), teachers' professional development is defined as 'teachers learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students' growth' (p. 10)."It is a complex process that requires both emotional and cognitive involvement, whether individually or in groups with other

teachers (Avalos, 2011). Consequently, teacher education programmes can be challenging, calling for new solutions to prepare EFL/ESL teachers as active meditators and constructors of knowledge to achieve their students' needs (Hüttner et al., 2011; Bayyurt & Sifakis, 2017). The first interest appeared in a ground-breaking collection published by well-known scholars (Richards & Nunan, 1990) in the field of TESOL (Teaching English to Speakers of Other Languages). This collection sparked lively debates about what should be at the centre of the knowledge base, or the experience and skills that second language teachers need to possess to be efficient and successful, and the answer to the question of why we should train them provides chances to polish their professional knowledge and abilities, which they can utilise in their classroom instruction to increase students' performance (Diefes-Dux, 2014; Timperley, 2011).

There is mounting evidence that teachers' professional learning in the form of workshops has maximum benefits in enhancing teachers' knowledge and classroom practices such as active learning opportunities (Borg & Al-Busaidi, 2012; Ekanayake & Wishart, 2015). According to Borg (2011), teachers' education has a significant impact on their beliefs and also appears to affect their content knowledge. Elçi et al. (2019) stated that professional development training compromises two parts: the individual part focuses on teachers' knowledge and skills in technology based on individual needs, while collaborative knowledge pushes teachers' knowledge beyond that knowledge towards the teachers' teams on the course or programme level. However, in the pedagogy of second or foreign language pronunciation, the lack of emphasis on pronunciation teaching is due to insufficient professional training (Foote et al., 2011; Macdonald, 2002), and many TESOL programmes do not provide professional training courses in pedagogical pronunciation (Murphy, 1997). According to Baker (2014), very few studies have investigated how EFL/ESL teachers' knowledge, experiences, and

interests enhance their teaching practices inside the classroom and how their knowledge can be developed in teaching English pronunciation (Baker, 2011).

Thus, in the pedagogy of second or foreign language pronunciation, teacher education remains under-researched. Therefore, scholars have argued for more emphasis on professional learning opportunities for ESL/EFL instructors in pronunciation teaching (Brinton, 2018; Derwing & Munro, 2015). However, there is limited research examining the process by which teachers effectively apply their professional learning related to pronunciation pedagogy in their actual classroom practices (e.g., Cohen & Fass, 2001).

Most studies on second and foreign language teaching education and pronunciation pedagogy focus on how teachers think about which parts of pronunciation to teach and which teaching methods to use. With few exceptions, data is only collected through surveys or questionnaires (Baker, 2014). The literature reviewed above reveals that previous work has failed to explore teachers' education in English pronunciation and that very few studies have examined teachers' education in relation to teachers' actual pronunciation instruction practices in the classroom, with the exception of Baker's (2011, 2014) studies. According to Baker (2011), even a single course in pronunciation pedagogy can have a substantial impact on teachers' knowledge and confidence, helping them become more efficient pronunciation instructors. However, research suggests that not many teacher training programmes provide such courses (Baker, 2014; Derwing, 2010; Henderson et al., 2012). Not surprisingly, scholars in the field have called for more teacher training to help ESL/EFL instructors build their confidence and expertise to better teach pronunciation (Celce-Murcia et al., 2010; Derwing and Munro, 2015; Murphy, 2014).

As stated by Burri and Baker (2020), "to what extent L2 teachers apply—in their classrooms— the knowledge and skills they acquired in a pronunciation teacher preparation setting and how their cognition and practices develop after completing a course on pronunciation pedagogy remains largely unknown" (p. 3). This is a pertinent topic to explore, as some suggest (e.g., Baker, 2014) that teacher training plays a role in the variety of activities a teacher uses, while others (e.g., Gordon, 2019) suggest that it might be more closely related to teaching experience. Thus, the next section focuses on some approaches and teaching and learning strategies that can enhance teachers' and learners' English pronunciation.

2.5 APPROACHES, TECHNIQUES, AND STRATEGIES IN PRONUNCIATION TEACHING

Before embarking on discussing the various approaches, techniques, and strategies for teaching L2 pronunciation, it is worth mentioning a brief conceptualization of these terms as they are used in this research study. To start with, the term "approach" is often used interchangeably with other relevant concepts such as "method", "technique", or "procedure" (Alghazo, 2015, p. 64). According to Richards and Rodgers (2001), an approach should be realised in a method that is frequently implemented by procedures. Nevertheless, they deal with an approach and a method at the level of design, viz., decisions about the material content, the syllabus objectives, and the roles of both teachers and learners. In this broad sense, Alghazo (2015) refers to teaching approaches as "the general principles or theories that underpin a teaching method and thus inform the teaching techniques or procedures used in the classroom" (p. 64). Thus, it is a collective term that includes other matters (e.g., course design, teaching material, characteristics of language teachers, and language of instruction) that

play a crucial role in determining the kinds of strategies, techniques, or procedures to be used in language classrooms (Alghazo, 2015).

Regarding pronunciation strategies, students' efforts to improve their pronunciation are referred to as "Pronunciation learning strategies." These measures are broad approaches to learning pronunciation that Pawlak (2010) views as "deliberate actions and thoughts that are consciously employed, often in a logical sequence, for learning and gaining greater control over the use of various aspects of pronunciation" (p. 191). This description clearly fits the classic definition of language learning strategies (LLSs) proposed by Oxford (1990), which emphasises the involvement of learners in the learning process, including cognitive, physical, social, and effective resources. To return to the principal concern of this section, pronunciation teaching approaches, pronunciation learning strategies, and pronunciation techniques are covered in more detail.

2.5.1 APPROACHES TO PRONUNCIATION TEACHING

As previously discussed, the status of pronunciation has either been marginalised or given high importance due to shifting views in research. These various views have resulted in the implementation of different but interrelated approaches to the teaching of pronunciation. Some of these approaches focus on teaching priorities and follow-up instructions, like the bottom-up, top-down, and interactive approaches (Dalton and Seidlhofer, 2000). Other approaches emphasise the nature of pronunciation instructions, like the intuitive-imitative, the analytic-linguistic, and the integrated approaches (Celce-Murcia et al., 2010). Still, other approaches focus on the central role of pronunciation in oral communication, like the intelligibility approach (Levis, 2018). To start with, the intuitive-imitative approach assumes that "the students' ability to listen and imitate the rhythms and sounds of the target language will give rise to the

development of an acceptable threshold of pronunciation without the intervention of any explicit information" (Hismanoglu and Hismanoglu, 2010, p. 984).

The availability of input is enhanced by particular technologies that are widely used in this approach, including audio tapes, computer-based programmes, websites, audio-video cassettes, compact discs, and digital video discs. In contrast, the analytic-linguistic method places greater emphasis on the pedagogical role of explicit involvement in the teaching of pronunciation. Developments in the fields of phonetics and phonology from the latter half of the century are drawn upon and often "watered down" for use in the language classroom. The learners are provided with explicit information on pronunciation using pedagogical aids such as the phonetic alphabet, articulatory descriptions, vocal charts, and practical exercises (e.g., minimal pair drills and rhythmic chants) (Carey, 2002). Different interactive speech software and websites can present explicit information (Lee, 2008). This approach was developed to complement the previous approach (namely, the intuitive-imitative approach) instead of replacing it (Celce-Murcia et al., 1996).

Instead of treating pronunciation as a separate skill that needs to be drilled and practised, the integrative approach treats it as an essential component of effective communication. According to Lee (2008), meaningful task-based activities are used to practice pronunciation. Pronunciation instruction is thus tailored to the individual needs of L2 students, and students practice pronunciation within the context of relevant task-based activities. The micro level of a dual-focus oral communication programme focuses on linguistic (i.e., phonetic phonological) competence through segmental and suprasegmental practice, while the macro level focuses on more global aspects of communicability, intending to develop discourse, sociolinguistic, and strategic competence through the use of language for communicative purposes (Morley, 1996).

An intelligibility-based approach is another approach that is the most reasonable approach to the teaching of pronunciation (Levis, 2018; Jenkins, 2000; Cruttenden, 2014). As mentioned before, intelligibility is a pronunciation level that enables an EFL learner to be understood while speaking and understand the speech of others (Levis, 2018, p. 232). The basic assumption of an intelligibility-based approach to pronunciation according to Levis (2018), is that "pronunciation can improve, no matter the age of the learner" (p. 223). The introduction of intelligibility gave rise to the suggestion of an intelligibility approach to the teaching of pronunciation within the Communicative Language Teaching approach. In basic terms, the intelligibility approach regards pronunciation as "an essential component of oral communication that should be taught in meaningful communicative pronunciation-focused activities" (Levis, 2018, p. 230).

In light of this, Jenkins (2000) has proposed the Lingua Franca Core (LFC) pronunciation syllabus, which encompasses the necessary phonological features for mutual intelligibility in both teaching and assessing English pronunciation. Therefore, she excluded some phonological features that do not jeopardise mutual intelligibility in non-native speakers (NNSs) interactions (e.g., the dental fricatives, final consonant clusters, weak forms, pitch movement, vowel quality, assimilation, and stress timing). According to Jenkins, these aspects are not relevant in English as Lingua Franca (ELF) interactions, hence there is no point to teach them.

The onus of intelligible speech is on individual speakers, who need to achieve confidence in their accent and not be a barrier to communication. In this case, instead of focusing on "full competence," learners should concentrate on mastering core phonological features to ensure intelligibility as an achievable goal (Isaacs & Trofimovich, 2012; Sung, 2013) rather than wasting their time acquiring a native-like

accent (Levis, 2016). Although there have been three main contemporary approaches to learning pronunciation, the learning of English pronunciation has been the subject of research for a long time. Celce-Murcia (2010) exemplified several pronunciation teaching approaches since the teaching of language started, and these are presented in Table 1 (based on Celce-Murcia et al., 2010).

Years	Approach	Definition
The late 1800s and early 1900s	Direct Method	Teachers provided students with a model for native-like speech. By listening and then imitating the modeler, students improved their pronunciation.
(1940s- 1950s)	Audiolingual Method in USA, Oral Approach in Britain	Pronunciation was taught explicitly from the start. Learners imitated or repeated after their teacher or a recording model. Teachers used a visual transcription system or articulation chart. Technique: minimal pair drill
(The 1960s)	Cognitive Approach	This de-emphasized pronunciation in favor of grammar and vocabulary. because (**a**) it was assumed that native-like pronunciation was an unrealistic objective and could not be achieved and (**b**) time would be better spent on teaching more learnable items, such as grammatical structures and words
(The 1970s)	Silent Way	The learners focused on the sound system without having to learn a phonetic alphabet or explicit linguistic information. Attention was on the accuracy of sounds and structure of the target language from the very beginning. Tools: sound-color chart, the Fidel charts, word charts, and color rods.
	Community Language Learning	The pronunciation syllabus was primarily student-initiated and designed. Students decided what they wanted to practice and used the teacher as a resource. The approach was intuitive and imitative.
The mid-late 1970s (1980s-today)	Communicative approach	The ultimate goal was communication. Teaching pronunciation was urgent and intelligible pronunciation was seen as necessary in oral communication. The techniques used to teach pronunciation were: listening and imitating, phonetic training, minimal pair drills, contextualized minimal pairs, visual aids, tongue twisters, developmental approximation drills, the practice of vowel shifts, and stress shifts related by affixation, reading aloud/recitation, recordings of learners' production.
20th century	Grammar-translation and reading-based approaches	Oral communication was not the primary goal of language instruction. Therefore, little attention was given to speaking, and almost none to pronunciation.
	Total Physical Response	Students would begin to speak when they were ready. They were expected to make errors in the initial stage and teachers were tolerant of them.
	Natural Approach	The initial focus on listening without pressure to speak allowed the learners to internalize the target sound system
Today-	New Directions	New thoughts from other fields, such as drama, psychology, and speech pathology. **Techniques**: the use of fluency-building activities, accuracy-oriented exercises appeal to multisensory modes of learning, the adaptation of authentic materials, and the use of instructional technology in the teaching of pronunciation

Table 1: Approaches to teaching pronunciation

2.5.2 PRONUNCIATION LEARNING STRATEGIES

In fact, Munro and Derwing (2015) outlined three important areas in need of empirical evidence in a recent reflection on the state-of-the-art research methodology for (L2) pronunciation: Classroom-based longitudinal studies on pronunciation

learning, individual learner trajectories after receiving pronunciation instruction, and individual learner differences affecting pronunciation learning, including strategy use.

Concerning strategies and their impact on the process of learning a foreign or second language, there have been numerous studies and research categorizing these learning strategies and explaining their effective application in language learning. Despite the challenges of identifying and classifying these strategies, some researchers (Oxford, 2003; Szyszka, 2017; Thu, 2009) have proposed different groups of strategies that are frequently used by language learners. Consequently, the effective use of pronunciation learning strategies may significantly influence the cognitive, social, and affective processes of L2 learning, thereby promoting learner autonomy and efficiency (Thu, 2009; Szyszka, 2017).

Szyszka (2017) concludes that Pronunciation Learning Strategies (PLS) should be introduced in the classroom, which would undoubtedly foster learners' autonomy in the case of improving pronunciation independently outside the classroom. Limited time dedicated to pronunciation teaching deprives learners of the chance of studying the strategies that are very likely to decrease the level of anxiety, which is very frequent in pronunciation-speaking performances (pp. 48– 49).

According to Peterson (2000), PLSs are "steps taken by students to enhance their own pronunciation learning" (p. 7). For Pawlak (2010), PLS means "deliberate actions and thoughts that are consciously employed [...] for learning and gaining greater control over the use of various aspects of pronunciation" (p. 191). Further to this, Szyszka (2017) conforms to this definition, which is only possible for learners who are "aware of their actions and thoughts activated in the process of improving their pronunciation" (p. 38). Oxford (1990) classified language learning strategies (LLSs) and are considered to have one of the best-characterized taxonomies, constituting the largest detailed

collection of tactics. These LLSs are classified into two main classes, which are further expanded into six sub-classes, with the first one encompassing direct strategy like memory, cognitive, and compensation strategies. The second class consists of indirect strategies that involve metacognitive, affective, and social strategies. Based on Oxford's division, Szyszka (2017) proposed strategies that work only in the field of pronunciation. The following diagram presents a list of PLSs:
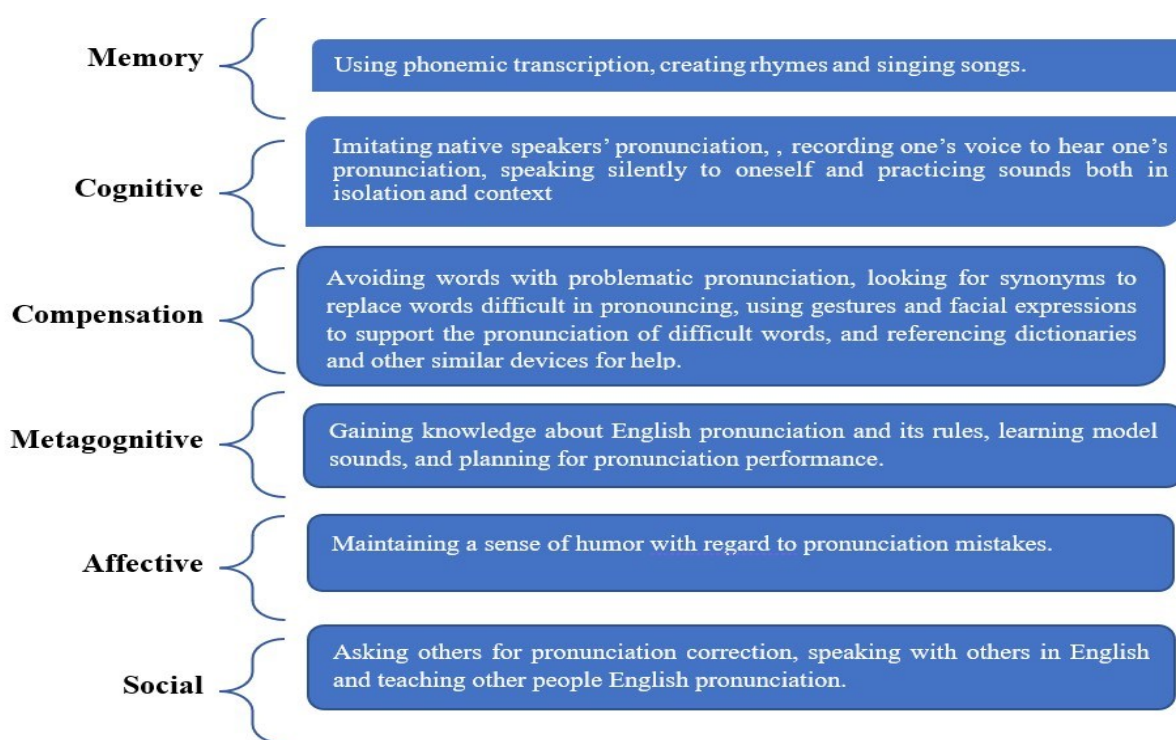
Figure 1: Pronunciation learning strategies (Szyszka, 2017, pp. 46-47)

2.5.3 TEACHING TECHNIQUES

In terms of teaching techniques, English language teachers have made use of different teaching techniques in pronunciation teaching. Rogerson-Revell (2011), introduced different aspects of teaching pronunciation regarding sounds, syllables, rhythm, connected speech, and intonation. Baker (2014) identified three teaching techniques used by teachers to teach students English pronunciation. Firstly, teachers use controlled techniques such as recitation drills, listening discrimination, and minimal pair activities. Second, classes engage in free techniques like role-playing, drama, and

presentations where students work together to solve problems and present their findings to the class. Finally, semi-controlled or guided techniques, which combine aspects of both controlled and free techniques, are used (e.g., information gap activities, interviews, or group discussions).

Celce-Murcia et al. (2010) provided extensive lists of techniques such as listening and imitating, phonetic training, minimal-pair drills, contextualised minimal pairs, visual aids, tongue twisters, developmental approximation drills, vowel shift and stress shift practice by affixation, reading aloud or recitation, and recordings of learners' production. All these techniques are mainly based on teachers having their students learn each sound by themselves and then apply them in real speech. Although some students benefit from these techniques, others do not learn the pronunciation easily from them. Thus, new techniques are being developed to enhance the learning of English pronunciation that have come from other fields such as drama, speech pathology, and psychology (Celce-Murcia, 2010). These techniques include the use of fluency-building activities as well as accuracy-oriented exercises, an appeal to multi-sensory modes of learning, the adaptation of authentic materials, and the use of instructional technology. Celce-Murcia et al. (2010) stated that the future of pronunciation teaching seemed quite insightful with the real of the internet capability. The logic behind this is the ease with which technological advances could be seamlessly incorporated into online platforms. This is a world apart from the more rigid process of modifying commercially sold CD-ROMs or DVDs programme.

Thus, internet sources have a lot to offer teachers and students, from instructional audio and video clips to authentic materials such as interviews, songs, movies, and speeches; from a place where information can be easily retrieved (e.g., online dictionaries) to an interactive space where learners can post questions about

learning pronunciation and receive answers from many others. Thus, there is an expressed need to integrate CALL and CAPT in pronunciation teaching and learning.

2.6 THE NECESSITY FOR CALL AND CAPT IN PRONUNCIATION TEACHING AND LEARNING

As mentioned above, some teachers teach English pronunciation through printed materials using the phonetic alphabet and activities such as minimal pair drills and listening to a cassette since they provide teachers with samples of native-speaker language to use in their classes (Celce-Murcia et al., 2010). Nevertheless, the past decade has witnessed an explosion in the massive development of (CALL) and interest specifically in (CAPT) with a recent proliferation of web-based and mobile apps and resources which have proven to be effective in teaching and learning English pronunciation by offering access to a variety of fluent models(e.g., Received Pronunciation (RP) or General American (GA) and granting teachers the opportunity to use many exercises for practice, creating a non-threatening environment to imitate and providing more visual, implicit and realistic feedback such as Automatic Speech Recognition (ASR) (Celce-Murcia et al., 2010; Gordon, 2021; Revell-Rogerson, 2021; Sadeghi,2013; Walker, 2005).

In his study, Walker (2005) used student-produced recordings to promote pronunciation accuracy, and the results found that students' recordings improved their pronunciation. The recordings increased their motivation and autonomy and permitted them to evaluate themselves. These recordings were analysed by speech analysis software, which improved their pronunciation. Sadeghi (2013) carried out a study using (CALL). The findings of his study revealed that Japanese EFL learners improved their perception and production of English consonants by using CALL. The researcher used audio and audio-visual media for perceptual training of English consonants, and it was

demonstrated that the audio-visual presentation is better than the audio one and that the improvement of pronunciation depends on the perceptual training.

Other studies found that the integration of technologies has proven its effectiveness in enhancing students' achievement scores and their attitudes and motivation towards learning (see Hsu & Chen, 2019; Kerouad & Fagroud, 2015; Wekerle et al., 2022). For instance, when Wekerle et al. (2022) examined ICT incorporation in the context of Norwegian higher education, the results found that students felt engaged and that it positively impacted their learning outcomes since they used it in active, constructive, and interactive activities. Ghanizadeh et al. (2015), for example, found that the integration of technology in almost all areas of language education was useful in improving the quality of input, making communication authentic, and providing timely and relevant feedback. Thus, the findings from the preceding empirical studies indicated that one of the main benefits of incorporating digital technology is its ability to improve both learning and teaching English pronunciation while also providing enjoyable and interesting activities for both learners and teachers. As a result, teachers can modify their pronunciation instruction by using a computer, which is one of the useful methods for improving pronunciation instruction. At the same time, tools and resources must be technically intuitive and robust so as not to exclude less experienced users.

Equally, the novelty value of the 'wow' factor can soon wear off if not supported by solid pedagogic foundations. Teachers need to consider the affordances of CALL/CAPT resources when evaluating their usefulness and implementing them in teaching to understand what elements of technology can add value or enhance pronunciation in teaching, learning, or assessment. Consequently, language teachers need more training and practice in or near actual teaching contexts (White et al., 2014),

contextualised activities that mimic specific teaching challenges (Kessler & Plakans, 2008), more support for situated training and institutional support (Hanson-Smith, 2006), and more collaborative and reflective hands-on practices (Farr & Riordan, 2012).

Even though there is agreement on the need for more training in technology integration in the preparation of language teachers, there is little agreement on the established consensus on methods and content of technology training in language teacher education contexts in terms of quality control to evaluate how rigorous or effective they are in terms of pronunciation teaching and learning. According to Reinders (2009), the lack of agreement is attributable to whether and how to incorporate technology into teacher education since technology education encompasses a broad range of elements, covering both pedagogical and technological aspects. As Revel-Rogerson (2021) asserted, "technological novelty tends to take centre stage and may temporarily disguise a lack of pedagogic rigour but is unlikely to maintain motivation in the long term" (p. 191).

Thus, many teachers have difficulty finding the most effective tools to incorporate ICT into pronunciation teaching due to "the sheer numbers and variety of the available technologies, which may seem daunting to teachers who are simply looking for effective tools to use in their classrooms" (Yoshida, 2018, p. 196). Kaiser (2018) found that many mobile apps have been developed with more attention paid to appearance and flash than to pedagogical principles. Thus, "many teachers feel unsure about how to teach pronunciation at all, and the idea of using computers, mobile devices, or other technology may make pronunciation teaching seem doubly intimidating" (Yoshida, 2018, p. 195).

Accordingly, it is a step in the right direction for CALL and CAPT to play a significant role in language teacher education when CALL/CAPT contributes to

students' learning of English language since many EFL/ESL teachers have received limited professional training programmes in phonetics or pronunciation pedagogy (e.g., Breitkreutz et al., 2001; Derwing, 2010; Derwing & Munro, 2005; Murphy, 1997; Saito & van Poeteren, 2012). Park and Son (2009) reported that the success of integrating technology largely depends on the teachers' positive teaching and learning experiences in using and applying CALL/CAPT meaningfully, especially in the classroom.

Thus, to suggest an evidence-based model to inform teacher education, the effective strategies to be used in language teacher education for technology integration need to be specified. To this end, the researcher will adopt Kolb's (2017) TRIPLE E framework, which stands for engagement, enhancement, and extension, to train university teachers to effectively enhance their TPACK competencies and teaching practices in teaching English pronunciation. Therefore, teachers are in urgent need of understanding how the integration of technology works in a way that supports English language learners through related courses, workshops, and seminars (Hubbard & Levy, 2006).

Teachers' professional development should not solely learn novel tools and skills, more significantly, it should fulfil the actual classroom needs to achieve considerable benefits (Guichon & Hauck, 2011; Hubbard & Levy, 2006; Hubbard, 2008; Thang & Gobel, 2012; Wang & Reeves, 2003). In light of this, Kolb (2020) stated that the integration of technology requires the right amount of knowledge of both technology and its pedagogical strategies. To put it simply, the integration of technology merely for technology's sake has no benefits unless it is efficiently directed by pedagogical perspectives. The following section focuses on some models in teacher training such as TPACK, SAMR, TIM, TAM, and TRIPLE E, and the rationale behind adopting the TRIPLE E framework in my study.

2.7 MODELS OF TECHNOLOGY INTEGRATION

Digital technology's impact on learning and teaching has been extensively studied. Researchers have found for decades that digital technologies have no positive impact on students' learning (Russell et al., 2003; Robertson, 2003; Waxman et al., 2002). However, other researchers have found conclusive evidence that digital technology can be effectively used to increase the speed and depth of teaching and learning (Alghazo, 2020; Bai, 2019; Gömleksiz & Düşmez, 2005; Hoyles, 2018; Rana et al., 2018; McCrocklin, 2016; Rana et al., 2019; Lee & Wallace, 2018; Yoshida, 2016).

Due to the lack of theoretical underpinning for designing or understanding the technology, the field of education has often been debated by researchers as a "topic of criticism" (Mishra & Koehler, 2006). Only looking at technology and not how it is used is part of the problem, as integrating technology into the educational process is not enough. It is an "add-on" that teachers only use if they have extra time (Kolb, 2017). Thus, what teachers need to know to better integrate technology into their teaching has received much attention recently (International Society for Technology in Education, 2000; National Council for Accreditation of Teacher Education, 1997; U.S. Congress Office of Technology Assessment, 1995; U.S. Department of Education, 2000).

Thus, the focus should be on how technology helps students achieve learning goals in ways they could not do without the tools, not on using technology to "drill and practice" (Klob, 2017). Technology should be incorporated consciously with active learning, quality over quantity, co-use over individuality, problem-solving skills, and creating and integrating prior real-world knowledge into learning. The literature is replete with references to various models used predominantly in teacher education and school contexts. For instance, the Substitution Augmentation Modification Redefinition (SAMR) model (Puentedura, 2006), the Technology Acceptance Model (TAM) (Wingo

et al., 2017), and the Technology Integration Matrix (TIM) were developed at the Florida Centre for Instructional Technology (FCIT) (Allsopp et al., 2007; Welsh et al., 2011), TPACK (Mishra & Koehler, 2006), and TRIPLE E (Kolb, 2017).

2.7.1 THE TECHNOLOGY INTEGRATION MATRIX (TIM)

The Technology Integration Matrix (TIM) is a framework and a descriptive tool that was developed by researchers from the University of South Florida Centre for Instructional Technology. The main purpose of this model is to assess teachers' levels of technology integration towards transformative teaching. It revolves around best practices and assists the educator in selecting the best tools that meet learning objectives. Further to this, it is a practical guide for incorporating technology into the classroom. Thus, this model assists teachers in planning technology-infused lessons that scaffold student engagement by following a comprehensive matrix for integrating technology and pedagogical strategies with content to spark critical thinking and problem-solving skills for learning. It begins at the entry level and moves through adoption, infusion, and transformation. The TIM incorporates five interdependent characteristics of meaningful learning environments: active, collaborative, constructive, authentic, and goal-directed (see Figure 2 below).
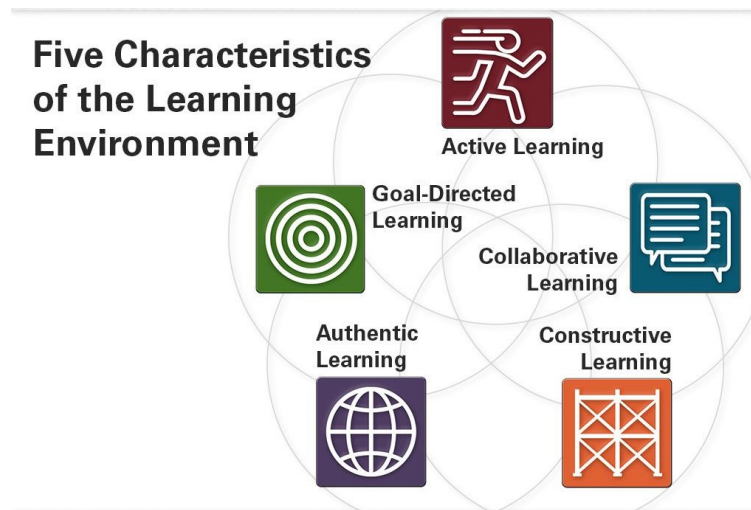
Figure 2:Graphic representation of the technology integration matrix (TIM) developed by the Florida Centre for Instructional Technology at the University of South Florida, College of Education

Although this model can be a handy guide for teachers, there are some limitations, as it can be clumsy and unwieldy for teachers since there are 21 components, which can take a lot of time for teachers to decide which level of technology to use when planning classroom activities (Harmes et al., 2016). Thus, since educators are seeking to integrate technology, teachers' attitudes towards technology can be a constraint that can prevent the implementation of technology in the classroom (Sawyer, 2017). Liu et al. (2017) asserted that teachers' confidence, access, and technical support are all significant factors that affect how technology is implemented in the classroom environment. Some other factors that influence the level of integration of technology are the years of teaching experience and the number of students per class. The researchers suggested that future research should use both quantitative and qualitative data methods to explore the complexity of technology integration (Liu et al., 2017).

Teachers' attitudes towards technology integration are critical, but the learning environment in which technology can be used is also important. Practice in a classroom that encourages students to use technology can help students learn content both inside and outside the confines of the classroom (Dotong et al., 2016). Thus, the TIM model

fosters learning environments with increasingly authentic learning by providing a model for technology integration that can transform the levels of technology use in a meaningful, authentic way as necessary for preparing students for authentic assessments of real-world skills. The TIM provides a framework for situating technology in instructional settings while maintaining a central focus on students (Harmes et al., 2016). Although this model has positive points in supporting teachers in integrating technology that students use for authentic assessments and real-world skills, there is one limitation in that it does not provide teachers with the areas of knowledge necessary for incorporating a lesson, which is one of the reasons why the TPACK works well with TIM.

2.7.2 THE SAMR MODEL

Another proposed model for technology integration is the SAMR model (developed by Puentedura, 2013). The SAMR model is a technology integration framework that has two enhancement stages. The first level is substitution and augmentation, and the second level of transformation stages includes modification and redefinition. The main purpose of the model is to assist teachers in integrating technology into their lessons. Cummings (2014) pointed out that the framework was designed to facilitate the acquisition of proficiency in modern consumer technologies and software for both teachers and students in the hope of promoting 21st-century skills. Hilton (2016) stated that the SAMR model gained popularity in late 2012 and that it provides teachers with a framework meant to enhance their integration of emerging technologies into their classrooms. Puentedura (2013) described each level as follows:
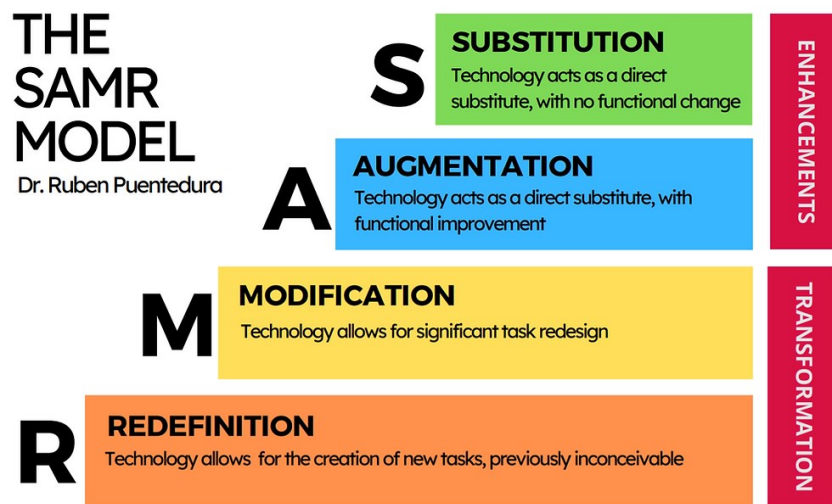
Figure 03: Graphic representation of The SAMR Model Image created by Ruben Puentedura, PhD, www.hippasus.com/rrpweblog/

In a qualitative study conducted in Western Australian independent schools by (Pegrum et al., 2013) of eight pre-service teachers using iPads for learning, the results revealed that the applications on an iPad assisted students' engagement, group work, and communication. The findings found that at the top level of the SAMR model, redefinition was one of the main strategies that the participants used because students were creating products that would not be possible without the utilisation of iPads. The SAMR framework is a new model, and its application with technology is necessary (Hilton, 2016). In a quantitative study completed by 131 high school students, the results found that the students did not have any positive reaction towards integrating mobile tablets into their learning process. Conversely, the researchers asserted that due to the lack of ICT training and the loss of balance in the three TPACK models, it is important to make sure that technological knowledge and skills are implemented effectively in teaching. Thus, by introducing both educators and administrators to a combination of TPACK and SAMR models, the teacher can understand the rationale for using a variety of tools to enhance both teaching and learning (Hilton, 2016). Further to this, the SAMR model serves as "a roadmap for teachers to gradually enhance their instruction with

technology and, more importantly, their teaching and learning classroom strategies" (Aldosomani, 2019, p. 48).

Although this model has positive points as a roadmap for teachers to enhance their teaching, there are some limitations to this model, as researchers found that its popularity has grown since 2013. In 2013, only one mention of the SAMR model appeared in the ISTE conference session descriptions. In 2015, the annual ISTE conference included 44 sessions where SAMR was included in their descriptions (Hamilton et al., 2016). Further to this, researchers suggest that the SAMR model is simple and ambiguous; it could be defined a bit more to reflect its use by first focusing on providing a true reflection of learning rather than the level of technology integration. Kolb (2017) reports on this conception by stating:

> SAMR does not directly address how learning goals play a role in the technology choice. We want to make certain that when we look at the SAMR model, we are also considering the learning outcomes and not just the unique ways that the technology tool is changing the way classroom activities happen. The TRIPLE E framework helps extend the SAMR model by making these connections. (p.25)

Other researchers argued that the SAMR model does not accommodate context (Berliner, 2002). As a result, important contextual components, such as technology infrastructure and resources (Ertmer, 1999), community buy-in and support (Zhao & Frank, 2003), individual and collective student needs (Lei et al., 2008; Mishra & Koehler, 2006), and teacher knowledge and support for using technology (Ertmer et al., 2012; Morsink et al., 2011), are not recognised.

2.7.3 TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) FRAMEWORK (2006)

To achieve effective learning goals, university teachers must have a good understanding of how ICT can be blended with subject content knowledge and their teaching strategies. Thus, finding a suitable framework that can explain university lecturers' skills and knowledge regarding ICT integration was a critical point in this research study. According to Mishra and Koehler (2006), the TPACK framework identifies the types of knowledge that teachers need to integrate ICT effectively into their teaching practices. As the first to propose this framework, Mishra and Koehler (2006) classified TPACK into three bodies of knowledge. These are pedagogical knowledge, subject content knowledge, and technological knowledge (see Figure 4 below).
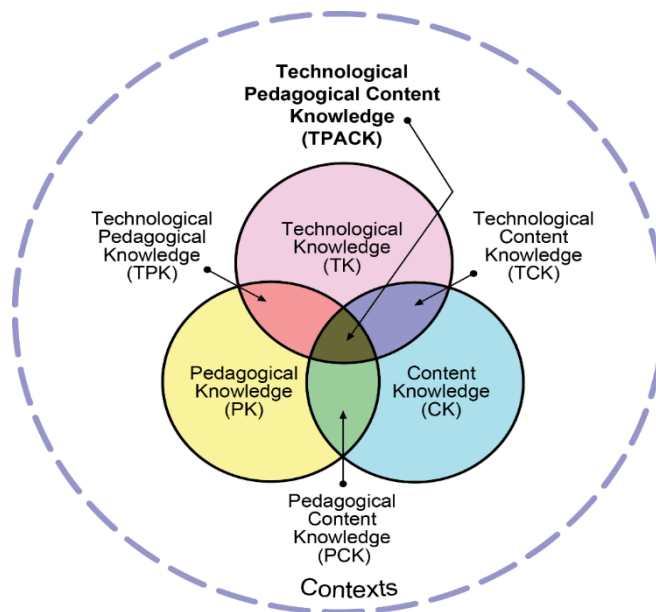
Figure 4:Technology pedagogical content knowledge framework (Koehler & Mishra, 2009; http://tpack.org).

Groth et al. (2009) stated that for effective integration of ICT into teaching, university teachers must understand how pedagogy, content, and technology can cooperate to construct efficient discipline-based teaching with ICT. Thus, there is a need

to further examine university lecturers' knowledge regarding the TPACK framework to understand how it can guide them in successfully incorporating ICT into their actual teaching classrooms. Accordingly, the TPACK framework provides a way of thinking about how ICT can be successfully implemented, particularly the knowledge required to integrate ICT into the classroom.

The framework has been extensively studied by many researchers to investigate teachers' knowledge and skills associated with ICT integration (e.g., Tai, 2013; Gökçe et al., 2014; Koehler et al., 2004; Koehler & Mishra, 2006, 2009). Mishra and Koehler (2006) asserted that the availability of technology in classes does not guarantee that teachers can efficiently integrate ICT into their teaching practices. Thus, this signifies the significance of the TPACK framework as a guide for teachers to understand how to integrate technology into their classrooms (Abbitt, 2011; Doering et al., 2014; Graham, 2011; Karaca, 2015; Kimmons, 2015; Stover & Veres, 2013). According to Abbitt (2011), the TPACK framework has a viable model for the knowledge base that supports technology integration into the classroom environment.

Mishra and Koehler (2006) emphasised that the TPACK framework provides a theoretical framework for not only thinking about technology integration but also considering the dynamic relationship between technology and teaching, which has the potential to change the concept and practice of teacher education. Kolb (2017) stated that the theoretical aspects of TPACK are appealing. Despite its frequent use, however, there is some criticism due to the lack of evidence explaining how it can contribute to the effective incorporation of ICT (Kolb, 2017). Supporting this, McGrath et al. (2011) argued that TPACK does not appear to be a framework that can be adopted as a single source of conceptual guidelines. This question was raised by Angeli and Valanides (2009), who debated whether TPACK is an adequate analytical and theoretical

framework. In general, such concerns by some authors have arisen since the sociocultural element in the framework is missing (Breen, 2018).

Recently, there have been an increasing number of novel studies related to the attainment of ICT proficiency and its integration into wider systems of practice, knowledge, and awareness (Angeli & Valanides, 2009; Azhar & Hashim, 2022; Meier, 2021). However, the TPACK framework may have value for the present research project of university lecturers and their integration of ICT in supporting students' pronunciation learning. For example, in this study, the researcher asked about the instructional strategies that university lecturers employed in their pronunciation teaching after attending the TRIPLE E PD workshops (e.g., co-use, co-engagement, personalization, differentiation, collaborative learning, role-playing, and self-reflective practices).

Further to this, the researcher observed what they learned in the TRIPLE E PD workshop in their pronunciation teaching practices for enhancing students' pronunciation learning as well as the technological tools that employ engagement, enhancement, and extension such as YouGlish, Rose Medical, ELSA, Vocaroo, Quizziz, online dictionaries, and Fraze.it. The TPACK framework and the TRIPLE E framework were expected to help university lecturers enhance their TPACK competencies and pronunciation teaching practices. Both of these frameworks have not been used for specific subject matter, such as pronunciation skills; thus, the findings of this study would contribute significantly to the existing body of knowledge, particularly in the Middle East and Jordan as a case study.

2.7.4 TECHNOLOGY ACCEPTANCE MODEL (TAM, 1989)

The TAM (Technology Acceptance Model) is one of the models most frequently used by information systems academics and practitioners to understand the uptake of ICT. According to Davis et al. (1989), the main purpose of TAM is to "provide a basis

for tracing the impact of external variables on internal beliefs, attitudes, and intentions" (p. 985). This model was introduced by Davis (1989) to understand the uptake of ICT in general contexts, frequently in business-related contexts. Further to this, Davis (1986) proposed that users' attitudes towards specific systems are a function of two major beliefs: perceived usefulness and perceived ease of use are the most important factors determining users' acceptance. Perceived usefulness is defined by Davis (1989, p. 320) as "the degree to which a person believes that using a particular system would enhance his or her job performance." To put it simply, individuals perceive any system positively if they think it can enhance their job performance in the areas where they perceive its usefulness.

Thus, they develop a positive attitude and increase their willingness to engage in using the system (a behaviour intention). However, perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). Supporting this, Davis (1989) developed scales to measure these two main variables (perceived usefulness and ease of use). For example, in the Canadian context, Davis (1989) presented two studies involving a total of 152 users and four application programmes. According to the findings, perceived usefulness was more important than ease of use. The TAM framework grew out of an understanding of TRA (the Theory of Reasoned Action) as the theoretical base model for the TAM (see Figure 5 below).
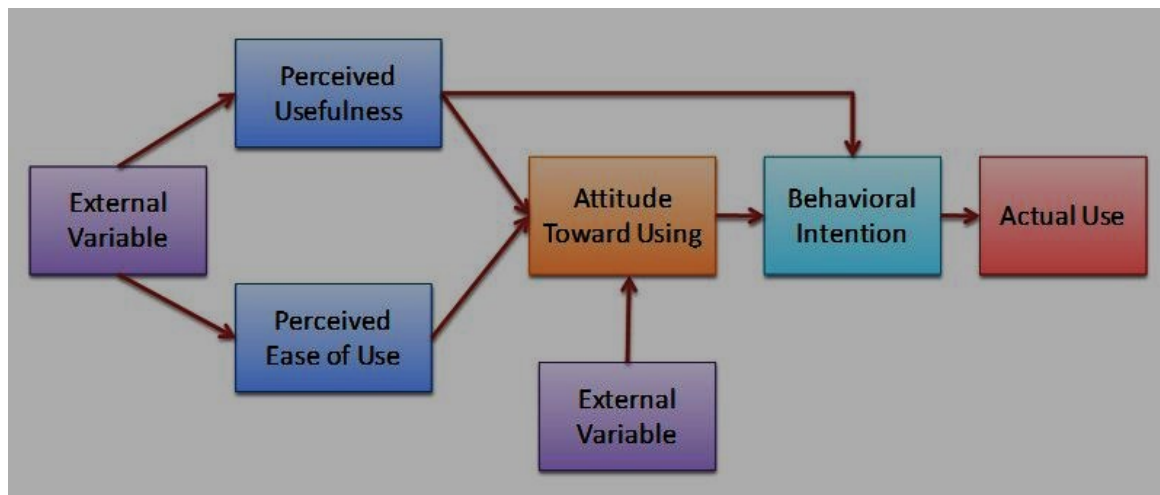
Figure 5:Technology Acceptance Model (TAM) by Davis (1989)

According to Davis et al. (1989), the theory is a more general idea that explains individual behaviour and suggests that behaviour could be determined by previous intentions and beliefs about that behavior. TAM is helpful "not only for prediction but also for explanation" (Davis et al., 1989:985). Therefore, TAM is an extremely helpful model for researchers because it can be used to explain and understand the variables that might influence the acceptance of new technology. Although this model has some positive points, one criticism of much of the literature on TAM is that the simplicity of TAM and the lack of understanding of the antecedents of technology acceptance (perceived usefulness and perceived ease of use) were the subjects of criticism in prior research (Marikyan & Papagiannidis, 2021; Lee et al., 2003; Venkatesh & Bala, 2008).

2.7.5 TRIPLE E FRAMEWORK BY KOLB (2017)

Over the past few years, frameworks such as TPACK, SAMR, and TIM have helped professional teachers think about the intersections of knowledge they need to attain to better incorporate technology into their classroom learning. Building on the work of these frameworks, the TRIPLE E framework was designed by Liz Kolb, a clinical assistant professor at the University of Michigan and co-founder of the 4T

Virtual Conference. It is a useful extension of previous technology integration frameworks like SAMR (Puentedura, 2012), TPACK (Thompson & Mishra, 2007), and TIM (University of Florida, 2005), which focus on how teachers should design learning. It is designed as a practical tool to assist teachers in putting "learning first, technology second." This framework is rooted in learning goals and instructional strategies for smart tool selection. An easy-to-use rubric that accompanies the framework guides professional thinking on how useful instructional choices are when combined with technology regarding learning objectives. When designing lessons that incorporate technology, the TRIPLE E framework can help educators decide which methods and strategies will best support mastery of learning outcomes.

The framework is based on three components: engagement, enhancement, and extension of learning goals. After establishing a clear learning goal and determining which technology tools will be used in the lesson, the framework can be utilised in evaluating the overall lesson quality by looking at the three lenses of the framework. Engagement is an aspect that takes into consideration how technology tools help students focus on learning goals and tasks. This ensures that technology engagement is time-on-task, effectively focused on learning objectives, and encourages students to participate in meaningful social learning through co-use or co-engagement. Time-on-task is present when incorporating technology that focuses on learning, not just swiping the tools.

Therefore, instructional strategies should be focused first on the tool to ensure that authentic engagement is occurring. This active and mindful engagement should lead to increased comprehension. The second component is enhancement, in which technology facilitates co-use, active learning, differentiation, personalisation, higher-level thinking skills, and real-world connections in ways that traditional tools cannot.

For instance, a technology tool may offer personalised scaffolds to shore up students and provide them feedback as they move through a piece of software. Extension is the third component that reflects how well technology creates a bridge between classroom learning and everyday life. This also takes into account how students can develop soft skills that will be useful in their everyday lives (see the Figure 6 below) (Kolb, 2017).
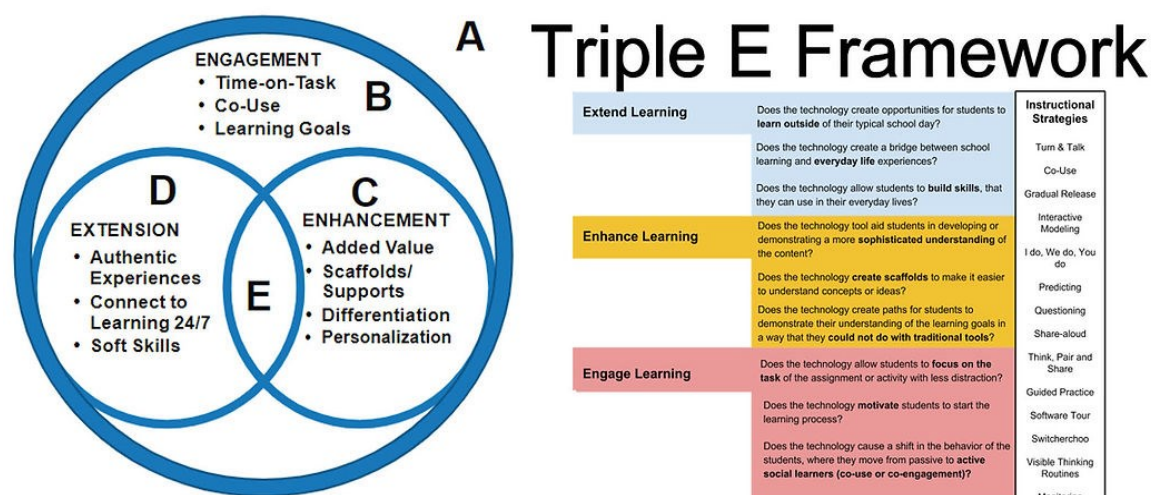
Figure 06: The TRIPLE E Framework by Liz (2017)

The framework includes instruments for designing lessons that help teachers plan their lessons and include technological tools. The goal of the TRIPLE E framework is to combine all three components to create an exemplary lesson plan. The main purpose of TRIPLE E is to allow teachers to put the needs of the learners first and then select the technological tools that leverage authentic engagement in the instructional goals (Kolb, 2017). The strength of the TRIPLE E model is not necessarily the integration of technology; the focus is on authentic engagement in the learning process. The framework formats are easy to follow, every TRIPLE E component is provided with multiple scenarios that clearly and effectively illustrate that component, and the TRIPLE E is valid and reliable (Schatzke, 2019). However, one limitation was that the

TRIPLE E framework's lesson plan rubrics were very detailed, and most teachers do not compose the detailed plans required for this rubric (Schatzke, 2019).

With the availability of many technological tools and new and shiny hardware and software, some teachers tend to be haphazard in choosing these tools, leading them to dismiss older technologies with the assumption that older means poor technology. Today, few teachers would argue that technology is a tool that helps learners meet learning goals. The question is: " How do educators measure a tool's ability to help students reach learning goals?" The TRIPLE E framework was developed to fill this gap and works as a practical tool that brings together instructional strategies, learning goals, and the selection of a purposeful tool. The previous frameworks focused on the substitution of technology with traditional tools and whether the use of technology was creative. However, the focus is not on whether the tools were able to essentially leverage the learning goals. As the world has become focused on standardising learning and outcomes, this has led students to use their time to achieve learning goals. This is where the TRIPLE E framework can assist in extending the current models.

2.7.5.1 RATIONALE FOR THE TRIPLE E FRAMEWORK

One aspect of educational technology integration on which most educators agree is that technology can be used to help students achieve their learning objectives (Becker, 2000). Previous studies have shown that educators do not feel like they have the skill set or framework to understand how best to assess whether technology instruments or tools help students achieve learning outcomes (Ertmer, 1999; Swanson, 2006). Furthermore, research has shown that incorporating technologies does not always result in the development of students' learning goals (Kleiman, 2000; McKenzie, 2003; Neiss, 2011; Vega, 2013; Williams et al., 2002). If educators wish to extend the opportunity of technology integration to improve students' learning outcomes, the complexity of

education and the variability of interactions between students, teachers, and the classroom environment must be considered. Simply understanding the technical aspects of technology incorporation is not enough; administrators or university lecturers need to carefully examine how technology, pedagogy, and the learning context can work together to promote student-centred learning objectives. Therefore, several studies have urged organisers of technology integration professional development to carefully and thoughtfully plan the design and delivery of the professional development to maximise the benefits (e.g., Barrett-Greenly, 2013; Gaytan & McEwen, 2010). Several meta-analysis studies in technology integration confirmed that the influence of educational technology on K–12 students' achievement differed mainly across projects (e.g., Kulik, 2003; Cheung & Slavin, 2011).

Teaching with the assistance of technology is about learning first and tools second. The use of the previous frameworks and models have clear benefits, specifically in planning for technology integration or considering how the technology modifies conventional classroom activities and routines. Therefore, the TRIPLE E framework was developed to work with or without the previous models that were adopted as guidance in the design and plan of the lecturers' training workshop intervention in terms of pronunciation teaching. This framework focuses on how technology meets the needs of language learners, evaluates both lesson plans and technological tools, searches for effective learning strategies built into both, and allows for pedagogical strategies to work with technological tools rather than looking at technological tools in isolation. The main goal is to help university lecturers walk away with the ability to teach with technology while making pedagogical decisions and to transfer what they have learned in the workshop to their actual teaching practices in the classroom.

Indeed, the TRIPLE E framework is systematically based on a significant amount of research that has been carried out over the past decade on what effectively works or does not work when it comes to the integration of technology in learning. For instance, studies have highlighted the significance of time on task active engagement (Kay & Lauricella, 2011; Wartella, 2015); the importance of quality use rather than quantity (Wenglinsky, 2006; OECD, 2015); and the assertion that learning goals should be the main core of technology enhanced lessons (Linnenbrink & Pintrich, 2003; Wartella,2015). Moreover, research support the avoidance of drill and practice methods which have been shown to have negative effects on learning outcomes and instead recommends incorporating more authentic problem- solving and creative activities (Vaala et al.,2015).

Additionally, value added strategies, for example, promotion of students' self-reflection, self-assessment and self -explanation have shown positive outcomes (Kampylis et al., 2016). Furthermore, employing authentic contexts (Brown et al., 1989; Lave & Wenger, 1990) and recognizing the pivotal role of teachers' instructional strategies and pedagogical supports when incorporating digital technologies, rather than focusing solely on the technological tools themselves, has been proven to be more successful (Pane et al., 2017; Kay & Lauricella, 2011; Bebell & Kay, 2010; Montrieux et al., 2015; Okojie et al., 2006).

To sum up, drawing upon evidence from the literature, this research study proposes the TRIPLE E framework for technology incorporation that overcomes some of the challenges associated with the previous models such as SAMR, TIM, TAM, and TPACK and weaves them into a practical measurement tool that focuses on the learning goals before the technology tool. This can make it easy for educators to determine how to choose specific tools to reach their learning goals and eventually develop learning

experiences so that the adopted tools have a positive effect on student achievement and learning outcomes.

However, the available technology has not been put to good use in English language teaching and learning classrooms for some reasons, especially in developing countries, and Jordan is one of the cases. For example, Khodabandelou et al. (2016) listed the barriers to technology integration in language teacher education succinctly as follows: Students are overloaded by all kinds of information; teachers do not know how to integrate technology to teach English, and this is because they have insufficient ICT training or the software to teach the students; the educational system also hinders technology integration in the English language learning process; and the environment of technology in English language classrooms is sometimes not lesson-friendly or user-friendly, as is proven by the current trend of technology. They concluded that teachers of second and foreign languages should be able to adapt their attitudes to technology and receive the requisite training to properly prepare themselves before teaching students.

Other obstacles to technology adoption in language teacher education, according to Hubbard (2008), include institutional inertia and ignorance, insufficient time for technology courses, insufficient infrastructure and standards, a lack of proven methodology, and a shortage of experienced and knowledgeable educators.

Now, let's consider the barriers and facilitators that impede and enhance ICT integration in pronunciation teaching and learning at the university level. As noted above, the literature tends to focus more on barriers at the expense of enablers.

2.8 BARRIERS AND ENABLERS TO TECHNOLOGY INTEGRATION

This section provides a comprehensive overview of the factors influencing ICT integration into higher education. It will encompass both the barriers that have long been the focus of research in this area (see Table 2 below) and the facilitators that can empower educators to enhance technology adoption. We will begin by exploring the barriers, categorizing them into external and internal factors, including lack of access, lack of technical support, insufficient time, teachers' lack of confidence and competence, resistance to change, and attitudes towards ICT. Following the examination of barriers, we will delve into the facilitators, which hold the potential to counteract these challenges and promote effective ICT integration.

Barriers	Authors
Lack of Availability and Accessibility	Aldosari, 2007; Al-Marwani, 2018; AlMulhim, 2014; Heyberi, 2012; Hismanoglu, 2012; Ja'ashan,2020.
Lack of Effective ICT Training	Albugami & Ahmed, 2015; Al-Marwani, 2018; Esfijani & Zamani, 2020; Fuente, & Biñas,2020; Lawrence & Tar 2018; AlMulhim, 2014; Mumtaz, 2000; Nikolopoulou & Gialamas 2015; Razak et al., 2018; Suárez-Rodríguezet al.,2018; Wu et al., 2021; Vitanova et al. 2015)
Lack of Time	Alghazo, 2020; Dang,2011; Ja'ashan, 2020; Jacobsen & Lock 2005; AlMulhim,2014; Mushimiyimana et al.,2022; Muslem et al., 2018; Rababah et al.,2012; Rakhyoot, 2017; Raman & Yamat,2014),
Inadequate Technical Support and Leadership Support	(February, 2022; Pelgrum, 2001; Sandholtz & Reilly, 2004),
University Teachers and Students' Attitudes	Badia et al., 2013; Christensen, 2002; Ertmer, 2005; Kubiatko, 2013; Kusano et al., 2013; Oye et al., 2014),
Limited Interactivity	(Asad et al, 2020; Hurst et al., 2013; Zeleňáková et al., 2012),
Students' Knowledge of Technology	Alghazo, 2020; Aung and Khaing, 2015; Kanwal and Rehman 2017; Khazaleh& Jawarneh, 2006; Bingimlas, 2009; Mulhanga & Lima 2017
Financial Issues	(Wright and Reju, 2012).

Table 2: Factors affecting ICT integration in education.

2.8.1 EXTERNAL BARRIERS

With regard to external barriers, there are conflicts, contrasts, and tensions around views between what is expected and how this impacts what university lecturers might do.

1. LACK OF ACCESS

Numerous studies have explored the challenges hindering the effective integration of ICT in educational settings. These studies, conducted in various countries, have consistently highlighted the importance of access-related issues as a common barrier. In Saudi Arabia, Al Mulhim's (2014) study revealed that limited access to ICT was a major barrier for female primary teachers. Similarly, Canadian educators, as found by Frost et al. (2017), faced challenges in providing students with up-to-date computers, suitable infrastructure, and adequate software. In the Greek context, Fragkouli (2006) stated that teachers encountered obstacles due to the lack of computers and inconvenient computer lab locations. The UK study by Hammond et al. (2009) identified difficulties in accessing ICT as a constraint for student teachers. Alemu's (2015) work in Ethiopia emphasized the common obstacle of inadequate access to ICT resources.

In Zambia, Chipembele (2016) reported that university teachers struggled to leverage existing ICT infrastructure due to accessibility and skill-related issues. Malaysian teachers, as documented by Hamzah et al. (2016), complained of device shortages, outdated technology, and the logistical challenge of accessing computer labs. In the Jordanian setting, as explored by Alkhawaldeh and Menchaca (2014), experienced a common barrier in the form of limited access to technology for all stakeholders. Turkish pre-service teachers, in the study by Baran and Cagiltay (2010), faced challenges related to internet connectivity and computer availability. Yemeni teachers, as reported by Al-Mamary (2022), stressed the importance of accessible ICT infrastructure, technical support, time availability, and technology training.

To avoid these barriers, Bingimlas (2009) emphasized the need for instructors to have up-to-date technology and reliable internet access to overcome access-related barriers. In essence, these studies collectively underscore that access issues,

encompassing resource availability, hardware, and software quality, are pivotal factors impacting the successful integration of ICT in educational environments.

2. LACK OF TECHNICAL SUPPORT

Technical support, defined by various researchers (e.g., Dexter et al., 2002; Frost & Sullivan, 2006; Resta, 2002), refers to skilled professionals who aid teachers in ICT integration. This support encompasses assistance with access, operation, and troubleshooting of hardware, software, and network resources, including help from ICT facility vendors and internal helpdesks. Technical issues pose a significant barrier to university teachers' ICT integration efforts, potentially reducing their use of ICT tools.

In the Malaysian setting, Ghavifekr et al. (2016) surveyed 120 lecturers and found that more than half cited limited technical support as a hindrance to effective ICT integration. Similarly, in the Turkish scenario, Yilmaz (2011) identified institutional barriers like hardware and internet connectivity issues, along with the university's role in providing technical support, repair, and maintenance. A study by Teo and Milutinovic (2015) among Serbian teachers in two universities revealed a positive link between technical support and ICT integration.

In the Omani context, Al-Senaidi et al. (2009) explored barriers to ICT integration in higher education, with university teachers largely agreeing that the primary obstacle was the lack of technical support at the College of Applied Sciences. These studies collectively suggest that the absence of professional and reliable technical support can frustrate teachers and deter ICT integration. As Tong and Trinidad (2005) noted, offering support to university lecturers can positively impact their decision to integrate ICT by minimizing troubleshooting time. Therefore, the studies discussed indicate that the lack of dependable technical support stands out as a significant barrier to effective

ICT integration, aligning with Ashiono's (2018) observation that inadequate technical support can lead to maintenance issues and hinder the benefits of ICT in the classroom.

3. LACK OF TIME

Integrating ICT into teaching often demands more time, especially in lesson preparation, troubleshooting, and professional ICT training (BECTA, 2004). Many studies (e.g., Arokiasamy, 2012; Habibu et al., 2012) have highlighted insufficient time as a major barrier to ICT integration in teaching, a viewpoint reinforced by findings in previous research (e.g., AlAbadi, 2019; Al-Alwani, 2005; Kafyulilo et al., 2016). Despite having computer skills, some teachers make limited use of ICT due to time constraints, as indicated by respondents facing challenges in scheduling computer time for teaching and learning (Kafyulilo et al., 2016).

Studies in the Saudi context (e.g., Al Asmari, 2011; Ageel, 2011) found that busy schedules impede ICT integration, given the additional time required for lesson preparation. BECTA (2004) also noted the time barrier, particularly in locating internet materials, exploring ICT resources, and preparing ICT-integrated lessons. Cuban et al. (2001) supported this notion based on a study in American high schools, emphasizing the need for time to prepare multimedia materials, preview websites, and provide training for successful ICT integration. This challenge affects teachers across ICT usage spectrums and can lead to exhaustion (Bingimlas, 2009). In brief, insufficient time is a formidable challenge for university lecturers, who must juggle teaching requirements alongside ICT integration. For these educators, time constraints remain a pressing concern (Wenger, 1998).

4. LACK OF EFFECTIVE ICT PROFESSIONAL DEVELOPMENT TRAINING PROGRAMMES

The literature consistently identifies a lack of ICT training as a prevalent barrier to effective ICT implementation in teaching and learning (e.g., Alabadi, 2019; Alasmari, 2011; Bingimlas, 2009; Balanskat et al., 2006; Hakami et al., 2013; Buabeng-Andoh, 2012). Teachers learn to integrate technology into their classrooms, but opportunities for ICT training can be scarce, impeding their progress (Bingimlas, 2009; Ropp, 1999). Insufficient ICT training and experience are frequently cited reasons for teachers not using ICT in teaching (e.g., Alabadi, 2019; Ghavifekr et al., 2016; Goktas et al., 2009; Lui et al., 2017; Oimoyiannisa & Komisb, 2007). A lack of training negatively impacts pedagogical decisions related to ICT integration (Alabadi, 2019) and directly correlates with lower ICT integration levels (BECTA, 2004). The deficiency extends to specific subjects, such as language teaching (Hamzah et al., 2009).

The significance of ICT training as a predictor for ICT integration varies across countries. In Germany, pedagogical ICT training is a strong predictor (Gerick et al., 2017), while technical support is a weak one (Drossel et al., 2017). In the UK, despite political pressure for increased ICT integration, teachers express frustration due to inadequate in-service training (Taylor & Corrigan, 2007). However, some studies show that even with training, many teachers struggle to fully integrate ICT into their classrooms. In the UK, skilled teachers failed to transfer this knowledge to practice (Cuckle & Clark, 2002). Continuing professional development (CPD) has shown potential benefits, impacting teachers' knowledge, attitudes, behavior, and skills (Bartleton, 2018; Fraser et al., 2007). CPD covers formal, non-formal, and informal learning dimensions and is a dynamic, long-term process (Kaliannan and Alam, 2015). It enriches teachers' career paths and aligns with their professional development needs. Therefore, a broader perspective on ICT CPD is warranted.

5. THE INFLEXIBILITY OF THE CURRICULUM

A substantial curriculum to cover is a recognized obstacle to ICT integration. John (2005) identified the curriculum's inflexibility as a tangible barrier to ICT integration that must be addressed before teaching. Birch and Burnett's (2009) study indicated a misalignment between assessment and ICT integration in higher education. Hamzah et al. (2009) surveyed Malaysian teachers and students, finding that they struggled to incorporate ICT within a rigid syllabus and amidst examination pressures.

Additionally, teachers expressed frustration with school-provided software that didn't align with their teaching materials (Hamzah et al., 2009). Weston (2005) also discovered that course content inflexibility hindered instructors from adopting new teaching technologies. Vrasidas et al. (2010) highlighted the curriculum as the most significant barrier to ICT integration, with 81.4% of teachers indicating curriculum length as a major impediment. This underscores the challenges teachers face when trying to incorporate technology into their teaching. These challenges revolve around the pressure to cover required topics within a limited timeframe. While curriculum limitations can discourage some teachers from ICT integration, they can inspire others to find creative solutions and enhance student performance.

Bullock (2004) illustrated this in the American context through two pre-service teachers. Suzanne, an English teacher, shifted from skepticism to a positive attitude towards ICT integration due to access and training. In contrast, Nancy, a math teacher, was initially excited about integrating ICT but became disappointed by curriculum limitations, which proved insurmountable (Bullock, 2004).

2.8.2 INTERNAL BARRIERS

Internal barriers are those that come from the teachers' attitudes, beliefs, and practices. These are affected not only by how people feel but also by their social situations, cultural backgrounds, and the way they were taught (Ertmer, 1999; Saxena, 2017).

1. RESISTANCE TO CHANGE AND NEGATIVE ATTITUDES

Teachers' attitudes and resistance to change are widely recognized as significant barriers to ICT integration in teaching and learning (Bingimalas, 2009; Becta, 2004; Demetriadis et al., 2003; Earle, 2002; Gamlo, 2014; Gomes, 2005; Hamlaoui, 2021; Lawrence & Tar, 2018; Schoepp, 2005). Nias (1996) explained that teachers often feel a strong sense of commitment to their teaching methods and resist adopting new strategies they disagree with. Hamlaoui (2021) found that experienced teachers may resist moving from traditional to technology-based teaching, either due to skepticism or a lack of confidence and competence. Gomes (2005) noted deep resistance among science teachers, a major obstacle to ICT integration.

Becta's (2004) review emphasized teachers' resistance to change as a primary barrier to ICT integration in education. Watson (2006) argued that integrating new technologies requires a change in mindset, and teachers' attitudes towards change significantly influence their classroom practices. Teachers are more likely to integrate ICT when they perceive it as useful and easy to manage in the classroom. Bansa (2020) found that perceived usefulness and ease of use strongly influenced Indonesian university teachers' attitudes and teaching performance, citing ICT's positive impact on student motivation and learning. Wong and Hanafi (2007) observed that perceived usefulness and ease of use positively influenced pre-service teachers' attitudes toward ICT use.

In the Malaysian setting, Teo et al. (2008) identified attitudes toward computers, perceived usefulness, and ease of use as key factors influencing teachers' intentions to use ICT. However, resistance and negative attitudes towards ICT can vary among teachers based on their backgrounds and experiences. Veen (1993) discovered that English teachers were more resistant to change, believing that their students did not benefit from ICT and fearing a loss of control. Domingo and Gargante (2016) found that teachers with positive attitudes were more likely to engage with technology. While resistance varies, some European countries have very few teachers against ICT integration, with only a fifth believing ICT lacks significant learning benefits (Korte & Husing, 2006).

2. LACK OF TEACHER COMPETENCE AND CONFIDENCE

Several researchers have highlighted the significant role of teachers' lack of confidence and competence as barriers to ICT integration in teaching (Compeau & Higgins, 1995; Raob et al., 2012). This lack of confidence often stems from inadequate or inappropriate training, resulting in underconfident and unprepared teachers (Raob et al., 2012). Factors contributing to teacher incompetence include insufficient training time and teachers having to train on their own time (Raob et al., 2012). Teachers' lack of confidence can be related to the concept of TPACK (Shulman, 1986, 1987).

TPACK encompasses teachers' interpretation and transformation of subject matter knowledge to facilitate student learning (Angeli & Valanides, 2009). Fear of failure and anxiety about ICT usage can also affect teachers' confidence (Beggs, 2000; Balanskat et al., 2006). Becta (2004) found that teachers lacking ICT knowledge were anxious about using it in front of their students, which affected their confidence. Studies have shown that teachers' lack of ICT knowledge and skills, especially in developing countries, is a significant barrier to ICT adoption (Goktas et al., 2009; Pelgrum, 2001).

Lack of technical competence is particularly pronounced in developing countries (Pelgrum, 2001). Students' perceptions of their teachers' ICT competence are also crucial. For instance, Tokareva et al. (2019) found that over half of the Russian students in higher education were dissatisfied with their teachers' ICT competence.

While teachers may have a positive attitude toward ICT, a lack of confidence in their capacity to integrate technology can still hinder ICT integration (Willis et al., 1999). Competence and confidence in technology are essential for it to be a useful pedagogical tool (Okojie et al., 2006). Despite these barriers, some facilitators can enhance the adoption of ICT in teaching (Alt, 2018; Bingimlas, 2009; Becta, 2004; Goktas et al., 2009; Lim & Khine, 2006; Lawrence & Tar, 2018; Scrimshaw, 2004). These facilitators encompass various dimensions, including access, training, support, time, planning, and the attitudes of both teachers and students.

3. QUICK ACCESS TO ICT TOOLS

While access to ICT can sometimes pose a barrier, it also plays a pivotal role in enabling and promoting its use in education. Researchers such as Alt (2018) and Lawrence and Tar (2018) have identified hardware, quality software, internet access, and technical, administrative, and peer support as essential factors that facilitate ICT integration. In the UK context, Hammond et al. (2009) emphasized that access and technical support in classrooms significantly support effective ICT integration in teaching. Similarly, Yildrim (2007) found that access to technological resources is one of the most effective ways for teachers to integrate ICT into teaching, a view supported by other researchers, including Moreno et al. (2017), Careaga & Avendaño (2016), and Pérez (2017), who consider access a fundamental prerequisite for successful ICT integration in schools. Access to ICT infrastructure and resources is deemed a necessary condition for ICT integration in education (AlShwabkah et al., 2016). Ultimately, the

availability and accessibility of ICT resources, including hardware and software, are critical determinants for ICT adoption and integration. Without sufficient access to these resources, teachers are unlikely to integrate ICT, leading to limited ICT utilization by students (Moreno et al., 2017).

4. THE VALUE OF PROVIDING ICT PROFESSIONAL TRAINING

In terms of ICT training, Teo (2008) stressed the importance of a supportive and non-threatening environment to boost teachers' competence and confidence in integrating ICT. Muhametjanova and Cagiltay (2016) identified in-service training as a critical enabler, emphasizing the need for improvements in quality and quantity in the Turkish context. Goktas et al. (2009) recommended the establishment of specific units in universities and schools to provide technical support to university teachers, reducing their teaching workload and enhancing ICT integration. Korte and Husing (2006) found that teachers in British and Dutch schools valued technical support, which positively impacted their ability to use ICT without wasting time on troubleshooting. Tong et al. (2005) emphasized that a lack of technical support could result in teachers' frustration and reluctance to integrate ICT.

In the Irish context, the National Council for Technology in Education (NACTE, 2015) highlighted the high priority of technical support and maintenance, which 85.3% of schools considered essential. BECTA (2004) emphasized that formal technical support is crucial to regular maintenance, reducing the risk of technical breakdowns. In Saudi Arabia, Bingimlas (2009) stressed continuous technical support but also encouraged teachers to address technical issues independently. He also highlighted the importance of providing teachers with relevant ICT resources, including hardware and software, which was echoed by Darmanin (2005), Lim and Khine (2006), and Scrimshaw (2004).

Alabadi (2019) recommended reforming university teachers' training to include ICT integration, emphasizing the importance of professional development programs. Al-Madani and Allaafiajiy (2014) suggested options like exchange programs with foreign higher education institutions. To enhance teachers' ICT competence and confidence, John (2005) and Scrimshaw (2004) recommended providing technical support for managing new hardware and software. Gray et al. (2007) stressed the need for effective teacher training tailored to meet teachers' needs. Baylor and Ritchie (2002) proposed in-service training designed to match teachers' ICT skill levels and experiences. In cases of training gaps, Bingimlas (2009) suggested that schools offer training courses, and teachers may self-train or identify courses independently when in-service training is unavailable.

5. THE IMPORTANCE OF HAVING SUFFICIENT TIME FOR ICT INTEGRATION

To address the time barrier in teachers' technology integration, institutions should allow more time for teachers, as suggested by Goktas et al. (2009). Birch and Burnett (2009) recommend manageable teaching schedules and flexibility in timetables for ICT-mediated lessons (Lim & Khine, 2006). Ramorola (2013) emphasized allocating sufficient time for technology integration, promoting collaboration among teachers during lesson planning and professional development. BECTA (2004) suggested providing non-teaching contact time during school hours to overcome time barriers in training. In the Saudi context, Bingimlas (2009) proposes reducing teaching hours or increasing daily lesson time to facilitate effective ICT incorporation, along with improved time management skills. In Australia, Selwyn (2007) noted the struggle with ICT integration in universities due to academic requirements and busy schedules, highlighting the need for more time and support at a larger scale.

6. THE IMPORTANCE OF HAVING TECHNOLOGY PLANS

Previous research underscored the significance of technology plans as enablers of ICT integration. In American higher education, McGee and Diaz (2007) stressed the need for ongoing support, including infrastructure and design assistance, to prepare faculty members and students for effective ICT integration. They also recommended strategies such as identifying instructional needs, tool assessment, adoption planning, ongoing support, and continuous assessment. In the Turkish context, Goktas et al. (2009) conducted a study involving teacher educators and deans. The findings highlighted strong agreement among stakeholders on the importance of technology plans for ICT integration. Qualitative results revealed additional factors, including computer availability in classrooms, free laboratories, web support, ICT courses, teacher motivation, activity-based course design, and teacher educators serving as role models for effective ICT use. This underscores the need for effective technological plans to facilitate ICT incorporation without troubleshooting or challenges.

7. TEACHERS' POSITIVE ATTITUDES TOWARDS TECHNOLOGY

Previous research underscores the impact of internal variables, particularly teachers' attitudes, on technology integration. Teachers' attitudes towards ICT integration can be influenced by ICT preparation programs (Judson, 2006; Laborda & Royo, 2007; Liu & Huo, 2007; Mama & Hennessy, 2013; Park & Son, 2009; Prestridge, 2012; Wozney et al., 2006). Positive attitudes are crucial for the success of any educational program. Teachers' attitudes play a significant role in successful ICT integration and influence how they respond to computer technology (Teo, 2006).

A recent study by Akram et al. (2022) in Pakistan found that teachers exhibit positive perceptions of technology integration, which enhances instructional practices, makes learning interactive, and keeps students motivated. Additionally, Rahimi and

Yadollahi (2011) discovered that teachers' attitudes towards ICT integration are related to their competence in using technology. More competent teachers are more willing to integrate ICT into teaching. Bordbar (2010) highlighted the positive relationship between teachers' attitudes and competence, stating that higher computer competence enhances positive attitudes and, in turn, leads to ICT integration. Dragon et al. (2012) found that pre-service elementary teachers' interest and enthusiasm for technology integration increased over a two-year study, emphasizing the positive impact of technology on teaching. This factor significantly enhances university lecturers' ICT integration into teaching.

2.9 REFLECTION ON ENABLERS AND BARRIERS TO ICT INTEGRATION

It is clear from the discussion of barriers and facilitators of ICT that one is the mirror image of the other. For instance, when accessibility is considered a barrier, if it is present, then it is an enabler. It is also clear that some factors are perceived subjectively. For instance, some teachers might focus on the shortage of technical support such as access, infrastructure, and so on, while others see ways around such a shortage. This perception is mentioned by Ertmer (1999), who stated that some teachers draw attention to first-order barriers, which result in their second-order barriers. Further to this, Ertmer mentioned that the lack of integration of ICT can only be addressed when second-order barriers are tackled.

While this review has addressed ICT barriers and enablers as distinct categories, it is essential to recognize their strong interconnectedness. For example, Bingimls (2009) recommended that some constraints, such as insufficient ICT competence skills and insufficient access to ICT, are more closely connected to others. In research, it has been found that a lack of competence is one of the most significant barriers to ICT integration in teaching. This barrier has some relationship with other barriers such as

lack of training, lack of sufficient time, and lack of technical support. There is also a very close relationship between a lack of competence and confidence. For instance, teachers with low confidence in ICT may be resistant to participating in optional ICT training because they might be afraid of committing errors in front of other trainees. Therefore, their ICT competence skills will not be enhanced (Becta, 2004).

Indeed, teachers are affected by a variety of factors, but none of them is completely responsible. ICT may not be used even if the necessary hardware and software are available. It appears that ICT integration requires a combination of factors and a long-term perspective; skills and confidence may grow over time. Concerns about the use of ICT are often shared by teachers who teach the same subject matter. In the British setting, John (2005) found that teachers in secondary schools were concerned about the link between subject pedagogy and ICT integration. For them, the most important factor when integrating ICT is ensuring that the pedagogy is integrated when blended with ICT and that the learning outcomes are fully matched.

2.10   SUMMARY

This chapter reviewed the relevant literature to address the needs of this study and explain how the data was accessed and accumulated. It also discussed pronunciation as a life-and-death matter in the medical field, the pronunciation teaching practices, approaches, techniques, and strategies of pronunciation teaching and learning, the need for CALL/CAPT in pronunciation teaching and learning, as well as the lack of empirical, classroom-based research on pronunciation teaching and learning and teacher cognition research in this area.

Furthermore, theories and models of ICT uptake in teaching and learning, such as the diffusion model, TAM, TIM, TPACK, SAMR, and the TRIPLE E framework, were introduced. Additionally, a section about some factors that act as enablers and

barriers to the integration of ICT was introduced. The review included enablers of the incorporation of ICT in teaching, focusing on providing teachers with access to ICT and technical support through adequate training. By doing so, I was able to gain a clearer picture of what has already been written and have a stronger foundation for understanding and analysing the knowledge, actions, and practices that lie at the heart of the research questions, giving shape and direction to the study as a whole. The next chapter moves to the research methods used to design this study and employed for gathering data for analysis of the university teachers' and students' views around issues of the TRIPLE E PD workshops and the integration of ICT to support pronunciation learning and teaching in higher education in Jordan.

CHAPTER THREE
RESEARCH DESIGN AND
METHODOLOGY

3.1 OVERVIEW OF THE RESEARCH STUDY

Following on from the positioning of this research through the conceptualising section and the review of relevant literature, including the conceptual framework, this chapter explains the mixed methods design methodology, describes the sampling process, and describes the participants. This chapter also introduces the selection of methods and procedures used for data collection as well as the process of data analysis. In closing, establishing trustworthiness (e.g., credibility, reflexivity, and transferability) and ethical considerations were discussed, with particular attention paid to specific aspects such as access and acceptance, participants' rights, informed consent, and anonymity and confidentiality.

3.2 PHILOSOPHICAL UNDERPINNING OF THE RESEARCH

According to Mertens (2010), "a paradigm is a way of looking at the world; it is composed of certain philosophical assumptions that guide and direct thinking and action" (p. 7). Recently, there has been an increased focus on the debate about research paradigms, with some advocating for a dichotomy between positivism and constructivism, while others embrace pragmatism. Pragmatism is one of the common paradigms associated with the use of mixed methods, as suggested by Creswell and Clark (2018).

Bazeley (2018) and Cury and Nunez-Smith (2014) explain pragmatism as a philosophy that focuses on problem-solving, considering the research questions and the desired outcome, and then selecting a methodology that effectively addresses these

questions. Creswell and Clark (2011) defined it as a set of ideas articulated by many people, including historical figures such as John Dewey, William James, and Charles Sanders Peirce. Further to this, they added that it draws on many ideas, including employing "what works," using diverse approaches, and valuing both objective and subjective knowledge.

In recent years, many researchers have shifted away from the belief that one research paradigm or strategy is inherently superior (Gray et al., 2016). Instead, they have embraced the idea that acquiring knowledge may require the use of multiple research strategies. Notably, Creswell and Clark (2018) and Leavy (2017) advocate for the use of mixed methods as a way to move beyond the traditional dichotomy of positivism and constructivism, towards a more pragmatic approach. Furthermore, according to Williams (2019):

> Pragmatic researchers, therefore, grant themselves the freedom to use any of the methods, techniques, and procedures typically associated with quantitative or qualitative research. They recognise that every method has its limitations and that the different approaches can be complementary (p.39).

The philosophy of pragmatism is based on the notion that researchers should use the philosophical and/or methodological strategy that proves most effective in addressing the specific research topic (Tashakkori & Teddlie, 1998). Thus, it is essentially a practical approach rather than an idealistic one (Cohen et al., 2011), and it is "practice-driven" (Denscombe, 2008, p. 280).

It claims that there may be both singular and multiple versions of the truth and reality, sometimes subjective and sometimes objective, sometimes scientific and sometimes humanistic. (Cohen et al., 2011). Other researchers (e.g., Onwuebuzie &

Leech, 2005; Creswell & Clark, 2018), argue that pragmatism is pluralistic and oriented towards "what works" to answer the research questions as one of the most useful approaches as a combination of experiments, case studies, surveys or whatever such combination of instruments can enhance the quality of research. This indicates that the world is not exclusively quantitative or qualitative but a mixed one (Cohen et al., 2011).

This mixture of methods can enhance compatibility (Creswell & Clark, 2018). As a result, the use of mixed methods research by researchers is frequently associated with the construction of knowledge from a pragmatist worldview that focuses on the research questions rather than the methods, as well as the use of multiple data sets and methods to examine the phenomenon being investigated, which may employ both formal and informal rhetoric (Biesta, 2010; Creswell & Clark, 2018).

3.3 RESEARCH APPROACH

The discussions between the advocates of quantitative and qualitative research methods have traditionally been framed as a clash of opposing schools of thought. However, many contemporary authors, such as Dörnyei (2007), Creswell (2014), and Cohen et al. (2011), argue that these two methods should not be viewed as mutually exclusive, but rather as a part of a continuum in practice. Qualitative research techniques, for example, are described as a procedure where the research problem is expolred in its natural setting rather than in a laboratory, immersing the researcher in the world of the respondents and revealing the relationships between different factors within the setting (Creswell, 2007; Denscombe, 2017). The qualitative research method allows for the collection of a large amount of information from various sources because it addresses questions such as "what," "how," and "to what extent," which aids in gaining a comprehensive understanding and meaningful insights into the issues from the

perspectives of the participants or involved audiences (Onwuegbuzie & Leech, 2006; Silverman, 2017). Roller and Lavrakas (2015) pointed out that qualitative research assumes that the answer to any single research question or objective lies within a host of related questions or issues relating to "deeply seeded aspects of humanity" (p. 1).

The data collected through the qualitative research method is not restricted by predefined categories, but it allows for in-depth information and insights (Patton, 1987). Qualitative results are not derived from statistical processes or quantification approaches but are gathered through open-ended questions that allow respondents to freely express their opinions. This can be achieved through various methods, including interviews, observation, ethnography, and focus groups (Creswell & Clark, 2011; Naoum, 2008).

The use of qualitative techniques offers multiple benefits. It builds rapport and relationships between the interviewee and the interviewer. It allows the interviewer to provide additional explanations while taking notes from the interviewee if there are any misunderstanding questions. Furthermore, it benefits both the researcher and the participants by allowing interviews to take place at any time and in any location, such as interviewees' homes, on the street, in a shop, or in an office. Other advantages can include face-to-face communication between the researcher and participants, interviewing in a relaxed and conducive atmosphere, easy identification of body language and expressions, accuracy, high researcher control of the discussion, and a high rate of response from the respondents (Creswell & Clark, 2011; Jackson, 2009; Naoum, 2008; Roulston, 2010). Given, (2008) states that qualitative approaches examine phenomena and capture individuals' thoughts, feelings, or interpretations of meaning and process. It is mainly suited to investigating university lecturers' practices

of pronunciation teaching with the employment of technological tools and instructional strategies that enhance learning goals.

In contrast, quantitative research methods offer distinct advantages. Quantitative data collection allows for the systematic measurement and analysis of variables, enabling researchers to draw on statistical techniques to identify patterns, relationships, and trends in the data. This approach provides a high level of precision, reliability, and generalizability of findings to a larger population (Bryman, 2016; Creswell & Creswell, 2017; Yilmaz, 2013). Additionally, quantitative research is structured, enabling the researcher to create standardized surveys or tests that can be administered to large samples, facilitating the comparison of data across different groups or conditions (Newman, 2007). Quantitative research methods are well-suited for investigating numerical or objective data, examining the strengths of associations or disparities between variables, and testing hypotheses and theories through statistical analysis (Creswell, 2014; Creswell & Creswell, 2017). The systematic and structured nature of quantitative research guarantees that data is collected and analysed in a way that reduces bias and subjectivity, enhancing the objectivity and rigor of the study (Bryman, 2016).

Thus, in the context of this research study, a mixed-method approach that encompasses both quantitative and qualitative methods enable the harnessing of the strengths of both approaches to gain a holistic understanding of university lecturers' practices of pronunciation teaching with the integration of technological tools and instructional strategies. This approach allows to triangulate findings, enhancing the validity and credibility of the research results. The following section seeks to provide a rationale for the selection of a case study as the mode of reporting this research.

3.3.1 CHARACTERISATION OF CASE STUDY

The present study adopts a case study approach within a mixed-methods design. A case study is defined as "the case study method explores a real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information, and reports a case description and case themes" (Creswell, 2013, p. 97). Meriam (2009) stated that "a case study is an in-depth description and analysis of a bounded system" *(p. 37)*. A case study is a combination of a design, a data collection method, and a data analysis technique (Yin, 2009).

According to Meriam (2009), the advantage of case studies is their unique and distinguishing characteristics: Particularistic (it focuses on a particular situation, event, programme, or phenomenon); descriptive: it yields a rich, thick description of the phenomenon under study; heuristic: it illuminates the reader's understanding of the phenomenon under study. It is naturally agnostic since it can be assigned to different ontological, epistemological, or methodological positions (Harrison et al., 2017). Considering these reasons, I believe that employing a case study approach in this research project is appropriate, as it allows for the exploration of multiple realities can be co-constructed between the researcher and the participants (Lincoln et al., 2011).

Capturing a rich sense of context is essential in reporting a case study, principally when activities and knowledge in action drive the theoretical proposition. Considering the merits of a qualitative case study (Stake, 2005), the aspiration to gain different perspectives, and the confirmation of a holistic account (Creswell, 2009), the unit of analysis, rather than the topic of investigation, characterizes a case study (Merriam & Tisdell, 2015). Further to this, there is the need for systematic procedures (Golafshani, 2003).

Yin acknowledges that case studies can encompass a spectrum of both qualitative and quantitative approaches. Although Stake (2005) asserts that a case study is constructed using qualitative data, notably observations and interviews, in shaping case studies, the research under consideration here adopts a methodological stance characterized by the synthesis of various research instruments. These instruments encompass interviews, questionnaires, focus groups, and classroom observations, serving the purpose of illustrating the applied methodology, as advocated by Mercer (2004, p. 138). This incorporation of different methods serves as a ″triangulation technique″ to certify trustworthiness (Lincoln & Guba, 1985, pp. 359–360). They serve as a clarification of meaning and a demonstration of the diversity of perceptions.

A case study requires an integrated, holistic comprehension of the case's complexity. Since this study is promoted by concrete and empirical issues, the first step was to gain insight into the existing usage of technology in teaching English pronunciation and how they teach English pronunciation with the use of technology, and this was done through the distribution of an online questionnaire via Qualtrics. As a researcher, I have found Qualtrics Survey to be user-friendly when creating a questionnaire and easy to implement. It also facilitated anonymity, as the option of IP addresses could be removed. Furthermore, it gives the respondents the ability to save their progress and resume the questionnaire at a later time. Alston and Bowles (2020) argued that the ability to vary the layout and presentation of your online questionnaire is increasingly important. Accordingly, it is accepted that the font and colour used will affect the response rate, and Qualtrics software provides a range of features and layouts. I also conducted individual interviews before the workshop with the 12 participants. The number 12 has been previously recommended by some researchers (Braun & Clarke, 2013; Fugard & Potts, 2015; Guest et al., 2006) as the minimal sample size to reach data

saturation. The participants have different academic backgrounds, including senior lecturers, associate professors, assistant professors, and instructors. Interviews serve as a bridge between conducting workshops and classroom observations, aligning with the characteristics of adopting multiple methods.

3.3.2 FOUNDATIONS OF THE CASE STUDY DESIGN

Gerrings (2006) suggested that the term ″case study" is "a definitional morass". According to Lune and Berg (2017), the purpose of case studies is to characterise and explain phenomena by systematically examining one location, a single topic event, or a series of connected events. It is clear that researchers have many different things in mind when they talk about case study research. Although identifying the case or unit of analysis can be difficult (Baxter & Jack, 2008), it is possible to extract some of the more widely agreed upon principles. Yin (2009) stated that one of the most prominent supporters of case study research defined it as an in-depth empirical analysis of a current phenomenon in its real-life setting, especially when the boundary between phenomenon and context is obscured.

While Yin (2009) defined a case study as a phenomenon, other researchers like Stake (1995) used the term "issues" as "intricately wired to political, social, historical, and especially personal contexts" (p. 17). Baxter and Jack (2008) suggested that these issues can help define the scope of the study as they usually come from professional experience, personal experience, and generalisations based on empirical data or theories. In this context, the issues have been refined through my teaching experience in TEFL, the use of educational technologies, and teacher education, along with insights from the literature and a blend of personal and observed classroom practices.

In this research study, the case or unit of analysis is university lecturers who engage in teaching English pronunciation through the incorporation of technological

tools and instructional strategies that enhance pronunciation learning goals. The focus of the study is to explore university lecturers' practices in pronunciation teaching following their participation in a four-session workshop. Further support is given by Hamilton and Corbett Whittier (2013), as one of the prominent advocates of case study research asserts that the aim is to capture the complexity of relationships, beliefs, and attitudes within an abounding unit through the employment of multiple forms of data collection, exploring more than one perspective.

In this research project, the case is bound to include those university lecturers who use technological tools (e.g., Youglish, ELSA, Rose Medical, Vocaroo, online dictionaries, Quizziz, and other related educational tools) with university students learning English pronunciation in a university environment. The university is located in the northern region of Jordan. The sample is limited to those who use technology to teach English pronunciation. For logistical reasons, participants were selected from locations within a reasonable distance of the researcher's home.

Designing a case study depends on its purpose. Thus, while Yin (2009) used the terms "explanatory", "exploratory", and "descriptive " to classify different types of case studies (pp. 9–10), Stake (2005) categorised case study work into three groups: intrinsic, instrumental, and collective. However, Creswell (2009) assured the significance of merging both perspectives in a "strategy of inquiry" to predict case study research combining both strategic and descriptive aspects alongside the object of exploration (p. 13).

Referring to Stake's (2005) categorisation, an intrinsic case study is undertaken when a single case is so unique or important to the investigator or researcher that there is no desire to generalize to any other cases. The purpose of an intrinsic case study is to

gain a thorough understanding of a particular case in question, such as a person, a small community such as a classroom or a school, or an educational programme (Mackey & Gass, 2005; Yin, 2009). An instrumental case study is used when the investigator is pursuing insight into an issue or wants to challenge some generalisation, rather than the case in its entirety. However, when there is no interest in the examination of an individual case, a collective case study extends this examination to multiple cases to examine some general phenomena (Stake, 2005).

As the current research project seeks to explore university lecturers' practices of ICT integration in the classroom and identify how ICT is integrated with appropriate pedagogy, a multiple case study approach will be adopted for the present research. According to Mackey and Gass (2005), the benefit of conducting case studies with more than one case or working with multiple cases is that it provides the investigator with multiple perspectives and the opportunity to compare across cases. According to Yin (2009), having two cases in the research can help mitigate such criticism. However, by including more than two cases, as in this research study, the results can be strengthened further. While the cases in this study are relatively small in number, they have not been chosen haphazardly, and they are not intended to be representative of the entire community. The main value of the case study lies in providing detailed into the phenomenon under investigation, rather than in making broad generalisation (Bishop, 2010).

Case study inquiry, on the other hand, is not generalizable, a fact that is frequently made in opposition to this method (Wellington, 2015). Stake (1995), predictably, dismisses such criticism, arguing that "the real business of case study is particularization, not generalisation" (p. 8). Furthermore, this research study is grounded in ontological and epistemological assumptions that acknowledge social reality as

subjectively experienced and socially constructed. As a result, the study does not aim to make broad generalisations.

3.3.3 TYPES OF MIXED METHOD DESIGNS

Timans et al. (2019) claimed that "mixed-methods research (MMR) scholars seem to be committed to designing a standardised methodological framework for combining methods" (p. 212). Further to this, they argue that while MMR transcends its native epistemology, it still draws from both qualitative and quantitative research approaches, which is evident in the data collected. As a result, various scholars (Ivankova & Clark, 2018; Creswell & Clark, 2018; Terrell, 2012; Wilkinson & Staley, 2019) have proposed different types of mixed-methods research designs. Creswell and Clark (2018), for example, categorise mixed method research into six major designs: (1) convergent parallel design, (2) explanatory sequential design, (3) exploratory sequential design, (4) embedded design, (5) transformative design, and (6) multiphase design. In light of the goals of using mixed methods research in this study, the explanatory sequential design is appropriate for this research project.

The explanatory sequential design involves two distinct interactive phases, with the first comprising the collection and analysis of quantitative data to expand on the initial quantitative results. The second phase is then designed based on the findings from the first phase, focusing on qualitative data (Creswell & Clark, 2018; Shorten & Smith, 2017). In this design, researchers follow up on specific quantitative findings and provide explanations using qualitative data (Wisdom & Creswell, 2013). Creswell and Clark (2018) recommend that researchers should transition from a postpositivist to a constructivist theoretical assumption when employing this design. They start with a postpositivist approach to select instruments and later shift to a constructivist

assumption to value multiple perspectives and pursue in-depth exploration (Creswell &
Clark, 2018).

Quantitative	Quantitative	Qualitative	Qualitative	Interpretation
Data collection	Data Analysis	Data Collection	Data Analysis	
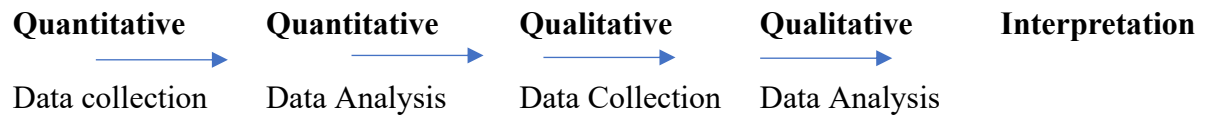
Figure 7: Sequential Explanatory Research Design (Creswell& Clark, 2007)

According to Tashakkori and Teddlie (1998), the sequential explanatory
research design can be utilised when researchers want to make groups based on the
quantitative results and follow up with a group through subsequent qualitative research
instruments. Creswell et al. (2006) suggested using the characteristics of quantitative
participants as a guide for purposeful sampling in a qualitative phase. These approaches
agree with this research study, as qualitative participants (university lecturers and
students) were purposefully selected (see Figure 8 below).
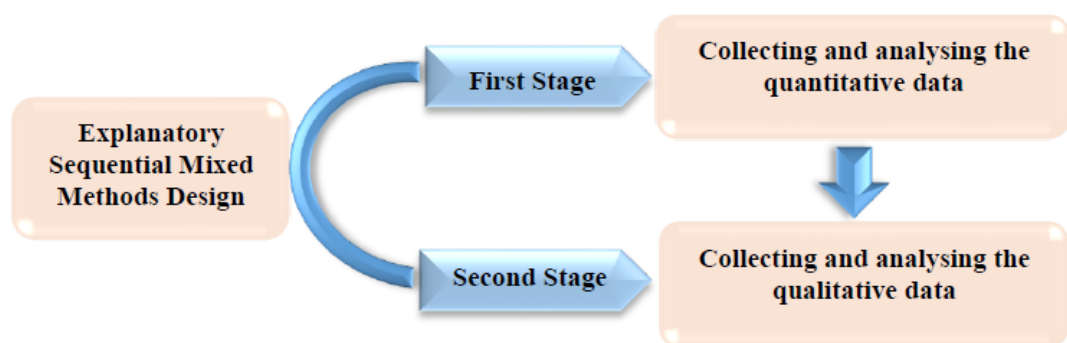
Figure 8: The research design of this study

3.3.4 RATIONALE FOR USING MIXED - METHOD RESEARCH

The combination of qualitative and quantitative approaches within a study offers a
multifaceted perspective, enriching the comprehension of intricate phenomena (Poth &

Munce, 2020). This mixed-methods research (MMR) approach leverages the consolidation of data from various sources, enabling a comprehensive exploration of the subject (Shorten & Smith, 2017). Reams and Twale (2008) underscore the necessity of mixed methods to attain diverse information, foster data synergy, and produce less biased and more accurate conclusions.

Six primary reasons advocate for the use of a mixed-methods approach. First, it expands the research scope, facilitating a deeper investigation through the collection of both quantitative and qualitative data (Creswell, 2003). Second, it broadens the range of perspectives, encouraging deeper insights and potential avenues for future research (Teddlie & Tashakkori, 2009). Third, combining the two approaches offers complementary insights and holistic views (Maxwell, 2016; Morgan, 2014; Venkatesh et al., 2013). Fourth, it reconciles epistemological differences and promotes in-depth understanding (Bergman, 2008; Lund, 2012). Fifth, it compensates for each method's limitations, enhancing the reliability of conclusions (Clark & Ivankova, 2016). Lastly, triangulation enhances the confidence in results by cross-referencing multiple data sources (Bergman, 2008; Ventakesh et al., 2013). These motives align with the five reasons synthesized by Tariq and Woodman (2013): complementarity, development, initiation, expansion, and triangulation.

The explanatory design, classified as the most straightforward mixed-methods design (Creswell & Clark, 2011), offers advantages such as a clear quantitative starting point, feasibility for single researchers, and an opportunity to tailor the qualitative phase based on insights gained from the quantitative phase. However, challenges include the time-intensive nature of implementation, the need to navigate institutional review boards, and the strategic decision-making regarding the second-phase sampling.

3.4 PILOT STUDY

The piloting process is thought to be crucial to research (Allen, 2017). It contributes to the improvement of the quality and validity of a research study (Jonker & Pennink, 2010). A pilot study was conducted prior to the main study, considering the potential positive effects of the planned research. The primary goal of the pilot study is to anticipate any potential problems in the design of the questionnaire instrument, such as leading questions and loaded or ambiguous words, and to check the clarity of the statements in the questionnaire. By doing so, it ensures the validity and reliability of the study (Dorney, 2007). The pilot study involved five second year Ph.D. students. The five students were studying at the University of Strathclyde. The students were briefed at the outset about the aim of the pilot study and the purpose of the research project. Then, they were asked to complete the questionnaire within a specific time range of 10 to 15 minutes. After completing the questionnaire, they were asked to comment on the content to identify any ambiguous words and check the clarity of the statements. Based on their comments, the questionnaire was finalized for distribution via Qualtrics.

3.5 RESEARCH POPULATION AND SAMPLING

As previously mentioned in Section 2.12, this study sought to answer three research questions. The figure below illustrates the design of the present study. It presents the number of participants in each phase as well as the instruments and data analysis used to answer the research questions.
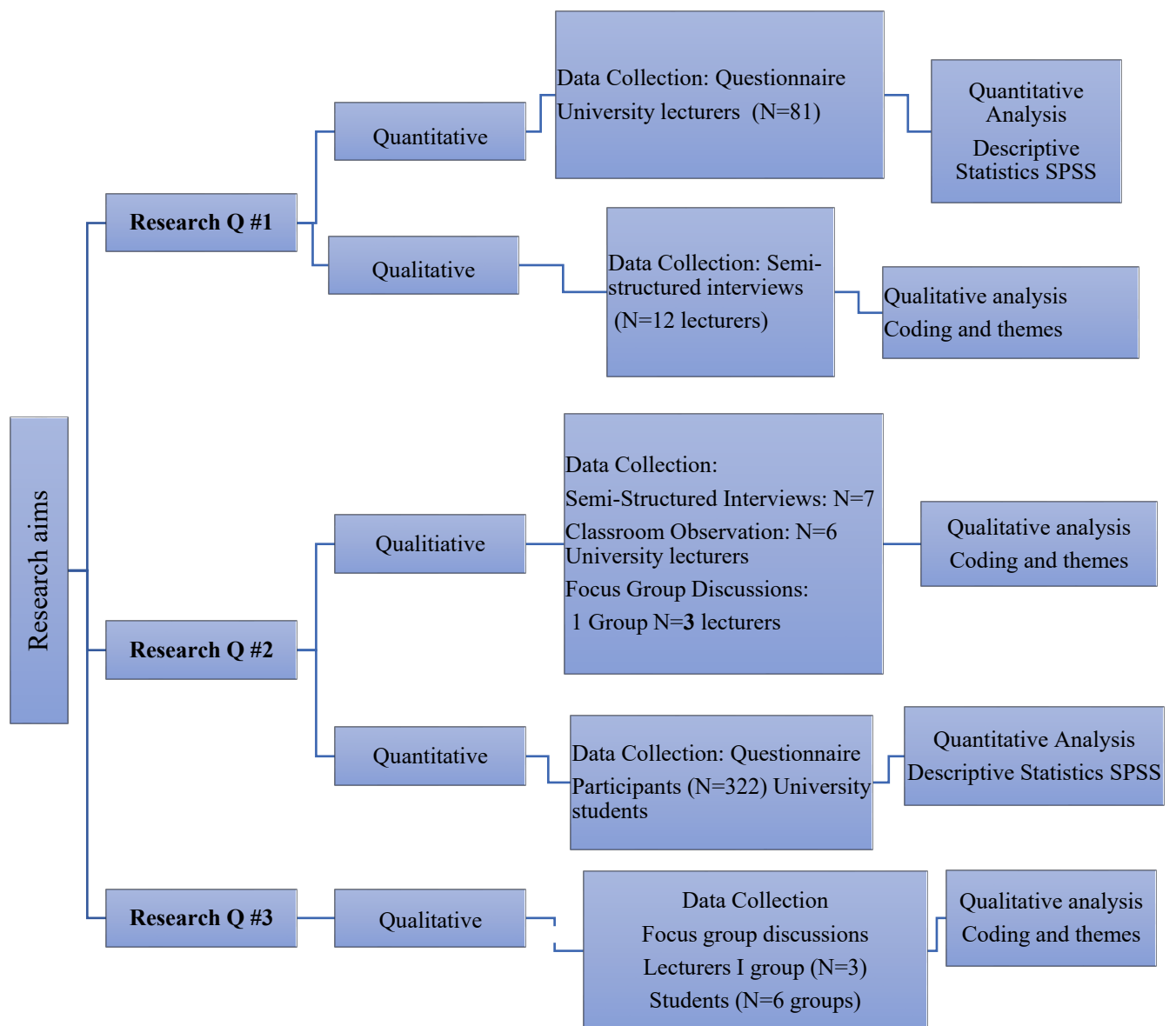
Figure 9: Research Design

From the figure above, we can see that this study employed a purposeful sampling process to recruit its intended participants. Therefore, the selection criteria were based on university lecturers who are working full-time and are fully dedicated to using English in their teaching and their willingness to participate. In this way, a process of "purposive sampling"—which is the deliberate choice of participants based on specific qualities they possess was used to select participants for this study. This

technique is a non-random method that does not require fundamental theories or a set number of respondents. The researcher decides, in simple words, what needs to be known and determines the participants who can participate and provide valuable information. It is primarily used in qualitative research to hand-pick cases for inclusion in the sample based on their judgement of their typicality and possession of rich information for the most effective use of available resources (Cohen et al., 2011; Bernard & Flitman, 2002; Denscombe, 2008; Patton, 2002).

According to Creswell and Clark (2011), purposive sampling requires knowledgeable or experienced individuals as participants. In this research, the participants were selected based on their professional status to obtain accurate and updated insight into the integration of technological tools and instructional strategies in teaching English pronunciation after attending the four training sessions. Sharma (2017) stated that there are many advantages to adopting purposive sampling techniques, as they can provide the researcher with a clear justification to make theoretical, analytical, and logical generalisations about nature from the studied sample. Moreover, it can include different phases, and each phase builds on the previous one. In these instances, purposive sampling is useful in providing non-probability sampling for the researcher to rely on. For instance, critical case sampling might be used before expert case sampling in case the researcher investigates a specific phenomenon further.

Despite the advantages of purposeful sampling explained above, there is a common criticism of using a purposefully selected sample as it cannot be representative of the whole population. It is relatively small and every participant in the study is considered a unique case, reporting his or her perspective and experience in a specific context. As a result, the generalisability of the results is limited, meaning that the findings of this small-scale study cannot be applied to the whole population (Thomas,

2013). Nonetheless, as was previously mentioned, generalisability is not the main concern in this qualitative research, as the main objective of this study is to collect detailed and rich information to investigate the impact of the TRIPLE E PD workshops on enhancing Jordanian university lecturers' TPACK competencies and pronunciation teaching practices in the classroom. This case study has valuable characteristics such as particularity, rich contextualization, thick description, and interpretation, along with triangulations, which are strengths that are more significant in qualitative research than generalization and objectivity are in quantitative research (Cohen et al., 2011; Punch, 2009).

In order to reach the intended participants, an invitation to take part in the study was emailed to all the participants, where the purpose of the TRIPLE E workshops, as well as the benefits and responsibilities of participants, were clearly stated. This allowed me to identify participants who were directly involved in using ICT for pronunciation teaching. It was clearly stated that all university lecturers were willing to participate in the TRIPLE E workshops. All university lecturers teaching in English had equal access and opportunity to participate, as a convenience sampling method was used. The second approach to recruiting participants was to make direct contact with the faculty, presenting, and inviting them to participate. In the first phase of the research, a quantitative approach involving a questionnaire was used to collect numerical data from a sample of 81 university lecturers. This phase also helped identify potential participants for the subsequent qualitative phase. The second phase incorporated qualitative methods such as semi-structured interviews, classroom observations, and focus groups to gain a deeper and more detailed understanding, enhancing the research's validity and reliability. The university lecturers in this study were invited to complete the questionnaire based on specific criteria, as illustrated in Figure 10 below.
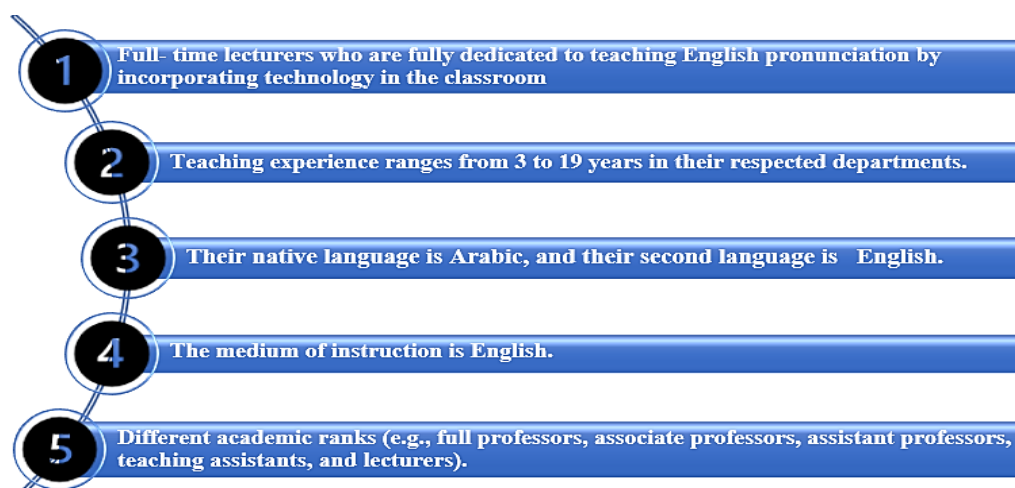
Figure 10: Inclusion Criteria

The demographic analysis found that most of the respondents were male, and they primarily held assistant professor positions. In terms of age, a significant portion was 40 years or older, with many falling within the 36 to 40 age range. Regarding academic qualifications, roughly half of the participants held Ph.D. degrees, indicating a high level of academic achievement, while nearly a quarter had master's degrees. When it came to teaching experience, a substantial proportion boasted over a decade of expertise, signifying a wealth of experience. Others had between 4 to 10 years of teaching experience, indicating a moderate level of experience, while a smaller group had 1 to 3 years of teaching experience, suggesting they were relatively newer to the field. This demographic overview provides valuable context for understanding the diverse characteristics of the lecturers who contributed to this research study.

Next, 12 full-time university lecturers with different academic ranks were recruited to participate in the interview and the TRIPLE E PD workshops. The participants in this phase are both Jordanian male and female university lecturers who are teaching different subjects. They employed different dialects, including American English, British English, and Technical English, as the medium of instruction. They are of different academic ranks (e.g., full professors, associate professors, assistant

professors, teaching assistants, and lecturers) with different teaching experiences ranging from 3 to 19 years in their respective departments. In the case of students, this primarily consists of male and female university students, all of whom have Arabic as their native language and English as their second language.

In the quantitative phase, a total of 322 students participated by completing a questionnaire after observing their classes. Additionally, during the qualitative phase, focus group discussions were held with six distinct groups of students from various classes and academic years, all of whom were selected from the observed classes. The demographic analysis revealed that the majority of participants were female (92%), with a smaller representation of male students (8%). In terms of age, a significant proportion fell within the 18 to 22 years old range (87.5%), while a minority were aged 23 or older (12.5%). Regarding their years of study, senior students formed the largest group (35.22%), followed by juniors (30.23%), sophomores (22.26%), and first-year students (11.3%). This demographic information is vital for comprehending the background and roles of the study's participants and was meticulously analysed using SPSS software and Excel spreadsheets.

3.5.1 THE EXPERIMENTAL GROUP

Initially, 12 university lecturers with different academic ranks (senior lecturers, associate lecturers, deans, heads, and instructors) participated in the 15-hour TRIPLE E workshops. However, only 7 participants completed all the required components for the study, including the 4th session of the workshop. Therefore, data from only seven participants was included in the analysis of the study. The TRIPLE E PD workshops were attended by seven full-time university lecturers. The majority of the participants were female (90%) and aged between 27 and 45. They majored in pharmacy and medicine, and they used English as a medium of instruction in their pronunciation

teaching. Furthermore, the participants collectively possessed a noteworthy range of teaching experience, with 70% having taught in higher education for a duration spanning from three to sixteen years.

Participant (Pseudonym)	Gender	Qualification	Length of teaching experience (years)
UL1	Male	Post-Doctoral degree (abroad)	10 years
UL2	Female	Master's degree in Jordan	4 years
UL3	Female	Master's degree in Jordan	4 years
UL4	Female	Master's degree in Jordan	7 years
UL5	Female	Master's degree in Jordan	5 years
UL6	Female	Master's degree in Jordan	6 years
UL7	Female	Doctoral degree (abroad)	7 years
UL8	Female	Doctoral degree (abroad)	10years
UL9	Male	Doctoral degree (abroad)	10 years
UL10	Male	Doctoral degree (abroad)	10 years
UL11	Female	Doctoral degree (abroad)	8 years
UL12	Male	Doctoral degree (abroad)	15 years

* UL: university lecturer

Table 3: Biography of the university context participants (Pseudonym).

Out of the 12 participants, six agreed to participate in the observation phase of the study. As shown in Table 4 below, all participants are female except one (UL1), who holds a Ph.D. from abroad. UL2, UL3, UL4, UL5, and UL6 are the only lecturers who are in their thirties and have three to seven years of teaching experience, all at the university. They stated in the interviews their willingness to learn and effectively integrate new educational tools and instructional strategies into their English pronunciation teaching.

Participant (Pseudonym)	Gender	Education	Preferences of Accent	Length in English-speaking countries	Teaching experience
UL1	Male	Post-Doc	American	America	10 years
UL2	Female	Master	British	Only Jordan	4 years
UL3	Female	Master	British	Only Jordan	4 years
UL4	Female	Master	American	Only Jordan	7 years
UL5	Female	Master	American	Only Jordan	5 years
UL6	Female	Master	British	Only Jordan	6 years

* UL stands for a university lecturer

Table 4: Background information of the observation group

3.6 DATA GENERATION AND COLLECTION

Capturing a rich sense of context is essential when reporting a case study, especially when activities and knowledge in action drives the theoretical proposition. Considering the benefits of a qualitative case study (Stake, 2005), the desire to gain different perspectives, and the need for a holistic account (Creswell, 2009), the unit of analysis categorises a case study rather than the topic of investigation (Merriam & Tisdell, 2015). Additionally, systematic procedures are required (Golafshani, 2003). Accordingly, for this research study, I chose to employ different research methods, including semi-structured interviews, focus group discussions with university lecturers and students, and classroom observation as the main methods demonstrating the "methodology in action" (Mercer, 2004, p. 138). According to Stake (2005), the case study is constructed using qualitative data such as observations, interviews, and documents.

This incorporation of different methods serves as a ″triangulation technique″ to certify trustworthiness (Lincoln & Guba, 1985, pp. 359–360) and to clarify meaning while demonstrating the diversity of perceptions. A case study requires an integrated, holistic comprehension of the case's complexity. As this study is motivated by concrete and empirical issues, the first step was to gain insight into the existing usage of technology in teaching English pronunciation and how it is integrated with ICT. This was accomplished through the distribution of an online questionnaire via Qualtrics. Additionally, I conducted semi-structured interviews with twelve participants before the workshop. The number of twelve has been recommended by some researchers (Braun & Clarke, 2013; Fugard & Potts, 2015; Guest et al., 2006) as the minimal sample size in qualitative research studies to reach data saturation. These participants have different academic backgrounds, including senior lecturers, associate professors, assistant

professors, and instructors. Through this integration of multiple methods, interviews serve as a bridge between conducting workshops and classroom observations.

3.6.1 INSTRUMENTATION

This study adopts a case study approach situated in a mixed-methods design. In other words, both qualitative and quantitative data have been collected to answer the research questions through four major sources. The four data sources included questionnaires, classroom observations, semi-structured interviews, and focus groups (see Table 5). To collect the intended data for analysis, various instruments were developed, including two questionnaires (for university lecturers and students), class observation, interviews, focus group guides, and teaching artefacts. Each will be described in turn.

Materials	Data Collection Instruments
Questionnaire	University lecturers' and students' questionnaires were created and published on the Qualtrics Strathclyde site.
Interviews	The semi-structured interview guide was developed by the researcher and conducted with university lecturers.
Focus group	The focus group interview was developed by the researcher to include both university lecturers and students after classroom observation.
Classroom Observation	This included observing university lecturers' integration of ICT and instructional strategies after attending the TRIPLE E PD workshop.

Table 5: Summary of Data Collection

3.6.1.1 QUESTIONNAIRES

A. FOR UNIVERSITY LECTURERS

With quantitative methods, questionnaires have become one of the most common research instruments for collecting data in the social sciences (Dörnyei & Taguchi, 2010). Due to the essence of scientific research, which "is trying to find answers in a systematic manner," it is no wonder that questionnaires are the most popular method in quantitative research (Dörnyei and Taguchi, 2010, p. 1). The main attraction of using questionnaires is their unprecedented efficiency in terms of efficient use of time, effort,

and financial resources (Dörnyei & Taguchi, 2010). To put it simply, the processing of the data can be fast and relatively straightforward, especially by using some modern computer software (e.g., Qualtrics). Versatility is another advantage, which means that they can be used successfully with different people in different situations, targeting a variety of topics, or, on the other hand, having the possibility to reach "small, scattered, or specialised populations" (Dörnyei & Taguchi, 2009, p. 121). Moreover, O'Leary (2014) suggests that questionnaires can reach a large number of respondents, represent a large population, make data comparable and amenable to analysis, and generate standardised, quantifiable, and empirical data. Questionnaire research, however, also has several limitations, such as the inevitable self-selection bias. Indeed, the impossibility of applying a systematic, purposive sampling strategy as the participants are self-selected.

Another limitation is the possibility of declining to fill out the questionnaires or having less enthusiasm for participation, as some might leave some questions without answers or answer the questionnaires randomly (Dörnyei, 2007). O'Leary (2014) points out that there are some concerns regarding the use of questionnaires in terms of being time-consuming and expensive, and sampling is difficult. Further to this, they are notoriously difficult to get right and do not go as planned.

Questionnaires can be structured or unstructured. Structured questionnaires include pre-coded questions usually linked with quantitative research, such as numerical data (e.g., how many?). How often? How satisfied? (Gay & Airasian, 2000). There are many advantages to using structured questionnaires, such as fewer discrepancies, ease of administration, consistency in answers, and ease of data management. In this research study, I opted to use a structured approach with different types of questions, such as closed-ended and open-ended questions, as the bias is significantly minimised as the

questions are standardised within common categories and transparent ones are asked (with a limited, predetermined set of answers). They are written with the specific objective of either confirming or rejecting a set of hypotheses. Not only is the validity of the research enhanced by using this format, but accurate findings are provided based on reliable data that can be precisely calculated in the findings. Accordingly, to obtain quicker results, this approach has been adopted by many scholars (e.g., Cohen et al., 2005; Gay & Airasian, 2000; Mason, 2017; Esterby-Smith et al., 2021). In addition to this, structured questionnaires are ideal for statistical descriptions, and so they are ideal for asking about factual matters such as occupation, age, and gender (Bechhofer & Paterson, 2012).

In the case of this research study, the development of the questionnaire followed suggestions from Brown (2002) to ensure clarity, ease of answering, and a simple, reader-friendly layout. An introductory letter preceded the questionnaire, informing participants about the main purpose of the research study and data collection nature. This also stipulated that all the replies from the participants would only be utilised for this research project. The introduction letter also clarified that the participants are required to answer all questions.

The researcher's personal information, including his email and mobile number, was included in case respondents wished to make any further inquiries. The participants were also thanked for their time. As a condition of ethical approval, the participants were required to read the participant information sheet and tick to indicate informed consent for inclusion in the study. Providing their consent was the only compulsory part of the questionnaire. The questionnaire was open from April 2021 to January 2022 to allow sufficient time for data collection and minimise coverage and non-response errors. To access as many eligible English language teachers as possible, the questionnaire was

widely advertised through various channels, including the presidency of the named university, deans, heads, the scientific research department, and the MOODLE platform. They assisted in distributing the questionnaire link to the participants. Furthermore, multiple visits to departments and reminder emails also encouraged more responses. However, non-response errors persisted, leading the researcher to seek approval from two other universities to expand the participant pool. The following figure displays the sections included in the questionnaire:

- Demogaphic background Information

- Teaching experiences

- Prior knowledge and use of technology in pronunciation technology.

- Perceptions and attitudes toward technology integration.

- Access to technological tools for teaching English ponunciation in the classroom, computer and english lab.

- The percentage of using technolgical tools in the classroom, english lab and computer lab.

- The rationale for using technological tools (e.g. for teaching pronunciation, practice, homework or assesssment).

Figure 11: University lecturers' questionnaire sections

The questionnaire was developed based on the literature review and the conceptual framework for this study. Qualtrics (an online survey tool) was used to collect quantitative data from the survey. Eight items were adapted from Kessler (2007) to measure university lecturers' knowledge of ICT integration, relevant to teaching techniques in English pronunciation, content knowledge, materials creation, and evaluative abilities. Participants were asked to respond on a five-point Likert scale, with 1 indicating strongly disagree and 5 indicating strongly agree.

B. FOR STUDENTS

The student questionnaire aimed to investigate the impact of the TRIPLE E PD attended by university lecturers on their pronunciation learning environment. It was developed based on the literature review and the study's conceptual framework. Qualtrics was used to collect data from university students who were taught by the six observed university lecturers. The figure below covers the sections included in the questionnaire. The questionnaire was open from April 2021 to January 2022 to allow enough time for data collection and minimise coverage and non-response errors. To reach as many of the university students as possible, it was essential to advertise the questionnaire widely using multiple and varied means, including their lecturers and the MOODLE platform.

1 Demographic informaion.

2 The tools that university lecturers used for pronunciation teaching.

3 The tools that university students used to improve pronunciation learning.

4 The most helpful technological tools that university lecturers used.

5 The willingness for more technology or not for pronunciation learning.
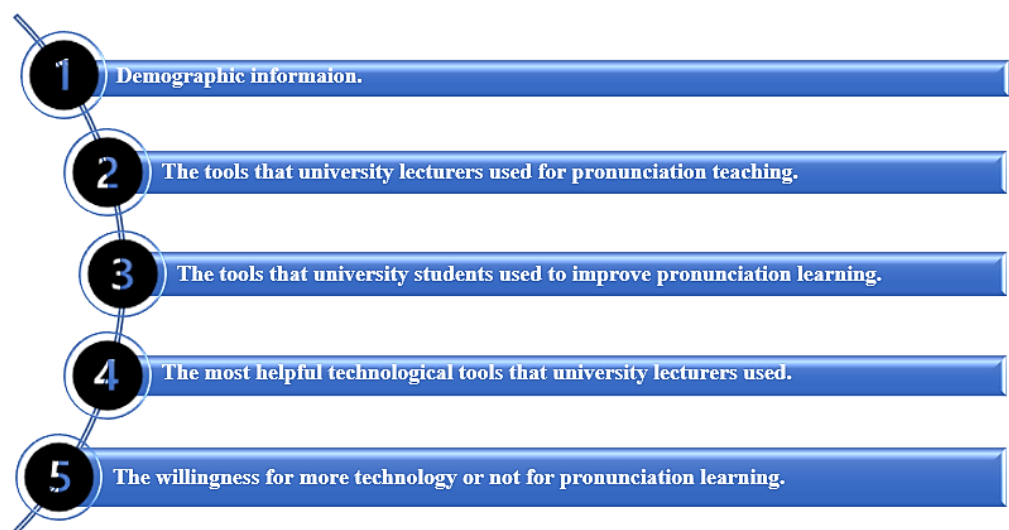
Figure 12: Students questionnaire sections

3.6.1.2 INTERVIEWS

Interviews are defined as "a mode of communication where one party, the researcher or interviewer, asks questions and the other side, the respondent or interviewee, provides answers" (Marvasti & Tanner, 2020, p. 329). Qualitative interviews can be conducted face-to-face, via telephone, video conferencing, Skype, or

email (Creswell & Creswell, 2017). In this study, face-to-face interviews were chosen with the opportunity to build rapport, pick up on visual cues, and use gestures (Creswell & Creswell, 2017).

The rationale for using the interview as a data source is that it is one of the most commonly used methods in the social sciences and one of the most useful sources of data collection due to its adaptability, openness, and responsiveness to context (Bryman, 2012, 2006; Busetto et al., 2020, Cohen et al., 2018; Creswell, 2013; Creswell & Clark, 2018; Marvasti & Tanner, 2020; Yin, 2014). Interviews involve a sort of actual discussion or dialogue between the researcher and the respondent that allows for the extraction of their experiences, perceptions, and feelings (Edwards & Holland, 2013).

Marvasti and Tanner (2020) stated that some researchers conceive of interviews as data extraction, while others consider interviews as social occasions where both the interviewer and interviewee are jointly participating in the production of knowledge. Rajab (2013) considers interviews a significant data collection resource that is efficiently used to explore and describe educational problems and practices. However, Kvale (1996) adopted the metaphors of "miner" and "traveller" to portray this distinguished distinction. While information is extracted by the miner, the wanders through the landscape of meanings explored by the traveller. Thus, all of these competing paradigms have deep implications for the research interview practices and, to the greatest extent, for the analysis of the data collected through the interview. Holstein and Gubrium (1995) see the respondents as "vessels of answers," where their inner thoughts are revealed through the precise and detached administration of a predetermined protocol.

However, Honan (2014) invites researchers to critically re-examine their a priori assumptions about interviewing practices and to disrupt and interrogate those practices

to create something different. He added that the interview is not an isolated data collection event, but an assemblage of meanings created within that particular moment. Therefore, he encourages researchers to link the interviews to audio files as well as photographic images of interviewees and the interview sites, all to boost the written transcripts and ground the interviews.

There are three variations of the qualitative interview. Most notably, the way questions are asked ranges from unstructured to semi-structured to highly structured (Cresswell, 2017; Marvasti & Tanner, 2020; Thomas, 2017). The highly structured interviews are followed by a controlled format with pre-established questions and no room for deviation from the interview protocol. By comparison, unstructured interviews are more flexible. The questions are open-ended and designed to solicit more elaborate and individualised replies. With semi structured interviews, the format is less rigid or controlled. This type of interview is also known as an "in-depth interview." The questions are not as fixed as those in structured interviews (Cresswell, 2017; Marvasti & Tanner, 2020; Schuh, 2008).

Taking into consideration the three major formats of interviews previously mentioned, structured, semi structured, and unstructured, I opted for a position on the second choice as the first one (structured interviews) can be too restrictive, and unstructured interviews are less manageable than semi-structured interviews (Mackey & Gass, 2015; Thomas, 2013), have little validity for screening decisions (Dana et al.,2013), and are more like a conversation than an interview (Patton, 2001). Therefore, semi-structured interviews were chosen as they are more flexible and give both the interviewer and interviewee more freedom to examine issues related to the main subject under discussion. Moreover, the type of question is designed to ask for more detailed and individualised replies; therefore, this helps in producing qualitative or descriptive

data (Bryman, 2012; Marvasti & Tanner, 2020). Additionally, semi-structured interviews serve as valuable data sources enabling researchers to investigate areas of knowledge deficit. This method encourages a reliance on respondents to provide comprehensive insights (Cohen et al., 2018). Furthermore, through the use of prompts and cues during interviews, interviewers have the capacity to extract intricate and in-depth information (Edwards & Holland, 2013).

In this research, semi-structured interviews were conducted with the participants to gather detailed information about their perceptions and experiences related to the study's phenomenon (Cohen et al., 2011). The flexibility of semi-structured interviews allowed for in-depth discussions on relevant topics (Borg, 2006; Cohen et al., 2018). Although semi-structured interviews offer a degree of flexibility, they are also more manageable than unstructured interviews. Thus, the focus points in the semi-structured interviews are clear, and a set of questions and significant points are designed as a guide for the interview (Thomas, 2009).

Further to this, they allow the interviewees the choice of adjusting the wording and sequence of questions based on the way the interview is being conducted. More significantly, it gives the interviewer the freedom to include additional unplanned questions when he finds them appropriate. This gives a great opportunity for the researcher to probe deeper into specific interesting points that may have been obvious during the interviews with the lecturers. This flexibility is one of the merits of semi-structured interviews. This flexibility gave me the freedom to move around points that I found irrelevant, and I encouraged the teachers to explain relevant points in more detail. Leading the path of the interview with the twelve participants confirmed that I was able to keep the respondents on track. Further ensuring they did not drift away from the discussed topics.

Added to this, I followed detailed guidance from the reviewed literature regarding ways of carrying out semi-structured interviews effectively. This involved creating a welcoming atmosphere, listening carefully to the needs and circumstances of the participants, a conscious understanding of my role as a researcher, reflecting on that role, and making the procedures of collecting the data as transparent as possible. Thus, this helped the respondents understand why they had been recruited. In addition, I had the opportunity to meet the participants and listen to them. This allowed me to develop a better understanding of their incorporation of technological tools in teaching English pronunciation. The qualitative approach through semi-structured interviews allowed the voices of the participants to be heard, filling the gap that quantitative methods alone could not provide (Creswell & Clark, 2018).

The flexibility and adaptable nature of semi-structured interviews as a data collection source granted me the perfect opportunity to inquire into the details of my subject and gather a larger amount of data. Unlike questionnaires, semi-structured interviews generate an enormous amount of data, making the process tedious and time-consuming to arrange and conduct. Moreover, the use of audio recording devices such as "smart recorders" can be intimidating to interviewees, possibly leading to incomplete or negative responses due to fear of evaluation (Wellington, 2015). Despite this, recordings are essential in conducting interviews as they preserve the employed language and ensure the conversation between the interviewer and the interviewees. Therefore, in this study, I recorded the interviews rather than taking notes, for different reasons. The first point is to have an objective record of what was said. The second point is that writing down the notes slows down the interview, which may lead to the researcher missing the spoken words. Further to this, slowing down the interview might make the interviewer annoyed as it lengthens their timeframe. However, having an

objective record on a "smart recorder" gave the researcher a great opportunity to listen many times and ensured that no information was missed regarding the discussed topic. Another advantage of using audio recording is that it gives the interviewer the space and freedom to talk and concentrate on the questions and answers given by the interviewees rather than being occupied with taking notes.

The interviews were conducted in order to identify the types of technological applications used in teaching English pronunciation, forming and organising lessons and class activities, purposes, methods of use, functions of the applications (lecturer-learner interactions, learning motivation), and lecturers' reflections on the use of technological applications and learning interactions. This also included questions about how lecturers are developing their TPACK competencies and their teaching practices. The questions sought to understand university lecturers' knowledge and perceptions of the use of technology in teaching English pronunciation and their ability to evaluate and select effective technological tools.

The first time I met the interviewees in their offices, I started with some small talk by introducing myself, talking about my previous experience and my study, and what I was aiming to achieve. I also talked about my background and asked them about theirs. The main aim of this small talk was to place the lecturers in a more comfortable position. The way I introduced myself gave the interviewees a full picture of why I was there and that I was not only after data but also genuinely cared about their feelings and what they had to say. This was a brilliant way to break the ice prior to going into the formality of asking the participants to read and sign the consent form that I have to use, as supported by the University of Strathclyde. Furthermore, once the smart audio recorder was turned on, they felt at ease and were not intimidated.

As the interviews were carried out in their personal offices based on the lecturers' preferences, I chose this setting to avoid distractions or interruptions from students and other teaching staff who might pop in from time to time. This allowed the interviewees to talk freely without feeling uncomfortable about their colleagues listening to or judging their speech.

Having a one-on-one interview with each interviewee made the process less intimidating by giving them as much time as they needed to answer questions and offer their perspectives. As all the interviews were recorded, they were first listened to and transcribed before starting to code the data. Based on the recommendations offered by some authors like Richards (2003) or Stucky (2014), before conducting any appropriate interview analysis, the content needs to be first transcribed. Furthermore, prior to starting the coding process, a full set of interview transcripts is required for reflection, as this will help in not missing any points. As a result, I am confident that I individually examined the entire picture of the conducted interview. Thus, transcribing every interview is an essential step towards analysing it. Some of the interviewees spoke completely in English, and some of them spoke in Arabic and switched to English from time to time. That was not a big issue for me, as I am myself bilingual and do not have any language barriers to understanding them.

As a researcher, I did all the transcription and translation myself. All the interviews were first transcribed verbatim, and then I fully anonymized the transcripts, ensuring the removal of any identifiable information, such as the participants' names, locations, and dates. Following Mertens's (2014) guidance, I considered this process as an integral part of data analysis itself, as it allowed me to engage intensively and intimately with the data. Additionally, I double-checked the transcripts to assure that no words were missed or misheard, going over them more than once to increase reflexivity

and trustworthiness (Olson, 2011). Being bilingual myself, I had no language barriers and could understand and translate between English and Arabic as needed during the transcription process.

After the first check of the Arabic transcripts to assure that no words were skipped or missed, the next step involved translating the transcripts into English. The accuracy of the English transcripts was then checked by the researcher to avoid losing meaning through translation from Arabic to English, and once the interviews were transcribed verbatim, they were checked by the participants (member checking). It has been suggested that the researcher in such a making-meaning process needs to engage with meanings and discourses to come up with accurate and valid translations (Jootun et al., 2009). Therefore, to ensure that the meaning of the text was not lost, the English transcript was translated back to Arabic and again back to Arabic (back translation/reverse translation).

Although interviews have many strong points, there have been areas that could be interpreted as weaknesses or limitations, despite efforts to address these at all stages. According to Denscombe (2017), the existence of an "interviewer effect" means that the interviewee's perceptions will affect how they respond to questions. For example, answers might be tailored to match what the interviewee believes the interviewer wants to hear. To counter this effect, each interview started with the interviewee assuring that there are no right or wrong answers to the questions and that, concerning their knowledge and practice, they are the experts. Further to this, a non-judgmental stance was adopted during the interviews, and facial expressions remained neutral (Denscombe, 2017).

Cohen et al. (2011) highlighted "interviewer bias" as another limitation. To counter this bias, great care was taken throughout the interview design to not include

leading questions as they might elicit a biased response (Wellington, 2015). The fourth limitation is that interviews do not provide evidence of the participants' practices in the classroom. To put it simply, what people say is totally different from what they do. Thus, to counter this effect, different methods (methodological triangulation) were used to provide different perspectives on the same issue, leading to a better understanding of the research topic (Denscombe, 2017; Wellington, 2015). The last one, conducting an interview, can be time-consuming and expensive; the quality of the data depends on the interviewers' interactions and skills and the interpretation of responses (Randall et al., 2013).

In this research project, the interview questions were designed to enable the university lecturers to elaborate on their responses to the quantitative questionnaire items. The interviews were conducted with twelve lecturers and typically lasted for 15 to 20 minutes. The main purpose of semi-structured interviews was to transcend the inquiry from "what" to "why" and "how" by capturing the phenomenon as it developed in the subjects' personal encounters or teaching experiences. Moreover, to generate data and further analysis such as types of technological applications used, formed and organised lessons and class activities, purposes, ways of use, functions of used applications (lecturers-learner interactions, collaborative learning, autonomous learning, and learning motivation), and lecturers' reflections on the use of technological applications and learning interactions. This also included questions about how university lecturers are developing their TPACK competencies and their teaching practices. The interview questions were developed from the main research questions.

3.6.1.3 OBSERVATION AS THE THIRD SOURCE OF DATA COLLECTION

In this research project, ICT integration with the employment of instructional strategies in teaching and learning English pronunciation is considered a function of

both intentions, ascertained through the published online questionnaire (Qualtrics), further explored in semi-structured interviews, and conducted in a four-session workshop with the main focus on the use of technological tools and instructional tools that meet pronunciation learning goals, ascertained through the scheme of works as teaching artefacts and classroom observation. The latter will provide empirical "at-the-scene-of-the-crime" evidence of lecturers' practices of incorporating technology for teaching English pronunciation. Observation is essential primary data on lecturers' incorporation of ICT and instructional practices that enhance learning goals during their practicum, answering the research question on how the TRIPLE E PD workshops enhanced university lecturers' practices in teaching English pronunciation at the university level. Accordingly, when situated in actual classroom practice, "professional development has tremendous potential to promote long-term changes in teachers' attitudes towards and practices with technology in the classroom" (Kopcha, 2012, p. 110).

The classroom observation method has multiple advantages as a widely used method in case study research with a qualitative design. It is an instrument that can complement information collected by other means. Moreover, it can broaden the scope of information as it provides the discovery of things that may not arise in the interview situations and helps in collecting live and first-hand data from situations occurring around language (Cohen et al., 2011; Curdt-Christiansen, 2019; Roller & Lavrakas, 2015). By the same token, KatzBuonincontro and Anderson (2018) pointed out that without using the observation method in qualitative research, this is considered a challenging process to understand creativity in action, particularly in the field of education.

Consequently, they claimed that, based on reviewing 37 studies, they found that the observation method is surprisingly underused and that more rigorous observation studies in education are needed. Robson and McCartan (2016) stated that there are always divergences between what people say in interviews and what they actually do in practice. Thus, by including classroom observation in my research, a light is shed on university lecturers' practices in integrating the new tools in teaching English pronunciation that cannot be illuminated by other methods such as interviews.

Indeed, through the adoption of classroom observation as an ethnographic study, the description of issues related to university lecturers (e.g., teaching English pronunciation in my research), used activities, interactions, and different types of communication are essential affordances of observation (Merriam & Tisdell, 2016). This way of employment can also incorporate other issues such as emotions and attitudes in various naturalistic contexts such as universities, schools, and the workplace (Curdt-Christiansen, 2019). As Wellington (2015) pointed out, one of the distinctive features of classroom observation is that it provides the researcher with the liberty of capturing data as it occurs in a natural situation.

Similarly, Roller and Lavrakas (2015) asserted that the adoption of classroom observation is advantageous in terms of gaining meaningful and nuanced understandings of the behaviour, attitudes, and values of the participants by getting close and becoming full-fledged members of their lives. As a researcher using classroom observation, I benefit from the in-situ approach of ethnography in multiple significant ways, such as by observing the actual experience of university lecturers, which makes the data accurate and true to their lives, which can highly contribute to the credibility of the data. Furthermore, I consume myself with the participants through the integration of the learned tools and instructional practices that meet the TRIPLE E criteria.

According to Curdt-Christiansen (2019), as a researcher using the classroom observation method, I have to keep in mind what to observe or record, how to record, and what to present from the rich field notes taken. Further to this, in what ways can the use of classroom observation be triangulated with other methods (e.g., interviews)? As my research requires specific information about capturing university lecturers' integration of ICT in their actual classroom practices and identifying how technological applications are incorporated with appropriate pedagogy, this way of capturing lecturers' practices in the classroom will grant me the space to access the interactions and non-verbal behaviours that happen in science activities. This information will provide me with a better overall sense and understanding of the situation, allowing me to answer the research questions. Moreover, Wellington (2015, p. 249) stated that observations assist researchers in overcoming "the image presentation" that interviewees may suggest during the conducted interview.

In essence, through the design of an observational data collection method, several choices are put in front of the researcher. This includes the type of observation, the role of the observer, and the observation instrument. According to Cohen et al. (2011) and Curdt-Christiansen (2019), several observation types are available to the researcher. This includes both structured and unstructured observations. In structured observation, the researcher creates categories in advance of the observation. However, in a semi-structured observation, the researcher has a focus, but no categories are predetermined. In unstructured observation, the situation is completely different, as the researcher observes a situation before deciding what is important for the research (Cohen et al., 2011).

In the current research project, a systematic (structured) observation schedule was used alongside an open, descriptive observation script to capture the evidence of

classroom ICT integration, instructional strategies around the tools, and students' focus on and take-up of the learning goals by university lecturers teaching English pronunciation during their practicum. The structured tools provide a summary of key features of the lesson adapted from Kolb (2017) (e.g., lesson title, grade level, subject, time frame, learning goals, lesson overview, triple E framework considerations (e.g., teaching strategies, technological tools), and assessment). Adapting statements from validated tools is important for ensuring that the instruments are appropriate and that the purpose of my research is addressed. Schatzke (2019) asserted that the Triple E rubrics are valid and reliable tools. He added that the Triple E Rubric is a trustworthy and valid tool for lesson preparation with technology integration.

Regarding the workshops, the type of knowledge and empirical data that workshop-based research generates differs significantly from that of interviews and observation. As a result, the workshop as a research methodology can be a stimulating and liberating activity for explaining knowledge (Ørngreen & Levinsen, 2017). Berg and Hernwall (2016), for example, used action research and participatory-oriented workshop approaches. While observations provide first-hand evidence of what the participants do and interviews provide access to inner thoughts and the motivations for acts, workshops incorporate elements of both without becoming either. By describing scenarios, acting them out in a simulated and facilitated environment, and having facilitated discussions, the group dynamics can work productively to open up the issues.

Conducting the TRIPLE E PD workshops among university lecturers co-constructed a place for collaborative negotiation of meaning. This was not only between the participants but also between the researcher and the participants, who both during and after the workshop adopted and adapted to what was being discussed, performed, and learned. In this way, the TRIPLE E PD workshops brought university lecturers

closer to practice. Workshops in larger research projects work well in combination with other methods in a mixed-method approach, such as in the case of my study (Creswell, 2009; Newby, 2014; Johnson et al., 2014). Thus, in this research project, the TRIPLE E PD workshop is, on the one hand, authentic, as the main aim of conducting the TRIPLE E PD workshops is to fulfil participants' expectations to enhance their TPACK knowledge in tandem with teaching English pronunciation through the incorporation of technological tools and instructional strategies that meet the TRIPLE E criteria (engagement, enhancement, and extension). On the other hand, the workshop is specifically designed to fulfil my research purpose: to produce reliable and valid data about the domain in question. (Baran et al., 2014; Darsø, 2001; Jaipal & Figg, 2010; Rossi & Sein, 2003; Wakkary, 2007; Yurdakul et al., 2012).

Indeed, the data generated in the Triple E workshop is quite different from data produced by other research instruments such as interviews or interventions into the participants' actual everyday practices. In this research project, four sessions were presented and discussed with the participants about the effectiveness of the adoption of the TRIPLE E framework in enhancing learning goals in terms of teaching English pronunciation. When a workshop is used as part of a research design, the researcher chooses an immersive and collaborative environment in which meaning is negotiated with lecturers. This provided an excellent opportunity to identify new factors at play and the relationships between them, which neither the teachers nor the researcher might have been aware of prior to the workshop (Ørngreen & Levinsen, 2017). Thus, the generated data and collected documents in the TRIPLE E PD workshops included the content and technological tools covered in the TRIPLE E training-based workshops and the researcher's reflection after each session. Below is the schedule and the content of the TRIPLE E PD workshops.

The TRIPLE E workshop

1st session	2nd session	3rd session	4th session
August 2021	September 2021	September 2021	October 2021

Content of the TRIPLE E workshop

Session 1	Session 2	Session 3	Session 4
1.Components of the TRIPLE E framework 2- TRIPLE E evaluation rubrics 3- Reflection	1. Instructional strategies in pronunciation teaching. 2. Remote learning (Lesson planning template) 3. Remote learning (Lesson evaluation). 4. Reflection	1. Synchronous and Asynchronous teaching. 2. Educational tools such as (Youglish, Voki, Frazeit, Forvo, pronunciationcoach, speechace/loom, audacity, and SoundCloud. 3. Formative and summative assessment.	1- Fostering engagment in online and blended learning. 2- Other educational tools (voicethread, flipgrid, tubequizard, nearpod, socrative, rose-medical.com, Elsa speak, spellingtraining, visualthesaurus. 3- Practice

Diagram (1): Schedule and content of the TRIPLE E workshop

3.6.1.4 FOCUS GROUP

Originally referred to as "group discussions," "group interviews," or "group interviewing," they share a number of features with the in-depth interview but also differed from it in many important ways. Although the depth and detail that can be gained via group discussions are generally less than what can be gained with IDIs, focus groups provide researchers with multiple perspectives as two or more people become actively engaged in a "focused" discussion about the topics the researcher is studying (Roller & Lavrakas, 2015, p. 104). Thus, focus group discussions have become a core

qualitative method in social science research and have been increasingly used across multiple academic disciplines (Dörnyei, 2007; Hennink, 2013; Marshall & Rossman, 2014; Mertens, 2010).

With the flexible and data-rich nature of this method, focus groups are often applied to mixed-method research (Roulston, 2010; Dörnyei, 2007). Further to this, they are applied to explore alternative interviewing techniques that would overcome the limitations of traditional one-on-one interviews (Hennink, 2013). Accordingly, the main aim is to gain a broad range of views on the research topic over a 60–90-minute period and to create an environment where participants feel comfortable expressing their views (Bailey, 2011, p. 136). Therefore, a wide range of data can be generated very quickly. According to Fern (1982), a single focus group discussion can generate about 70 percent of the same issues as a series of in-depth interviews with the same number of people.

Indeed, the most distinguishing feature of focus group research is the interactive discussion that generates data, which results in a different type of data not available through individual interviews, thus increasing the clarity, depth, and detail of the discussion. In this way, it uncovers various facets and nuances of the issues that are simply not available by interviewing individual participants, namely by producing collective narratives and quality checks on the provided information (Hennink, 2013).

Typically, it can be described as an interactive discussion between six to eight pre-selected participants (Bloor, 2001; Hennink, 2013; Finch et al., 2003; Morgan, 1993; Moore, 2006; Stewart and Shamdasani, 2014). The size of the focus group can provide various options to stimulate discussion and ensure that participants have enough time to talk and share their perspectives during the discussion. In this research project, the researcher has embraced the acknowledgement in Prince and Davies' (2001) research that small-sized groups of 4 to 6 may be productive since they encourage members to

take part in the discussion: consequently, a considerable number of different ideas may be generated on the topic under discussion within a certain time limit. Krueger (1994) stated that a focus group "must be small enough for everyone to have the opportunity to share insights and yet large enough to provide a diversity of perceptions" (p. 17).

Thus, the main purposes of utilising focus groups are to generate rich and experiential data and explore the participants' attitudes and feelings about the integration of new technological tools and instructional strategies that meet the TRIPLE E criteria. This included questions and issues that emerged from the observations to ensure that the participants' voices were truthfully represented. This promotes a deeper understanding of participants' behaviours and provides a great opportunity to encourage further triangulation of data in my research (Caillaud & Flick, 2017).

When compared to many individual interviews, questionnaires, tests, and surveys, focus groups have the following strengths: Firstly, in practical terms, the cost of carrying out focus group approaches is an attractive research method, specifically in academic research (Wimmer & Dominick, 2013). Secondly, a focus group can build on one another's thoughts, stimulating thinking where participants often motivate one another, which is effective for generating new ideas and hypotheses (Anderson, 2018). Dörnyei (2007) highlights that by thinking through, inspiring, discussing emerging issues, and challenging each other, this "collective wisdom" experience of group brainstorming produces high-quality data and an inspiring environment. This back-and-forth process of sharing ideas and collecting data as a group (David et al., 2007) lets the researcher summarise and learn more about the priorities and suggestions of the participants, which can make the research project run more smoothly.

Thirdly, the ability of focus groups to handle contingencies. They provide the researcher with the liberty to discover and explore linkages between ideas that would

go untouched in a simple survey. The researcher has the opportunity to ask for clarification on any vague responses that are not listed as options. Added to this, there is a great opportunity to explore significant issues other than those listed on a questionnaire that may arise in the course of group discussion. Fourthly, time is another advantage of the focus group discussion. Eliciting responses from 4 to 6 participants in a focus group lasting one to two hours is more efficient than interviewing the same number individually. Fifthly, flexibility is another advantage of the focus group. Wells (1974) asserted that the researcher "works from a list of topics-listening, thinking, probing, exploring, framing, and ideas" (p. 134). Lastly, the results of focus group discussions possess high face validity (Gerrish & Lacey, 2013; Krueger, 2000; Marshall & Rossman, 2014; Monsen & Van Horn, 2007).

After discussing the benefits of focus group discussions as a methodology tool, there are some challenges to consider. Focus group discussion "is not totally free from complications; the approach is far from perfect" (Tayie, 2005, p. 96). Time control is challenging, as discussion of irrelevant issues may take considerable time.

Data analysis is largely dependent on the context and understanding of participants' comments. Focus groups heavily depend on the skills of the moderator, who must know when to probe for further information, when to stop respondents from discussing irrelevant topics, and how to get all the respondents involved in the discussion. All these things must be accomplished with professionalism and care, as if the respondents are allowed to stray too far from the topic under consideration, the produced data may not be useful, and if there is one sarcastic or inappropriate comment from one of the participants, this may have a chilling effect on the group's performance (Tayie, 2005).

Since the core aim of this research is to examine the impact of TRIPLE E professional development workshops on enhancing university lecturers' TPACK competencies and teaching practices, it is important to listen to the voices of both students and lecturers after classroom observations. This approach provides valuable opportunities for both groups to express their views. By conducting focus groups and gathering feedback from students and lecturers, we can tap into their collective wisdom and experiences regarding the incorporation of new technological tools and instructional strategies that meet the TRIPLE E criteria of engagement, enhancement, and extension. This approach ensures the collection of high-quality data and fosters an inspiring environment for meaningful results.

3.7 DATA ANALYSIS METHODS

According to the research inquiry, the analysis of different methods serves different purposes. The use of a mixed-methods approach allows data to be separately analysed and then merged. According to Creswell and Clark (2018), data merging can be classified in three ways: convergent design, explanatory sequential design, and exploratory sequential design. Convergent design is the most appropriate when both qualitative and quantitative components are collected concurrently and contribute equally to answering a single research question. However, in the explanatory sequential design, the researcher begins with the collection of quantitative data, such as questionnaires, which have priority for addressing the study questions. In this way, both approaches, quantitative and qualitative, are related to each other and are not independent. The rationale behind the use of this design by the researcher is to combine the collected data into one single image that explains the findings and themes. Finally, in contrast to explanatory design, exploratory sequential design. The main priority is qualitative data, as the researcher starts with QUAL data, analyses it, and then uses the

findings to develop QUANT material to be utilised for the second phase of data collection.

In this research study, I opted to follow Creswell and Clark's (2018) convergent integrated approach and analyse each set of collected data separately. As stipulated by Creswell and Clark (2018), I prioritise qualitative findings over quantitative findings as deeper and more informative data; nevertheless, I still find quantitative data valuable as it triangulates the findings.

In this research project, two sets of quantitative data needed to be analysed, including questionnaires (from students and lecturers) and three sets of qualitative data, including semi-structured interviews, focus groups, and observational data during the actual teaching practices. The observatory data is derived from the ICT integration, instructional strategies, worksheets, and the participants' notes. According to Cohen et al. (2011), there is no single correct way of analysing data, and therefore, researchers should adhere to the principle of fitness for purpose. The purpose of this research project is to investigate the impact of the TRIPLE E PD workshops on enhancing university lecturers' practices in teaching English pronunciation in the classroom. For these reasons, a qualitative approach is adopted for data analysis.

The qualitative data analysis approach (a systematic process of thematic analysis) is used in this research project using a combination of pre-determined and emergent codes, which is compatible with the project's interpretative theoretical perspective (Braun & Clarke, 2006). The rationale behind using thematic analysis is how the volume of original data is compressed to examine underlying concepts. Braun and Clarke (2006) recommended the use of thematic analysis, as it is "not wed to any pre-existing theoretical framework" (p. 8) and lends itself to the flexibility required of qualitative research design. Having such a theoretical freedom framework, thematic

analysis can offer a "rich and detailed, yet complex account of data" for the researcher (Braun & Clarke, 2006, p. 5). According to Watson (2018), qualitative data analysis methods allow for the identification, examination, comparison and contrast, and interpretation of relevant patterns or themes. Meaningfulness is determined by the project's specific goals and objectives; the same data can be analysed and synthesized from a variety of perspectives depending on the topics being addressed.

This section outlines the data analysis process. Both quantitative (questionnaires) and qualitative (semi-structured interviews, focus group discussions, and classroom observation) data analysis techniques are presented and discussed. Table (6) aligns each research question with the data collection instrument and the specific analytical procedures that are applied.

Research Questions	Data collection instrument	Data analysis
RQ1. What TPACK knowledge do Jordanian university lecturers have about ICT in teaching English pronunciation at the university level?	Questionnaire (university lecturers) Semi-structured interview	Descriptive statistical analysis (SPSS frequencies, means, standard deviations. Thematic coding analysis (Braun and Clark, 2006)
RQ2. What are the perceived impacts of the TRIPLE E workshops on university lecturers and students when teaching and learning English pronunciation?	Workshop training Semi-structured interviews Classroom observation Questionnaires (students)	Thematic coding analysis (Braun and Clarke, 2006) All the data will be recorded and transcribed verbatim. Descriptive statistical analysis (SPSS frequencies, means, standard deviations).
RQ3.What do university lecturers and university students perceive as barriers and solutions of ICT integration in teaching and learning English pronunciation at the university level?	Focus group (university lecturers and students)	Thematic coding analysis Braun and Clarke, 2006) All the data will be recorded and transcribed verbatim.

Table 6: Data analysis process.

3.7.1 QUESTIONNAIRE

As for the quantitative data, the results of the questionnaires were analysed to produce descriptive statistical numbers via the online Qualtrics website. Qualtrics is an online survey tool that provides researchers with ready-to-use templates. The questionnaire utilised in this research study was constructed using one of their templates, and this was done to obtain the needed information about the use of technological tools in teaching English pronunciation in the classroom, language lab, and computer lab. In addition, the reason for using the tools is either to teach English pronunciation, practice, or evaluate it. Since doing the analysis requires knowledge of appropriate statistical software, the researcher opted to use the most widely available and comprehensive statistical package in universities: SPSS and Microsoft Excel© pivot tables. Once the questionnaire was closed, the data were downloaded to Microsoft Excel© and IBM SPSS Statistics for Windows, Version 26.0, for analysis. Qualtrics automatically codes the quantitative data into numerical groups for ease of analysis. The researcher cleaned the data before undertaking the analysis. This software is broadly used to examine quantitative data (Howitt & Cramer, 2011). Thus, the quantitative data were analysed by applying descriptive statistics, and bar charts were produced using Excel.

3.7.2 INTERVIEW AND AUDIO DATA TRANSCRIPTION

Transcribing interview recordings into a manageable format is considered the first step in interview analysis and research activity (Silverman, 2017). Although transcription in qualitative research is abundant, this has been devastatingly critiqued by Flick (2014), who cautions that no system can provide the researcher with a completely accurate account of the original spoken words and should be approached with a "critical eye (and ear)" (p. 65). Further to this, and to mitigate any bias in the transcription process, a reflective approach was adapted through the analysis process to counter this

bias (Flick, 2014). The adoption of transcription conventions is affected by the research design (Curtis & Curtis, 2011). There are several transcription methods available, ranging from a comprehensive transcription that includes every pause and "um" to a transcription that merely incorporates the main points raised (Curtis & Curtis, 2011).

As my research seeks to investigate university lecturers' knowledge in terms of the deployment of ICT in pronunciation teaching with the use of instructional practices, my priority for the transcription was to preserve meaning, and so a broad approach was adopted. My concern was with the spoken words, not the pauses and "ums." In his seminal study, Densombe (2017) questioned the usefulness of such laborious transcription, but he also pointed out its efficacy as a part of the analysis process as the reason for bringing the researcher closer to the data and bringing the talk to life again.

Once transcribed, I did not immediately check the accuracy and did not read the transcript for at least two days. By using this approach, I gave myself sometime between transcription and accuracy. Thus, when I returned to the document, I was able to look at it again. I listened to the recordings and read the transcripts at the same time. In practice, as data are in the form of transcripts, this involves reading and re-reading data items (which could be done on paper or a screen). As I am working with audio, repeated listening helped me "achieve the necessary immersion" (Terry & Hayfield, 2020, p. 434).

Having completed the transcription process with the twelve participants, the next phase was to select a systematic and replicable technique for compressing the volume of original data. Therefore, examine the underlying concepts. For that, the recommendation from Braun and Clarke (2006) was taken to be to use thematic analysis as there is no wedding to any pre-existing theoretical framework and as a "method that works both to reflect reality and to unpick or unravel the surface of reality" (Braun &

Clarke, 2006, p.81). They asserted that thematic analysis has possibly been referred to as the most widely used qualitative data analysis method. This method of analysis lends itself to the adaptability required for qualitative research design. Furthermore, the value of thematic analysis stems from its status as an analytical approach rather than a methodology. It is not restricted to a single theoretical paradigm. The only constant is that the data being analysed is qualitative, and the analysis treats it as such throughout the whole process. Thematic analysis is based on the researcher's interaction with his or her data, which is driven by their research questions. What matters is that you understand your position regarding the data and how your output will be structured as a result.

Thus, with such theoretical freedom, the adoption of thematic analysis can offer rich, detailed, and complex data. (Braun & Clarke, 2006). Furthermore, the rationale for using this type of qualitative content analysis is to unpack the richness of messages in the spoken data (Joffe & Yardley, 2003). As a result, Braun and Clarke (2006) argue that for studies like mine, where there is a large amount of data, specifically from the semi-structured interviews conducted, it is critical to distinguish between the data corpus and the data set, where the former is the entire collected data, and the latter is the data used for a specific analysis. Although there are minor differences between Creswell's (2012) data analysis and Braun and Clarke's (2006) exclusive focus on thematic analysis, I decided to follow the phases of analysis guided by Braun and Clarke (2006). Consequently, there are multiple advantages to adopting a thematic analysis method, as it provides flexibility, simplicity, and tangibility, as themes can be identified in a combined top-down and bottom-up fashion of analysis (Braun & Clarke, 2013: p. 178). The results of this method are easily understood by the public, which has a low level of education (Javadi & Zarea, 2016). Similarly, Fertuck (2007) asserted that

thematic analysis is a qualitative research method that provides a means of accurately and conscientiously interpreting texts.

3.7.2.1 DATA ANALYSIS DESIGN

As outlined in the previous section, a process of thematic analysis as described by Braun and Clarke (2006) was used in this research project. They describe thematic analysis as "a method for identifying, analysing, and reporting patterns (themes) within data" (p. 79). As a thematic approach facilitates searching for themes across the entire data set (Braun & Clarke, 2006), this suggests that it is a suitable method for this case study. Thematic analysis offers the researcher a choice of coding methods where the coding and theming are driven by the researcher, namely an inductive approach or a theoretical thematic approach ("bottom-up") (Braun & Clarke, 2006; Terry & Hayfield, 2020).

Although the inductive approach defines themes or patterns as emerging from the data, Wellington (2015) questions whether the emergence of themes from the data is a mysterious event that occurs independently of the researcher. Instead, he insists that the data is entirely dependent on the researcher. As a result, inductive analysis is a method of coding data without trying to fit it into a pre-existing coding frame or the researcher's analytical expectations. This type of thematic analysis is data-driven in this way. However, it is vital to emphasise that researchers can't free themselves of their theoretical and epistemological commitments, and data aren't coded in an epistemological vacuum (Braun & Clarke, 2006). In this approach, the identified themes bear little relationship to the specific question that is asked of the participants. Further to this, they are not driven by the researcher's theoretical interest in a specific area or topic. In contrast, a theoretical thematic approach ("topdown" way) is deductively more

researcher-driven, where data is coded to themes that reflect a specific area of interest for the researcher (Braun & Clarke, 2006).

In keeping with the objectives of this research project, thematic analysis was utilised to discover meanings emerging from the subjective views of university lecturers in the semi-structured interviews. This method was assumed to be compatible with the research objective, which is to investigate lecturers' TPACK knowledge, experiences with classroom practices, and scaffolding tasks in teaching English pronunciation. Prior to creating the codes, the researcher noted that it is vital to make a further decision concerning the level at which the thematic analysis is carried out. Braun & Clarke (2006) proposed that thematic analysis goes beyond either a semantic or latent level. Semantic codes (meanings expressed verbally) were used to explore the data at a surface level, describing what participants say or do and exploring the importance of patterns in the data. In contrast, the latent thematic goes to a deeper level by investigating the underlying ideas, suggestions, assumptions, and ideologies that go towards shaping the semantic context. The use of both latent and semantic codes throughout the whole text to discover the underlying meanings.

As this research project seeks to investigate lecturers' TPACK competencies regarding the use of technology in teaching English pronunciation as well as the perceived impact of the TRIPLE E PD workshops on enhancing their knowledge and teaching practices, it aims to understand the lecturers' experiences and their ways of teaching that shape what they say and do; therefore, a latent thematic analysis approach is the primary method used.

3.7.2.2 DATA ANALYSIS PROCESS

Braun and Clarke's (2012, 2013, 2020, 2021) approach to thematic analysis offered a useful guide that went through six recursive and iterative phases, starting with "familiarising yourself with your data" and ending with "producing the report." Each phase can be useful only if quality engagement is produced. Therefore, returning to a phase and moving to and fro between phases should not be unusual (Terry & Hayfield, 2020). The figure below describes the six phases.

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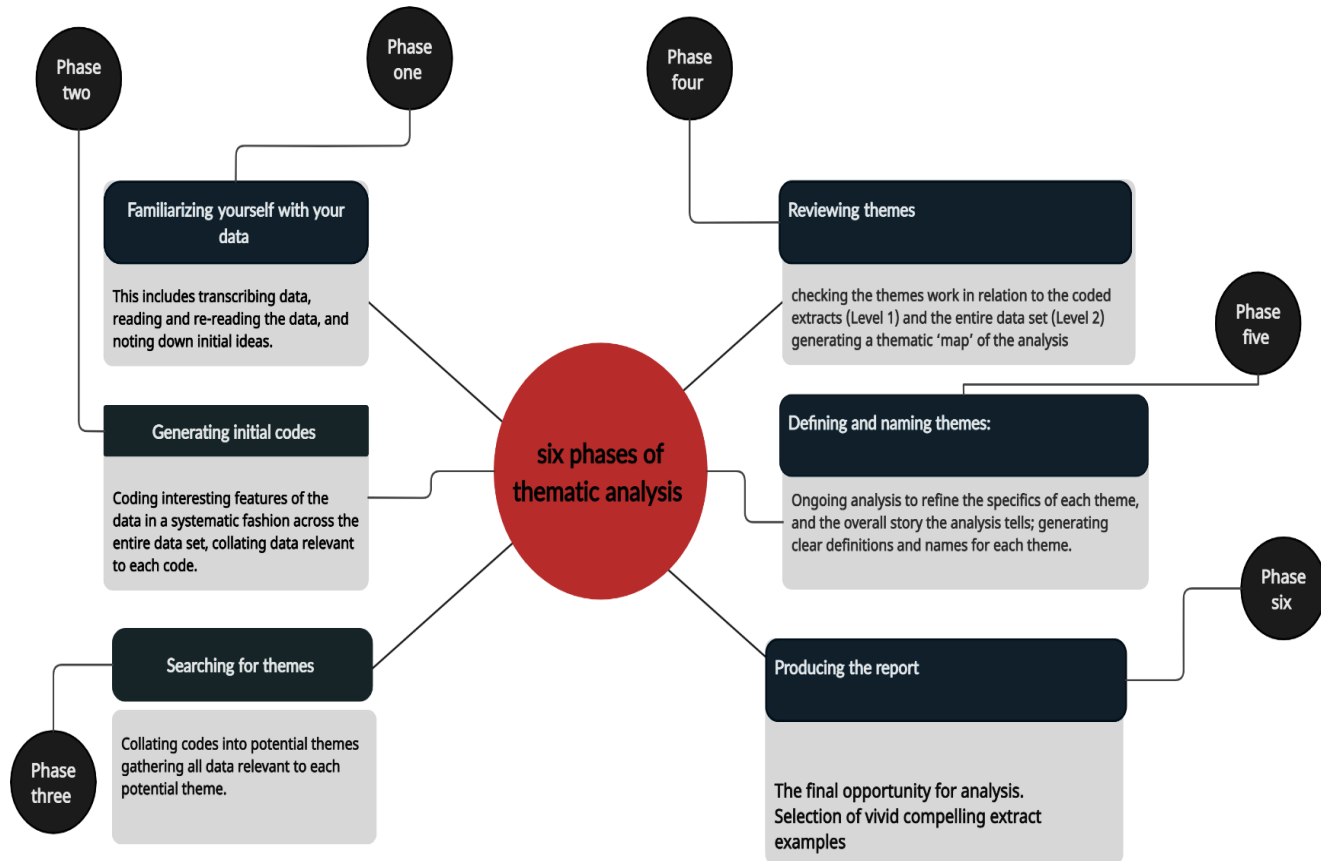
Figure 13: Thematic analysis phases (Clarke and Braun, 2006)

3.7.3 CLASSROOM OBSERVATION

The purpose of observational data is:

> To take the reader into the setting that was observed. This means that observational data must have depth and detail. The data must be descriptive—sufficiently descriptive that the reader can understand what occurred and how it occurred. The observer's notes become the eyes, ears, and perceptual senses for the reader. The descriptions must be factual, accurate, and thorough without being cluttered by irrelevant minutiae and trivia (Patton, 2002, p. 23).

As previously outlined, observations are essential in qualitative research as they provide the researcher with the liberty to witness certain patterns of teachers' practices in the classroom. Further to this, the significance of its contribution to educational

practice is in part due to both its holistic and critical views of classroom observation (O'Leary, 2014). It represents, at least in mainstream policy circles, a means of measuring productivity in education by spending time assessing teaching practices. While one might identify nuances in the approaches used across educational systems on the planet, "[one] of the underpinning issues traversing the different contexts and purposes of observation in schools is the notion of teacher effectiveness" (O'Leary, 2012, p. 793). A recent report carried out by the World Bank Group, for instance, suggested that it is imperative to keep in mind to focus on observational outcomes such as the use of instructional time and materials, pedagogical practices, and the ability to keep students engaged (Bruns et al., 2016).

Although one might claim that any desired information could be collected merely through the adoption of interviews, it is imperative to note that participants are often unaware of their conduct, specifically of practices and routines with which they have become familiar over time. EFL classrooms (e.g., Teaching English Pronunciation) are no exception. Accordingly, the first motivation behind the choice of using observation in this research project is that this permits the researcher to identify characteristics of the classroom relevant to pronunciation teaching with the incorporation of technological tools and instructional moves that meet the triple E criteria. The second reason for choosing observation is that the teachers could become somewhat familiar with the presence of the researcher prior to the onset of more personalised data collection procedures, namely participant observation and interviews.

Generally, the main purpose of classroom observation in this research project is to portray factual descriptions of classroom events. The emphasis is on the content of teaching English pronunciation (the objectives of the lessons, technological tools and apps, tasks assigned to the students, and how the lesson is taught). Further to this, how

technological applications are integrated with appropriate pedagogy. To capture such data, an observation instrument framed within the Triple E framework will be developed to facilitate the observation process and produce richer and thicker field notes.

3.7.3.1 DATA ANALYSIS DESIGN

Data analysis is not off-the-shelf; it is custom-built, revised, and "choreographed" (Huberman & Miler, 1994). In light of the use of an observational tool framed within the TPACK and TRIPLE E frameworks, the analysis will involve data segmentation and coding of the observation data. According to Spencer et al. (2014), observational data requires management and analysis in the same way as interview data does. In this way, I will "assure ample opportunity to observe and record salient data and make sound decisions about what to exclude and include" (LeCompte et al., 1993, p. 200). Further to this, Spencer et al. (2014) highlighted that the analysis of observational data is purely research generated. Thus, the explanation of the observed events is mainly dependent on the accuracy of the observers' notes.

In this current research project, a content analysis approach will be adopted for analysing the data taken from classroom observation. The main goal of content analysis is to "provide knowledge and understanding of the phenomenon under study" (Downe-Wamboldt, 1992, p. 314). Joffe & Yardley (2003, p. 56) further emphasise the potential of content analysis to unwrap the richness of "messages contained in talk data." Roller & Lavrakas referred to this process as a quantitative method that begs the question of its appropriateness in qualitative research design as a systematic reduction of data. Qualitative researchers primarily employ an inductive strategy in this method, in which new discoveries of meanings and interpretations are guided by the researcher's immersion in the data (e.g., written texts). Therefore, the development of their hypothesis is primarily based on what they see in the data. Quantitative researchers, on

the other hand, employ a deductive strategy that entails prioritising a specific question or speculation and then scouring the data for answers (2015, p. 233).

Although quantitative learning researchers (e.g., Krippendorff, 2013) assert that the quantitative approach is more efficient than, in his words, the "fishing expeditions" of qualitative content analysis because, by entering into the analysis with a specific research question, the researcher can "read texts for a purpose, not for what an author may lead them to think or what they say in the abstract" (p. 37). He asserted that the main focus of qualitative content analysis is the contextual meaning that can be derived from textual and non-textual data, which is what makes it so valuable. Furthermore, it makes systematic inferences from the content. This incremental process facilitates the researcher's ability to find increasingly relevant meanings in the content, leading to credible and transparent outcomes. Additionally, the researcher can typically modify the codes and add new ones to capture the specifics of the data in addition to the pre-existing ones.

In this research project, a qualitative-directed content analysis approach (Hsieh & Shannon, 2005) was used. The advantage of using this method is that. First, it allows the researcher to use the TPACK and TRIPLE E theoretical constructs as the starting point for coding and also continue defining new codes during data analysis. This method, according to Mayring (2004), can assist the researcher in determining the initial coding scheme or relationship between codes (deductive category application). For example, the researcher will code all highlighted passages after observing the classes using the predetermined codes. Any text that is not categorised within the initial coding scheme will be given a new code. Second, it gives the researcher the liberty to "validate or extend" the used theoretical frameworks by identifying "categories [that] either offer

a contradictory view of the phenomenon or might further refine, extend, and enrich the theory" (Hsieh & Shannon, 2005, p. 1281, 1283).

Additionally, as research in an area grows, a directed approach makes explicit the reality that researchers are unlikely to be working from the naive perspective that is often viewed as the hallmark of naturalistic designs (Hsieh & Shannon, 2005, p. 1281, 1283). Finally, this method provides the researcher with codes and exemplars and offers descriptive evidence of the findings. These advantages fit well with my research goal.

3.7.3.2 DATA ANALYSIS PROCESS

When speaking of qualitative content analysis, we are mostly referring to the analysis of written texts (field notes). As previously mentioned, qualitative content analysis is used in this research "to provide knowledge and understanding of the phenomenon under study" (teachers' practices while integrating tools and instructional practices in teaching English). By using a priori deductive codes (e.g., the TPACK codebook), the researcher can get into the data and use an inductive approach to identify new codes and refine or even eliminate a priori codes.

Before a qualitative content analysis of the observational data can be conducted, there is a need to prepare the material that will be analysed to create findings and draw conclusions. In this research, the materials will include designed activities, lesson plans, slides, used apps, and a classroom observation proforma. At this point, the process of analysing observational data goes through eight basic steps that are divided into two phases of the overall process: coding of the content that generated the data that are analysed in phase 2, which includes analysing the data created in phase 1 by identifying categories and themes and developing interpretations of the findings.
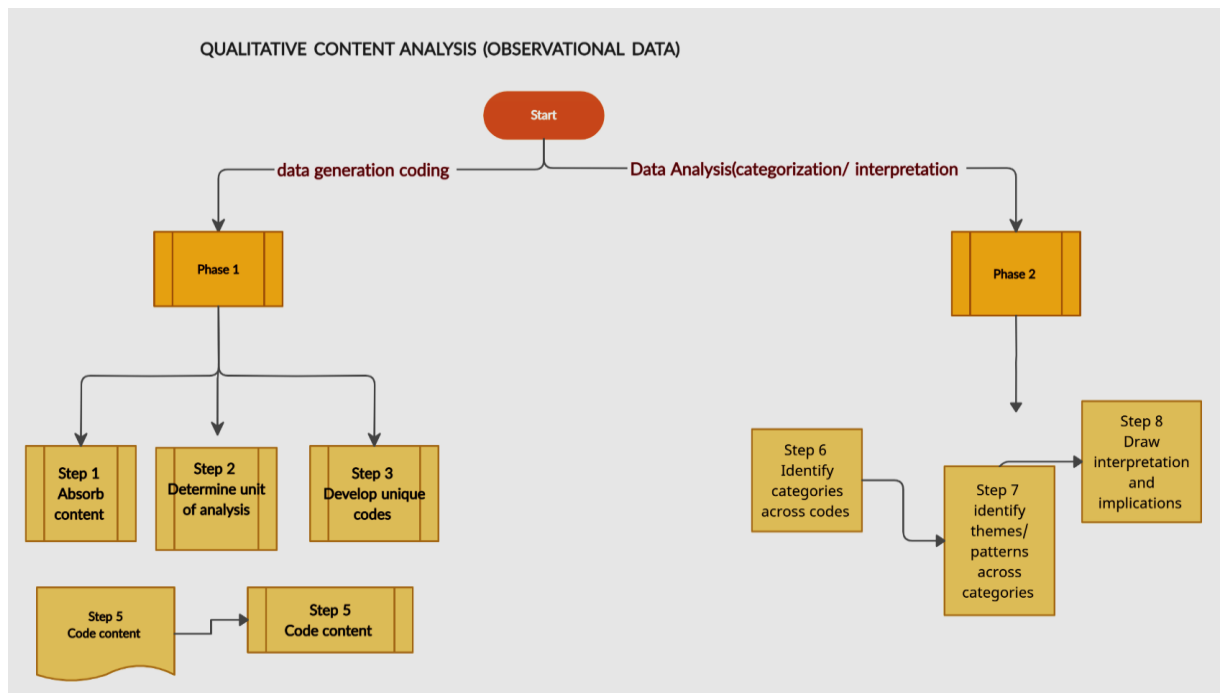
Figure 14:Phases and steps in qualitative content

3.8 ESTABLISHING TRUSTWORTHINESS

In qualitative research, Yin (2009) suggested that to skitch the big picture, there is a need to avoid purely subjective judgments in the collection and analysis of data. To establish trustworthiness in my research, different instruments were used (triangulation) to answer research questions. For instance, to check university lecturers' TPACK competency, a questionnaire and semi-structured interviews were utilised. Regarding the perceived impact of the TRIPLE E, semi-structured interviews, focus group discussions, a questionnaire, and classroom observation were utilised, which helped to validate participants' views and opinions. For example, how university lecturers integrate technology and instructional strategies in their pronunciation teaching was triangulated using classroom observations, a student questionnaire, and a focus group discussion.

In terms of the barriers and facilitators of ICT integration in pronunciation teaching and learning, different views and instruments were employed to validate

credulity through focus group discussions with different university classes, years of study, and academic positions. This way of triangulating data minimises researcher bias, as Roller and Lavrakas (2015) spoke of presenting evidence to gain credibility in a way that minimises researcher bias and researcher-created variability and provides results that are reasonably known to be accurate. According to them, the primary elements of credibility are scope (target population coverage and data collection), question-answer validity, and inter-interviewer and inter-observer reliability. While Creswell and Miller (2000) expressed the need for gaining credibility, other researchers like Lincoln & Guba (1985, p. 290) posited the concept of credibility as "transferability" and "dependability" and were the first to address trustworthiness as the central concept to appraise rigour in qualitative research. According to them, the first question was, "How can I persuade my audience that the research findings of my inquiry are worth paying attention to and worth taking account of?" While Cohen et al. (2013) argued that both qualitative validity and qualitative reliability depend on each other and that research without either is considered ineffective and invalid, Creswell (2009) separated them into distinct categories.

According to Teddlie and Tashakkori (2009, p. 26), they preferred the global term "trustworthiness," in tandem with Lincoln & Guba (1985), who shifted away from the term to the traditional positivist terminology associated with quantitative research. Trustworthiness integrates four criteria, namely credibility, dependability, and confirmability, as the criteria that directly replace "validity," "generalizability," "reliability," and "objectivity" (Teddlie & Tashakkori, 2009, p. 212). Accordingly, in my research project, I have opted to utilise specific terms related to trustworthiness and emphasise the role of reflexivity.

3.8.1 REFLEXIVITY

At its core, reflexivity in qualitative research is considered a recurring guideline that can increase truthful reporting and firsthand knowledge (Russell & Kelly, 2002; Watt, 2007). It is the process in which "the researcher's ability to be able to self-consciously refer to him or herself in relation to the production of knowledge about research topics" (Roulston, 2010, p. 116). It is actively engaging the researcher in "critical self-reflection about their potential biases and predispositions that they bring to the qualitative study" (Cypress, 2017, p. 259). Thus, it aids the researcher in investigating his or her positionality and understanding how it constructs knowledge. It goes beyond "reflection" in that it examines the relationship with others (e.g., research participants and site) (Roulston, 2010). Furthermore, Creswell and Poth (2018) argued that the research positionality in qualitative research would significantly influence all aspects of the research study.

Stake (1995) described "reflexivity" as a process that starts with the identification of the case study's problem and ends with the formulation of research questions that include a sense of "where the chosen research approach originates, where it may be headed, and what might be problematic about it" (Alvesson & Sandberg, 2013, p. 7). This requires acknowledging that researchers are inextricably linked to the social contexts they study and that viewpoints on the "realities" of our surroundings are always subjective, multifaceted, and never neutral (Atkinson et al., 1993; Cohen et al., 2013). This is described by Crabtree and Miller (1999, p. 10) as acknowledging "the importance of subjective human creation of meaning" without rejecting unequivocal conceptions of objectivity.

In this research project, the notion of neutrality has been used as an essential criterion for ensuring trustworthiness (Krefting, 1991). Consequently, I did my best to

always be on guard for my own biases, preconceptions, and assumptions that I might bring to this study. Added to this, is the employment of a systematic process in organising and analysing data (e.g., coding, identifying themes, categorization of themes, and demonstrating the logical rationale for eliminating overlapping themes) (Creswell & Millar, 2000).

3.8.2 CREDIBILITY THROUGH TRIANGULATION

Roller and Lavrakas (2015) define "credibility" as the completeness and accuracy of the data qualitative research study gathers. For Lincoln and Guba (1985), credibility is the extent to which the findings of a qualitative research study are internally valid (i.e., accurate). It is "the crunch question: truth value." (Miles & Huberman, 1994, p. 278). It is significantly based on the richness of the gathered information and the ability of both me, as a researcher, and others to have confidence in the data (Patton, 1990; Hoepfl, 1997). This was done through the adoption of different forms of triangulation (Lincoln & Guba, 1985; Patton, 1990; Merriam, 1998; Creswell & Miller, 2000; Creswell, 2009; Cohen et al., 2013).

Teddle and Tashakori (2009) argued that collecting diverse types of data offers greater insights into a phenomenon that the methods individually cannot offer and, therefore, provides more valid and stronger inferences than a single method does. It is through method triangulation that we can gain a richer, more nuanced understanding of the research outcomes than would be possible from using any one method by itself. In this way, one method informs the other, which together informs the final interpretations and implications (Roller & Lavrakas, 2015). Further to this, Cope (2014) pointed out that triangulation is a mechanism to substantiate findings by using one method and correlating the outcomes with another, as well as to gain a comprehensive view of the phenomenon. Pawlak & Szyszka (2018), as cited by Alghazo (2021), pointed out that

"this triangulation of instruments is argued to be the key to avoiding the flaws associated with the use of single data collection tools" (p. 157). For instance, relying solely on observation to investigate the perceived impact of the TRIPLE E PD workshops leaves out "much of the interesting information [which] cannot be observed because it is mentalistic and not behavioristic" (Alghazo, 2021, p. 157).

Thus, in this case study, a range of methods were used to complete rather than confirm the findings, whilst also taking into consideration the fact that "completeness" in itself is a term that should be used carefully in the context of enhancing lecturers' TPACK knowledge and teaching practices. In practical terms, triangulation was applied across the methods used to address the research questions and the types of data generated through these, namely questionnaires, interview transcripts, classroom observation, and focus group discussion. By doing so, the use of different methods compensates for individual restrictions and exploits respective profits. Where possible, I obtained supporting data from documents to verify the data that participants had supplied. To take advantage of the form of triangulation, I used a wide range of participants with different academic ranks, teaching experience, and years of study. Their individual experiences and opinions were verified against others, and, eventually, a rich picture was constructed based on the contributions of a wide range of people: students and lecturers (Shenton, 2004).

3.8.3 TRANSFERABILITY OF FINDINGS IN THIS STUDY

The third criterion of trustworthiness has been addressed by the fact that the goal of this study is not for me as a researcher to specify what is transferrable but rather to allow the reader to determine whether the findings are applicable to another situation beyond the local context described in the case study. Roller and Lavrakas (2015) define transferability as the extent to which other researchers or users of the research can

determine the applicability of the research design and/or the study findings to other research contexts (e.g., other participants, places, and times).

Transferability is primarily established through a thick description that is "necessary to enable someone interested in making a transfer to reach a conclusion about whether the transfer can be contemplated as a possibility" (Lincoln & Guba, 1985, p. 316). What is more, thick descriptions are used by qualitative researchers in real-life settings not only to achieve transferability but also to bridge the gap between practitioners and researchers (Lospina et al., 2018).

3.8.4 RELIABILITY AND CONFIRMABILITY

One of the necessities of qualitative research is to assure the confirmability of the data. In this way, the researcher determines the accuracy or credibility of the findings through specific strategies. Common strategies for conformability are triangulation, respondent validation, strong data collection methods, and member checking (Obiakor et al., 2010). Data for this research project was gathered using different data collection methods, such as interviews, questionnaires, classroom observation, and teaching artefacts.

Regarding respondent validation, the participants were allowed to add any additional information and validate the accuracy of the findings (Cresswell, 2008). Member checking was done by providing the participants with a transcript of their personal quotes. All participants confirmed the quotes and approved their use. Besides this, to ensure consistency in this research, an "audit trail" was created (Lincoln & Guba, 1985). In the case of this study, the audit trail was created by keeping a clear record and storing the various types of collected data. This also assisted with ensuring confirmability, which is the process of demonstrating that outcomes were drawn from the data rather than my own biases and assumptions (Shenton, 2004).

It has been argued by many researchers that interviews may lack reliability. For instance, Creswell (2009) stated that the reliability of interviews seems elusive. This is probably because "their openness to so many types of bias, interviews can be notoriously unreliable, particularly when the researcher wishes to draw comparisons between data sets" (Brewerton & Millward, 2001, p. 74). However, in this research project, reliability was enhanced by designing and using a checklist with all the interviewees to stimulate university lecturers' and students' dialogues.

Regarding classroom observations, the TRIPLE E observation rubric was used as a guide in the process of observing university lecturers. This involved observing lecturers' use of ICT and instructional strategies in teaching English pronunciation in classrooms. Therefore, a consistent approach was followed when conducting the interviews with the participants, recording their answers (using a smart recorder), writing the transcriptions, and analysing the data.

Further to this, obtaining detailed field notes and developing a codebook of codes that represent the coding analysis. Peer debriefing also enhanced the reliability of the interviews by discussing and comparing the codes and themes with a Ph.D. student at Strathclyde University who is an expert in qualitative research. Overall, the reliability of this study was improved by the researcher's careful planning of schedules to keep each research tool (questionnaires, interviews, and classroom observations) consistent.

3.9 ETHICAL CONSIDERATIONS AS A UBIQUITOUS PRESENCE

Ethics are the principles and rules of behaviour that act to clarify what is acceptable or allowed within a profession (O'Leary, 2010). In the same vein, Neuman (2007) stated that researchers have to take ethical considerations into consideration when conducting research, even if the participants are not concerned about ethics. Ethical considerations follow different guidelines. This includes ensuring all the

participants have given informed consent, ensuring no harm or deception comes to the participants, and, lastly, ensuring confidentiality and anonymity (O'Leary, 2010).

Researchers in the social and behavioural sciences emphasise the organisation of ethical considerations and the importance of ethical issues being considered throughout the research process (Miller et al., 2012; Atkins & Wallace, 2012). According to Cohen et al. (2013), ethics is the common ground that unites all research from the moment that a project is conceptualised until, and even after, the final story is written or told, as reflected in the abundance of regulatory codes of practice and related literature (Cohen et al., 2013, p. 75). Within educational institutions, as is particularly evident in my study, Calder (2020) asserted that ethics can seem:

> Dazzling, or even infinitely demanding." But grappling with ethical issues is a vital part of the qualitative researcher's repertoire of skills. It is a kind of craft, involving quite specific kinds of thought and action – but deploying forms of critical reflexivity that are also at the heart of other aspects of good research practice (pp. 93–94).

Indeed, it bears in mind obtaining the balance between the professional demands of the researcher and the rights of whoever participates in the study, which establishes rapport and trust between the researcher and participants (Guillemin & Gillam, 2004; Hammersley & Traianou, 2012; O'Leary, 2014). The following is my attempt to address ethical considerations for the present research project in terms of access and acceptance, informed consent, anonymity, confidentiality, and participants' discomfort.

3.9.1 ACCESS AND ACCEPTANCE

As a requirement for any research involving human subjects, this study obtained ethical approval from the University of Strathclyde Research Ethics Committee at both the university and school of psychological sciences. Additionally, Strathclyde

University's ethics committee assured that the three Jordanian universities granted their consent for the study to be conducted. The comprehensive process aimed to guarantee the absence of risks to the human subjects involved. Throughout this ethics approval process, the University of Strathclyde assured that the research study did not, in any way, interfere the physical or psychological well-being of participants, and that the research materials and procedures remained free from sensitivity, discrimination, or impropriety. In instances where uncertainties arise or changes need to be made during the project's duration, the researcher is obligated to promptly inform and update the ethics approval committee at Strathclyde University.

3.9.2 PARTICIPANTS' RIGHTS AND INFORMED CONSENT

As my research involves human participants and I am fully aware of the role of ethics in carrying out robust and valuable research, ethical consideration is essential. Obtaining informed consent as a kind of respect from the participants who contribute information to my research project is considered an important feature that must be carefully addressed before starting the research (Cohen et al., 2011). A clarification on how my participants would be treated is concisely explained in the participant information sheet and the consent form (see Appendices A and B), which were given to the participants, accompanied by verbal explanations of the objectives of the research project at the commencement of the study to stipulate accurate information to the respondents. This was done to assure that the respondents are fully informed about the nature of the study, its aim, and significance, as well as the procedures to be followed (Cohen et al., 2007; Matthews & Ross, 2010).

Participants' informed consent is obtained when they have a thorough understanding of what the research study involves, how it will be conducted (methods), how data will be used and stored, and the benefits and risks related to the study. As a

result, all of these elements must be clearly clarified and completely understood by the participants in order for consent to be fully informed (Bera, 2018).

University lecturers and students in my research project were fully informed about the study's purpose and significance, how data will be collected, processed, and stored, and their freedom to withdraw from the study for any reason and at any time without the burden of providing any form of clarification. They were informed that they can take part in this research project if they wish; if not, they can withdraw before, during, or after the study, and any data concerning them would thereupon be deleted. The detailed explanation was achieved through regular meetings between the researcher and the respondent prior to the start of the research project, and participants were required to check and sign after reading the statement "I have read and understood box" to demonstrate consent. Only lecturers and students who signed the consent sheet took part in the study. They were provided with a copy of the signed form, and another one was retained by the researcher.

3.9.3 ANONYMITY AND CONFIDENTIALITY

While the anonymity principle indicates that "information provided by the participant should in no way reveal their identities," the promise of confidentiality is intended to ensure that anonymity is preserved (Cohen et al., 2016; Miller et al., 2012). To protect lecturers' and students' identities, code numbers will be assigned to them, and any quotes and other information will be redacted in such a way that they cannot be linked back to individuals. Names will not be used in the reporting results, and nobody will have access to the raw stored data except the researcher, the named supervisors, and the Ph.D. examiners. The data collected will be carefully stored on the university server on a password-protected computer and will be deleted 10 years after the project is completed. All these issues were thoroughly explained to the participants before

beginning the research study. The information regarding data anonymization and the assurance of confidentiality was also included in the participants' information sheet. Ultimately, prior to the commencement of data collection procedures, the necessary aspects of access and acceptance, participant rights, informed consent, and the guarantee of confidentiality through data anonymization were properly catered to and explained to research participants.

3.9.4 PARTICIPANT DISCOMFORT

The lecturers might feel uncomfortable about providing answers to questionnaires or interviews, being observed in the classroom, or sharing their documents. Further to this, students might be worried about providing honest answers because they might feel it could affect their grades. The researcher is experienced as a facilitator and mentor. Thus, he is well-equipped to deal with challenging situations. Thus, lecturers have a clear understanding of what good teaching practices look like in advance of being observed and understand what the observer is looking for throughout the observation.

Moreover, the participants are assured that their teaching commitments are not affected at all by completing the questionnaires, attending workshops, conducting semi-structured interviews, and making classroom observations, as the researcher is a passive observer. The workshops were conducted at a convenient time to decrease their workloads. Research records will be stored securely in a locked filing cabinet and on a password-protected computer, and only the researcher and the researcher's supervisors will have access to the records. The data will be destroyed after 5 years.

In conclusion, when adopting the ethnographic approach, ethical issues are considered essential as they determine the success or failure of a study and therefore need to be well prepared before, during, and after data collection.

3.9.5 PRACTICAL EXAMPLES OF TAKING AN ETHICAL APPROACH

My research journey was not relatively smooth, as a potential area of concern could have been the handling of withdrawals and informing participants about case selection decisions. The interview sessions began with 12 participants, which were reduced to 8, with six cases attending all four sessions to complete the study. UL10, the first one to withdraw, did so just after the interview session ended because he became the head of the clinical pharmacy and pharmacy practice and informed me of his decision as he was so busy, though he expressed his interest in attending the workshops and incorporating the new tools and methods in teaching English pronunciation. He was only able to attend one.

UL11 and UL12 also withdrew from the study as they were snowed under, emphasising that they had a lot of work to deal with, such as working alongside the ministry of health to deal with COVID-19. Others did not justify this, as they withdrew from the research study for no reason. UL8 attended the interview and four workshop sessions, but she apologised for not completing the rest of the study because she had an eye surgery operation. UL7 and UL9 apologised for the classroom observation, as they had Arabic courses and training commitments for students outside the university. UL1, UL2, UL3, UL4, UL5, and UL6 who accepted to complete the whole study would emerge as the cases chosen for the basis of this report.

3.10 CONCLUDING REMARKS

In conclusion, this chapter has provided a comprehensive overview of the research design and methodology employed for data generation and analysis. The ethnographic case study design, influenced by a mixed-methods (quantitative and qualitative) approach, was outlined and justified. The research questions, which primarily focus on how trainees articulate the integration of technological tools in

teaching English pronunciation and the perceived impact of the TRIPLE E PD workshops on teaching and learning English pronunciation, have guided the study. While the research questions are predominantly qualitative in nature, the study has also incorporated elements of a mixed-methods approach. This was evident through the administration of two surveys- one for lecturers and one for students- conducted throughout the study duration. Additionally, the use of three qualitative methods (interviews, classroom observation, and examination of teaching artefacts) over the same period was deemed essential for achieving a comprehensive understanding and explanation of the phenomenon of integrating technological tools and instructional strategies to enhance learning goals. In terms of data analysis, a combination of descriptive statistics, thematic analysis, and content analysis techniques were employed. This multifaceted approach allowed for a thorough exploration of the research questions and the subsequent presentation of findings. The upcoming chapters will leverage these research questions, presenting the outcomes in conjunction with a discussion that draws connection to the existing literature.

Overall, I contend that my role as a researcher has proven advantageous for several reasons, aligning with the perspectives put forth by Trowler (2011) and Coghlan and Brannick (2009) and echoing the broader literature on endogenous research. With the benefit of hindsight now that I am no longer actively involved in the research context, I am better positioned to recognise how my role as a researcher facilitated the potential for this study. This potential might not have been attainable if I had not been afforded the valuable opportunity to oversee the professional development programme (the TRIPLE E workshop) alongside knowledgeable and experienced individuals of varying professional statuses. This diverse collaboration, including heads, deans, senior lecturers, associate professors, assistant professors, and instructors, has significantly

bolstered my confidence and enriched my experience in a highly positive manner. Moreover, the procedural aspects of this research project were consistently governed and guided by ethical considerations, as succinctly summarized in the preceding section.

CHAPTER FOUR
Combined Findings and Discussion 1:
ANALYSIS OF THE USE OF ICT

4.1 INTRODUCTION

This chapter deals with Research Question 1: What TPACK knowledge do Jordanian university lecturers have about ICT in teaching English pronunciation at the university level? To respond to this research question, two main aspects were investigated: (1) lecturers' knowledge of ICT; and (2) lecturers' use and access to ICT integration specific to pronunciation teaching. As discussed in Chapter 3, this research question was addressed using both a questionnaire and semi-structured interviews. The semi-structured interviews, which focused on lecturers' perceptions of the technological tools used for pronunciation teaching and investigated their TPACK knowledge, aimed to enrich the findings of the questionnaire. Quantitative analyses were conducted using SPSS and Excel sheets, and the thematic analysis approach was applied to analyse qualitative data. The chapter will begin by presenting the results of the questionnaire, followed by the interviews. Furthermore, this chapter offers a comprehensive discussion of the findings. The issues raised in the questionnaire and interviews were discussed in light of the relevant literature. This chapter concludes by outlining how the outcomes of the survey and interviews inform the next phase of the research.

4.2 QUESTIONNAIRE RESULTS

The questionnaire results consist of four main sections that begin with a descriptive analysis of lecturers' technological and pedagogical knowledge (TK/PK) in section (4.2.1), followed by a presentation of the lecturers' access to ICT in the classrooms, language labs, and computer labs in Section (4.2.2). In addition, the quantity

and frequency of ICT use are explored in Section (4.2.3). Finally, the findings related to functional activities, such as teaching segmental and suprasegmental features, guiding students to do homework, and assessing students' pronunciation performance using ICT in the classrooms, language labs, and computer labs are presented in Section (4.2.4).

4.2.1 DESCRIPTIVE ANALYSIS OF LECTURERS' TECHNOLOGY KNOWLEDGE (TK) AND PEDAGOGY KNOWLEDGE (PK) (SUB-SCALES)

According to university lecturers' responses, the results show that nearly half of the respondents were knowledgeable about integrating technology into pronunciation teaching in all four sub-factors. By contrast, approximately 10% of the respondents indicated that they categorized themselves as not confident on all items. The results of the first two factors (TK1 and TK2) revealed that over half of the respondents reported themselves as competent with technology, either for their technical ability in dealing with it or for the technical skills needed to use it in pronunciation teaching. However, (9% of 66) TK1 and (14.52% of 62) TK2 reported having insufficient ICT knowledge. Regarding the ability to choose the correct tools to teach English pronunciation and facilitate the communicative approach (TK3 and TK4), over half of the participants reported themselves as competent and knowledgeable. In contrast, (8 % of 61) of TK3 and (8% of 63) of TK4 indicated that they were not confident in choosing and integrating the right technological tools in their lessons. It is surprising that nearly a quarter of the participants were in neutral positions.

In all four sub-factors, nearly a third of the participants indicated that they were not skilled or unsure in their ability either to use ICT and choose suitable tools for teaching English pronunciation or integrate the communicative approach. The results reported here show that half of the respondents believed that they had a moderate level of competency in technological knowledge.

Regarding pedagogical knowledge, the participants were asked about their knowledge of pedagogical approaches to teaching English pronunciation. This included how to use technologies in diverse teaching strategies, assess student performance (higher- order thinking skills) and adapt teaching based on what students currently understand or do not understand. Furthermore, the ability to implement technologies to help learners overcome challenging concepts and the ability of university lecturers to employ a wide range of teaching strategies in pronunciation teaching. Looking at Figure 15 below, it is apparent that in PK1, regarding knowing how to use different teaching approaches in pronunciation teaching, the results showed that university lecturers had a moderate level of pedagogical knowledge. Based on the frequency shown below, over half of the respondents reported themselves as competent in using diverse teaching strategies. However, 42.00 % indicated that they were unsure and not competent in knowing how to facilitate pronunciation instruction using different teaching approaches.

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
PK1 (N=64)	3.12%	4.69%	34.38%	48.43%	9.38%
PK2 (N=63)	3.18%	4.76%	23.81%	52.38%	15.87%
PK3 (N=61)	3.27%	4.92%	22.95%	59.02%	9.84%
PK4 (N=63)	3.17%	9.53%	22.22%	49.21%	15.87%
TK1 (N=66)	4.55%	4.55%	30.30%	46.97%	13.63%
TK2 (N=62)	3.28%	11.47%	14.45%	59.55%	11.25%
TK3 (N=61)	3.40%	11.50%	21.16%	52.46%	11.48%
TK 4 (N= 63	3.71%	4.76%	26.83%	55.28%	9.42%
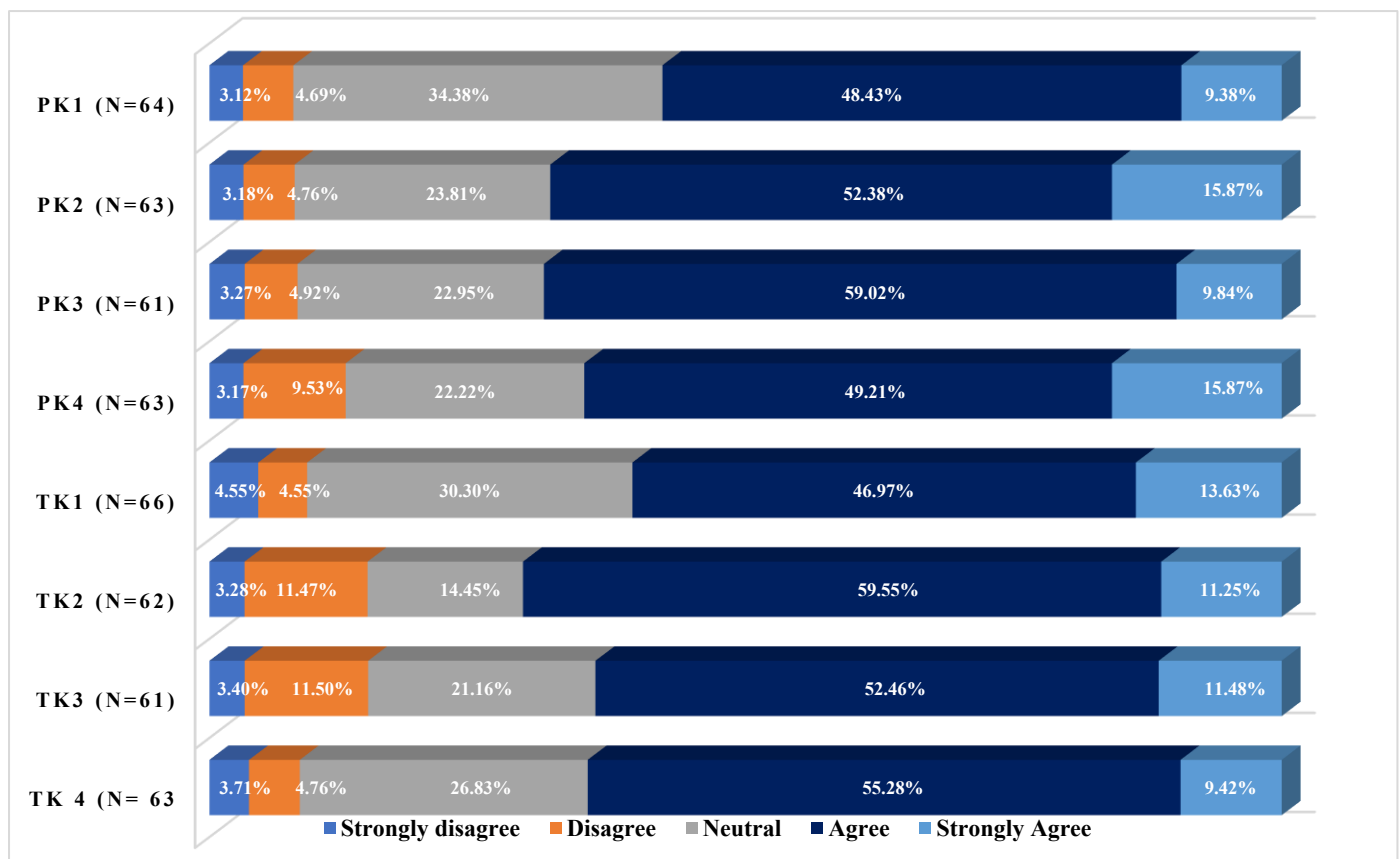
Figure 15: University lecturers' technological and pedagogical knowledge in pronunciation teaching (TK/PK)

* TK= Technological Knowledge   PK= Pedagogical Knowledge

Regarding the PK2 statement on university lecturers' ability to use technologies in giving students tests that address higher-order thinking skills, more than half of the participants believed that they had moderate competency levels. In the neutral position were just over a third of the respondents. However, less than 10% of the 63 showed low competence in using technologies. In terms of the PK3 statement, just over half of the respondents knew well how to implement technologies in their pronunciation teaching to help university students overcome challenging concepts, and nearly a quarter of lecturers remained in a neutral position. However, less than 10% perceived a lack of competency in incorporating technology to assist students in overcoming difficult concepts. The last statement (PK4) in the survey was about knowing how to select effective teaching strategies using pronunciation teaching technologies. The results

found that just over half of the respondents showed a high competency level. However, 34.92% of the 63 reported themselves as unsure and not competent in choosing effective pronunciation teaching strategies.

Let us now investigate the differences between university lecturers TKs and PKs levels and gender. To answer this, the statistical significance was analysed using an independent t-test. The purpose is to compare and assess the differences. The results indicated that there were no statistically significant differences in the degree of TKs attributable to participants' gender (TK1(X^2= 1.548, p= 0.461, TK2 (X^2= 3.194, p=0.203), TK3 (X^2= 1.028, p=0.595) and TK4 (X^2= 5.952, p=0.051).

The same is the case for the differences between pedagogical knowledge and gender, the results revealed that there were no statistically significant differences (PK1 (X^2= 3.045, p=0.218), PK2, (X^2= 5.572, p=0.062), PK3, (X^2= 3.733, p=0.155), and PK4, (X^2= 4.998, p= 0.082).The results revealed there were no statistically significant differences among university lecturers in the degree of technological knowledge (TK) attributable to their teaching experience (TK1 (X^2= 0.348, p=0.840), TK2, (X^2= 5.970, p=0.051), TK3, (X^2= 4.169, p=0.24), and TK4, (X^2= 1.184, p= 0.553).

The same is the case for the differences between pedagogical knowledge and teaching experience (PK1 (X^2= 1.184, p=0.553), PK2, (X^2= 2.476, p=0.290), PK3, (X^2= 2.218, p=0.330), and PK4, (X^2= 1.16, p= 0.572). Altogether, findings of this study indicate that university lecturers TKs and PKs competence is unaffected by gender and teaching experience.

4.2.2 PARTICIPANTS' ACCESS TO TOOLS AND APPLICATIONS

1. AT THE CLASSROOM

When the participants were asked what hardware tools and applications, they had access to inside the classrooms, the results found that nearly half of the respondents

had access to interactive whiteboards (54.79%, n = 40), smartphones (45.21%, n = 33), and desktops and laptops (45.21%, n = 33). In the case of social media platforms and other software tools, approximately half of the respondents had access to PowerPoint (73.97%, n = 54), Zoom (67.12%, n=49), YouTube (63.01%, n = 46), Moodle (54.79%, n=40), WhatsApp (47.95%, n = 35), and online dictionaries (38.36%, n = 28). Surprisingly, as apparent from Figure 16 below, very few had access to learning apps and pronunciation tools such as VoiceTube, Kahoot, and Praat software.
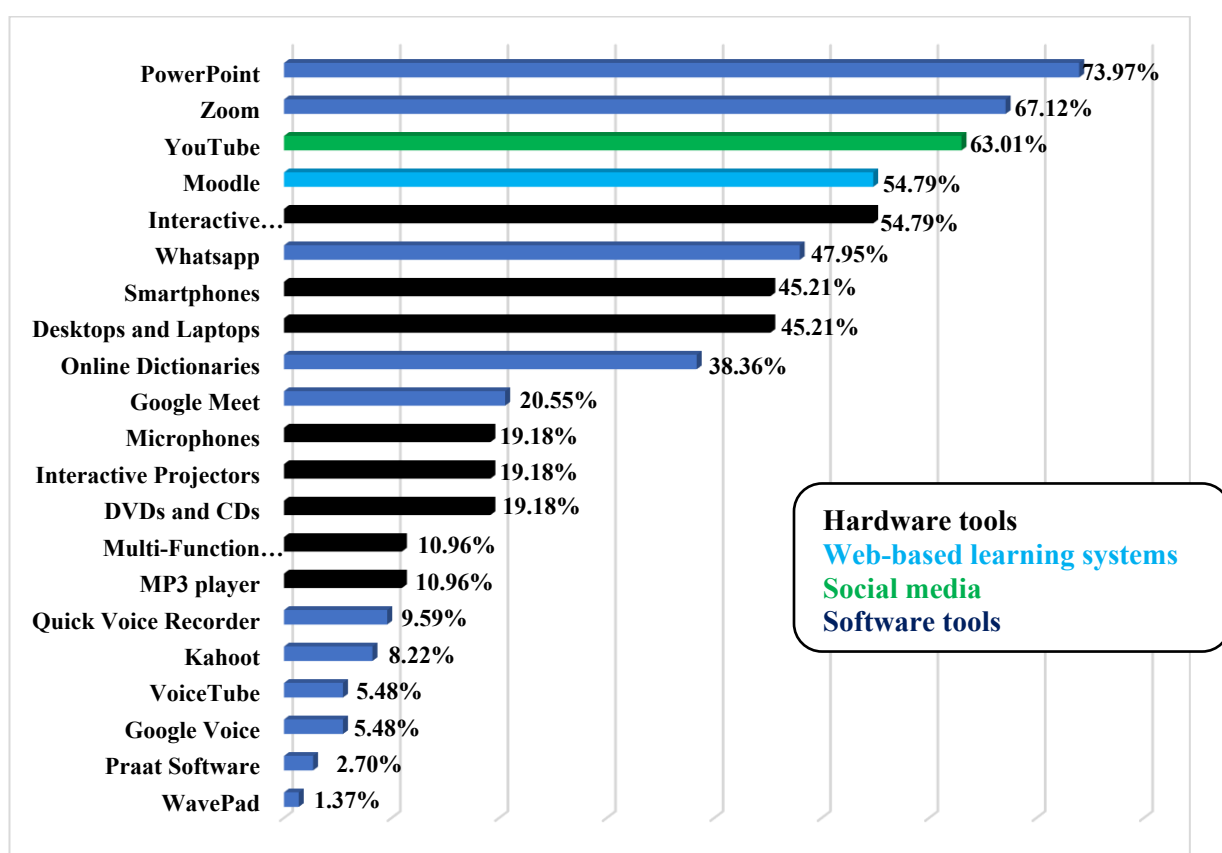
Figure 16: Participants' access to ICT tools and applications in pronunciation teaching in classrooms

2. IN LANGUAGE LABS AND COMPUTER LABS

In this section, the participants were asked about the tools they had access to when teaching English pronunciation in both language labs and computer labs. The results revealed that in terms of hardware tools, nearly a third of the respondents had

access to projectors (36.21%, n = 21), half of them had access to interactive whiteboards (53.45%, n = 31), and nearly a quarter had access to headphones (24.14%, n = 14) and headsets (22.41%, n = 13). A closer inspection of Figure 17 below shows that university lecturers had similar access to interactive whiteboards in all three environments. By contrast, the availability of auditory tools such as headphones and headsets were better in language labs and computer labs.

In the case of social media platforms and software tools, nearly half of the respondents had access to YouTube (74.14%, n = 43), PowerPoint (81.00%, n = 47), and a third to Facebook and E-campus. The results here can be compared with those in the previous section, where some tools like WhatsApp, Moodle, online dictionaries, and Zoom were reported to be more accessible inside the classrooms. With regard to Facebook, it was mainly accessed in both language labs and computer labs. Remarkably, in the case of specific pronunciation tools and learning apps, a very small number of the respondents had access to Praat software, learning games, WavePad, ShowMe, and Voice Spice in both language labs and computer labs. What is unexpected about these results is that university lecturers had limited access to learning and pronunciation tools inside the three environments.
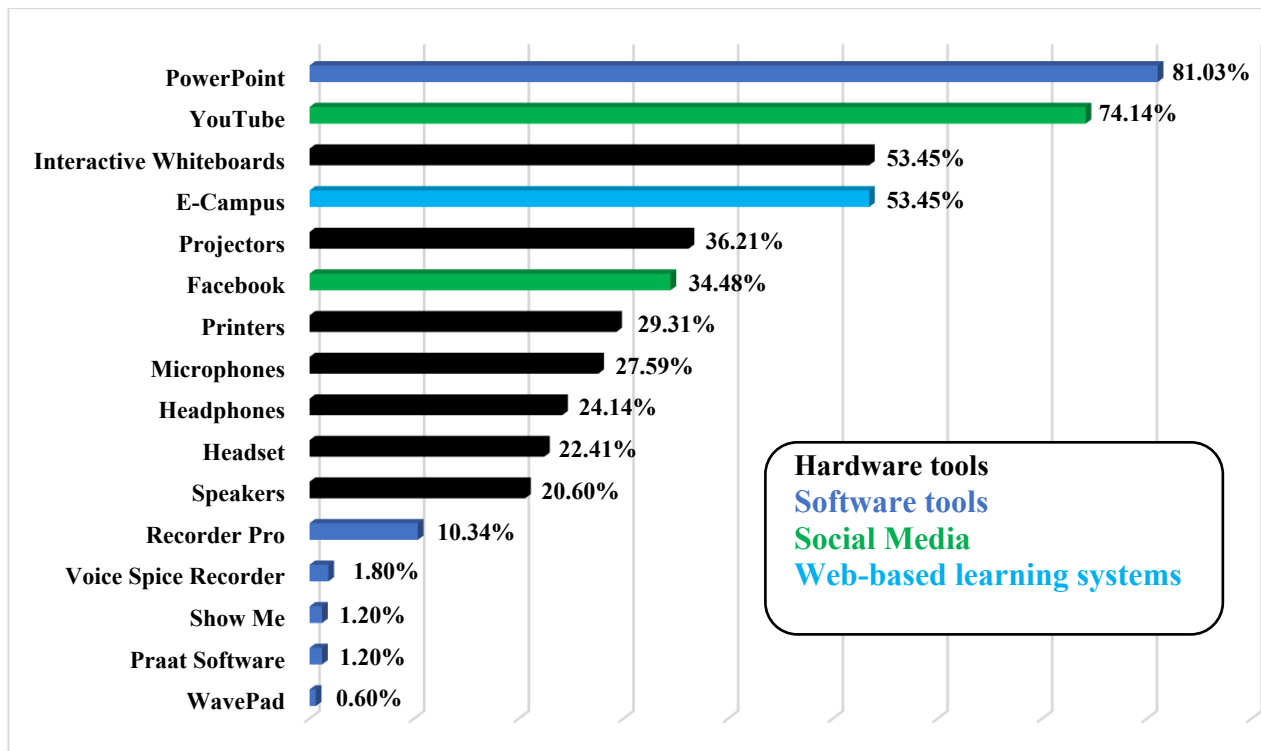
Figure 17: Participants' access to ICT tools and applications in pronunciation teaching in the language and computer lab

4.2.3 THE FREQUENCY OF USE OF ICT IN PRONUNCIATION TEACHING INSIDE CLASSROOMS, LANGUAGE LABS, AND COMPUTER LABS

Using a three-point scale (always, usually and sometimes), the participants were asked about how often they used ICT tools inside the classrooms, language labs, and computer labs. Regarding hardware tools inside the classrooms, the results revealed that nearly a third of the respondents always used interactive whiteboards (27.27% of 55) and desktops and laptops (45.71% of 35). A third of them sometimes used interactive projectors (27.00% of 40) and scanners and printers (30.43% of 23). Concerning mobile learning and the use of mobile devices in Jordanian universities, the results revealed that university lecturers usually used tablets (18.18% of 22) inside the classrooms. Comparing the frequency of use of tools inside the classrooms, what stands out in Figure 21 below is that university lecturers frequently used different tools in both language labs and computer labs. While lecturers frequently used desktops and laptops, interactive whiteboards, projectors, and printers inside the classrooms, the frequency of use of

auditory tools such as headsets, headphones, web cameras, and speakers was better in both language labs and computer labs. Another unexpected finding was that, while university lecturers frequently used mobile learning devices in the classrooms, they were not used as frequently in language labs and computer labs.

Concerning the frequency of use of software tools and social media, nearly a third of the participants always used PowerPoint (41.67% of 60), Moodle (35.56% of 45), E-Campus (28.00% of 50), and Zoom (27.27% of 55) inside the classrooms. In the case of online dictionaries (37.00% of 27), participants sometimes used them for pronunciation teaching inside the classrooms. Although these tools were reported to be frequently used inside the classrooms, they were not used as often in the labs. However, only a minority of lecturers made frequent use of pronunciation software tools and learning apps, such as Kahoot, Google Voice, and Praat, in these environments; see Figure 18 below.
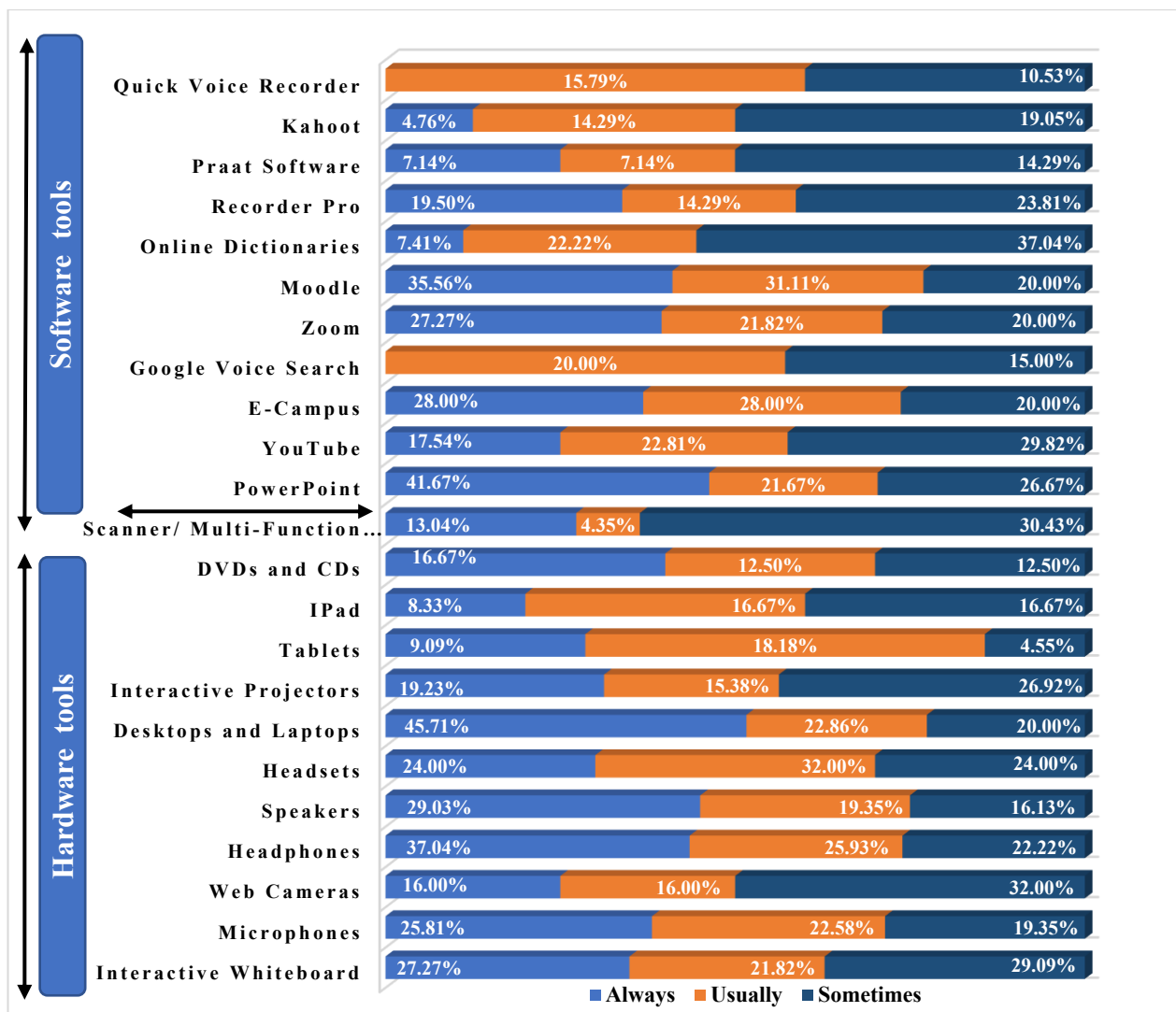
Figure 18: The frequency use of ICT tools in pronunciation teaching in the language lab, computer lab, and classroom.

Let us now investigate whether there were differences in the frequency of use of ICT tools and gender. To answer this, the chi-square test was performed. At a significance level of 0.05, it was revealed that there was a statistically significant difference between the frequency of use of hardware tools and gender ($X^2 = 45. 163^a$). However, there were no significant differences between the frequency of use of software tools and gender ($X^2 = 4.264^a$). As a result, gender does not affect the frequency of use of software tools (sig = 0.935). This shows that an equal percentage of male and female lecturers frequently used software tools, but the case is different with hardware tools (sig = 000).

Regarding the frequency of use of hardware and software tools and teaching experience. Further statistical tests revealed a statistically significant (sig = 0.006) difference between the frequency of use of hardware tools and teaching experience. The results showed that university lecturers with between 4 and 10 years of teaching experience were more frequent users of hardware tools than other teaching experience categories. However, the results showed that there were no significant differences (sig = 0.658) between the frequency of use of software tools and teaching experience.

Regarding the age of the respondents. The results revealed that there was no statistically significant difference between the frequency of use of software tools and age ($X^2 = 41.298^a$). By contrast, there was a significant difference between hardware tools and the age of university lecturers. It was found that university lecturers aged 40 and above were more frequent users of hardware tools than other age categories ($X^2 = 248.836^a$). The results showed that they use more outdated tools such as printers, scanners, DVDs and CDs, interactive whiteboards, and projectors. Further to this, they use some auditory tools such as speakers, microphones, headphones, and headsets. A possible explanation for this might be that older and senior lecturers with substantial teaching experience and a higher position rank are generally more selective with the technology they use, limiting tasks to those they know they can do in order to minimise errors.

4.2.4 FUNCTIONAL ACTIVITIES OF ICT TOOLS

In this final section of the questionnaire, the participants were asked to report on what they used ICT tools for when teaching English pronunciation. This included both teaching segmental and suprasegmental features and guiding students to do homework outside the borders of the classrooms, as well as assessing their pronunciation performance in the classrooms, language labs, and computer labs.

4.2.4.1TEACHING OF SEGMENTAL AND SUPRASEGMENTAL FEATURES

1. **AT THE CLASSROOM**

When participants were asked about their usage of ICT tools, their responses revealed that they employed the same hardware tools with consistent regularity for teaching vowels, consonant sounds, stress, intonation, and practicing connected speech practice. The data in Figure 19 below shows that nearly half of the respondents used interactive whiteboards (33.33% of 38), desktops and laptops (37.29% of 59), smartphones (46.43 % of 28) and smartboards (43.90% of 41) for teaching segmental and suprasegmental. In the case of the following software tools, PowerPoint (40.63% of 39), YouTube (30.00% of 71), E-campus (36.76% of 68), and online dictionaries (45.45% of 33) were used for both teaching and introducing segmental and suprasegmental features. Surprisingly, only a minority of respondents made use of learning apps and specific pronunciation tools such as Learning Games, Praat software, Kahoot, Google Classroom, Google Voice Search, and Quizlet.
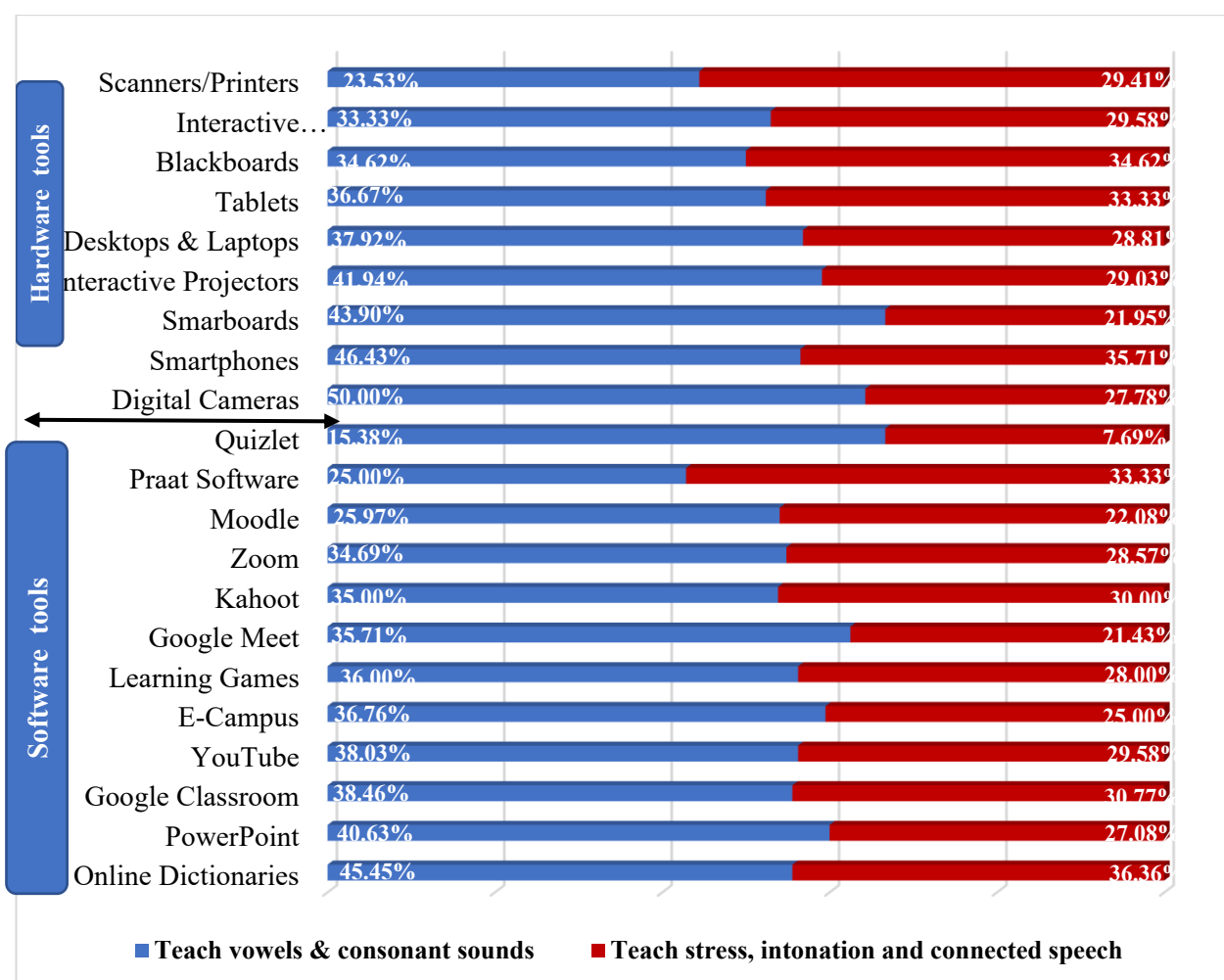
Figure 19: The functional use of hardware, software, and pronunciation tools in the classroom

2. LANGUAGE LABS AND COMPUTER LABS

When the participants were asked to report for what they used ICT tools in language labs and computer labs, the data in Figure 20 below revealed that they used the same hardware tools with similar frequencies for both teaching vowels, consonant sounds, stress, intonation, and connected speech. Nearly half of the respondents used interactive whiteboards (37.14% of 39) and projectors (n = 40) in both computer labs and language labs. Additionally, a third of them used speakers (n = 23), headphones (n = 23), smartboards (n = 17), and microphones (n = 19) in both environments.

In the case of software tools and social media, similar frequencies and tools were used in both language labs and computer labs. The results found that a third of the respondents used PowerPoint (n= 36) and YouTube (n= 32). These results reveal

that, compared to the classroom environment, university lecturers used a lot of auditory tools, such as speakers, headsets, and oriented- presentation tools, for both teaching segmental and suprasegmental features. What is surprising is that the availability of smartphones, smartboards, E-Campus, and online dictionaries was better inside the classrooms.

Remarkably, only a small number of respondents used learning apps and pronunciation tools in both language labs and computer labs. While a very small number used Google Voice Search, Recorder Pro, and Learning Games in language labs, only a minority used Praat Software, ShowMe, and WavePad in computer labs. Comparing the data from this section with the previous classroom section, it is evident that very few lecturers used learning apps and pronunciation tools such as Kahoot, Quizlet, learning Games, Praat software, Google Classroom, and Google Voice Search inside the classrooms.

Chart data:

Hardware tools

Tool	Teach vowels & consonant sounds	Teach stress, intonation and connected speech
Scanners/Printers	26.32%	36.84%
Cassettes	27.27%	31.82%
Tape Recorders	31.43%	36.36%
CD-ROMS	34.78%	33.33%
Printers	35.48%	39.13%
Interactive Whiteboards	37.14%	30.48%
Smartboards	38.24%	29.41%
Projectors	38.60%	31.58%
Speakers	40.00%	36.67%
Microphones	40.63%	37.50%
Headphones	41.94%	29.03%
Webcameras	46.15%	38.46%

Software tools

Tool	Teach vowels & consonant sounds	Teach stress, intonation and connected speech
Recorder Pro	25.00%	37.50%
Quizlet	26.32%	10.54%
Learning Games	29.41%	35.30%
WavePad	33.33%	16.67%
Praat Software	33.33%	33.33%
PowerPoint	35.65%	25.74%
Socrative	37.50%	37.50%
YouTube	38.55%	30.18%
Google Voice Search	46.67%	40.00%
Show Me	50.00%	25.00%

■ Teach vowels & consonant sounds   ■ Teach stress, intonation and connected speech

Figure 20: The functional use of ICT tools in language labs and computer labs

4.2.4.2 GUIDING STUDENTS TO DO HOMEWORK AND ASSESSMENT

In this section, university lecturers were asked about which tools they used to guide students to do homework activities and assess their students' performance inside and outside the borders of the classrooms, language labs, and computer labs.

1. AT THE CLASSROOM

When asked about the functional tools used in the classrooms, the findings showed that the same hardware tools were used on a consistent basis for both guiding students to do their homework and assessing their pronunciation performance. A closer inspection of Figure 21 below shows that nearly half of the participants used interactive

whiteboards (n = 42). In the case of social media and software tools, the results revealed that nearly a third of the respondents used PowerPoint (n = 31) and YouTube (n = 23), and half of the participants used Moodle (n = 40) and Zoom (n = 36) for both guiding students to do homework activities and assessing their pronunciation performance, but only a small number of respondents used learning apps and relevant pronunciation tools such as learning games, Quizlet, online dictionaries, Praat software, and Google Voice.
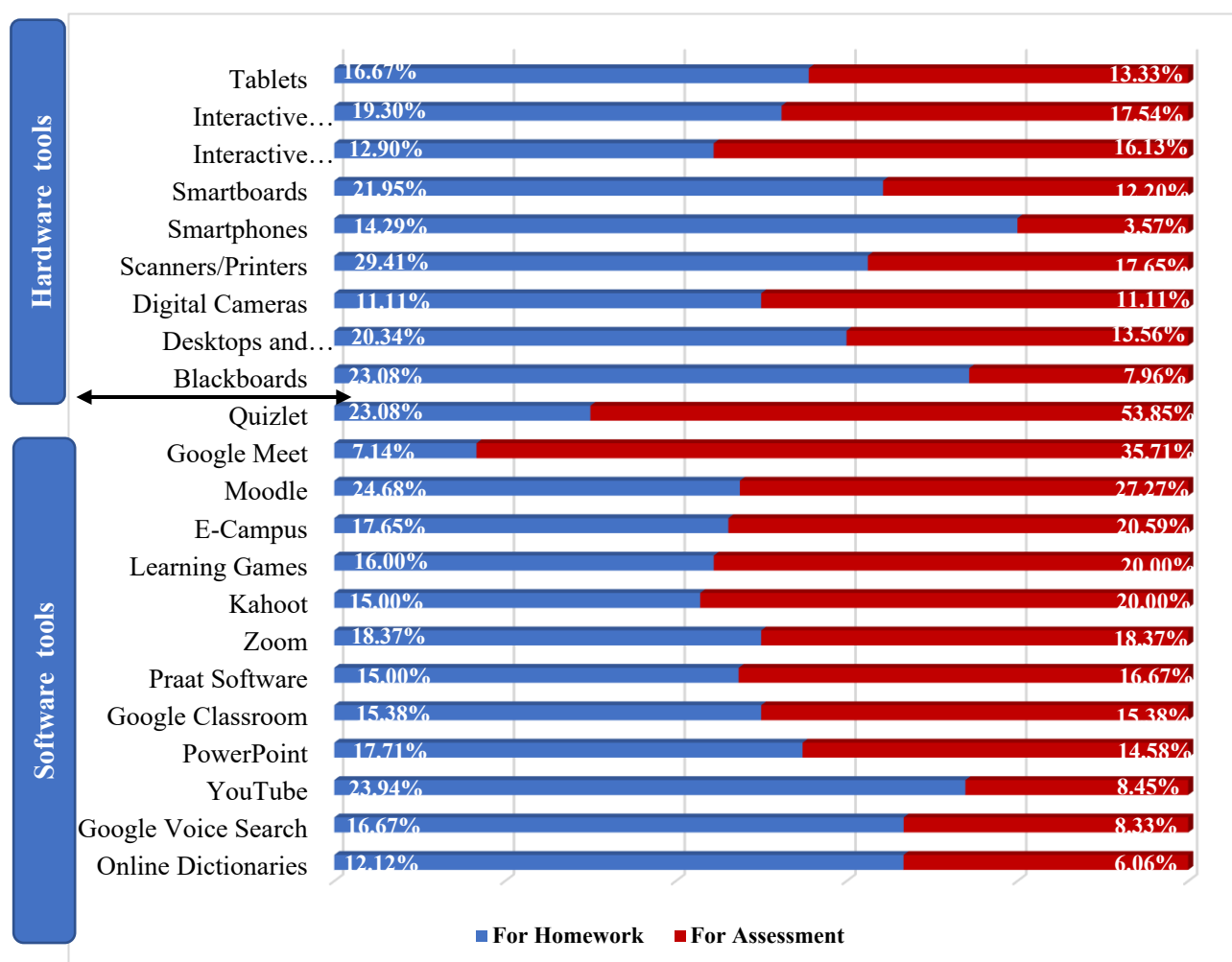
Figure 21: The Functional activities use of hardware, software, and pronunciation tools in the classroom

2. LANGUAGE LABS AND COMPUTER LABS

Regarding the functional use of ICT in language labs and computer tools, it is apparent from the figure that different hardware tools were used in both language and

computer labs. Nearly a third of the respondents (n = 34) used interactive whiteboards inside language labs. However, a very small number used headphones (n = 13), headsets (n = 15), microphones (n = 12), and CD-ROMs inside computer labs. What is surprising here is that university lecturers used a lot of hardware tools for teaching segmental and suprasegmental features. However, very few made use of these hardware tools for guiding students to do their homework or evaluating their pronunciation performance. In the case of software tools, nearly a third of the participants used PowerPoint and YouTube in language labs. Regarding learning apps and specific pronunciation tools, the findings revealed that a minority of the participants used Praat software, learning games, and Google Voice in language labs. Additionally, only a few tools such as WavePad, Quizlet, Venngage, Socrative, and ShowMe were used in computer labs (see Figure 22 below).
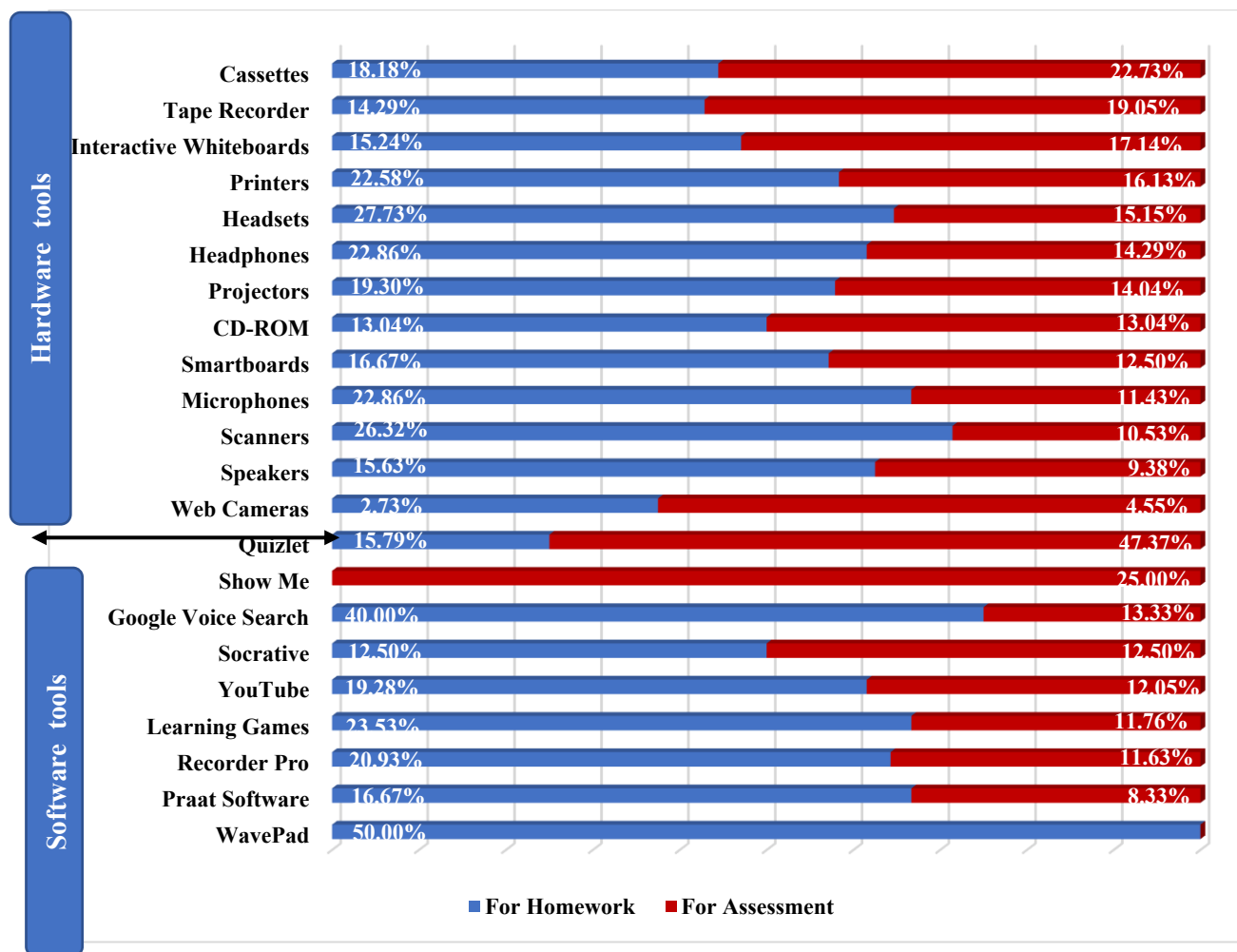
Figure 22: The functional activities use of ICT tools in language labs and computer labs.

4.3 SEMI-STRUCTURED INTERVIEWS RESULTS

In this qualitative section, thematic analysis was employed to scrutinize the perceptions of university lecturers regarding their use of and access to technological tools. Additionally, their insights regarding the evaluation and selection of appropriate technological tools for teaching pronunciation were examined. It is noteworthy to acknowledge that during the interviews, there was a variation in the language used by the participants. Some interviewees spoke exclusively in English, while others engaged in discussions predominantly in Arabic, occasionally interspersing their discourse with English. The results of the interviews generated three subthemes, as can be seen in Figure 23 below:

```
                ┌─────────────────────┐
                │   TECHNOLOGICAL     │
                │     ROADBLOCK       │
                └─────────────────────┘
        ┌──────────────┼──────────────┐
┌───────────────┐ ┌──────────────┐ ┌──────────────────┐
│ Lack of ICT   │ │ Unfamiliarity │ │ Inability to     │
│ training      │ │ with effective │ │ evaluate effective │
│               │ │ ICT tools     │ │ technological tools │
└───────────────┘ └──────────────┘ └──────────────────┘
```
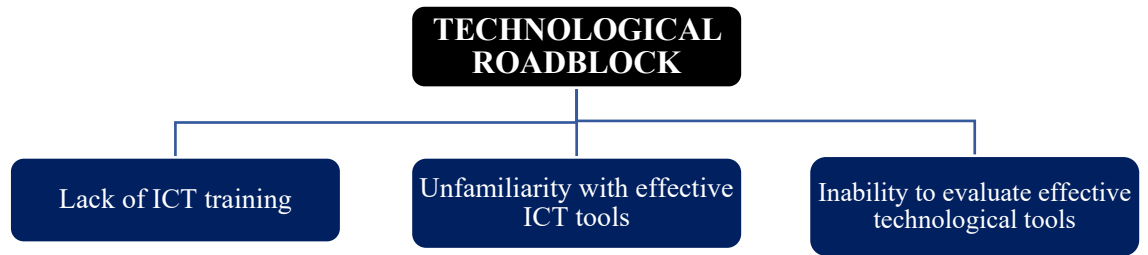
Figure 23: Thematic analysis of the primary theme and its related subthemes.

4.3.1 LACK OF ICT TRAINING

The first subtheme that emerged from the thematic analysis was the lack of ICT training. This subtheme was reported as a challenge by some respondents. UL2 highlighted this issue as a significant problem faced by university lecturers:

"A very important point is that we are all not well trained on how to use technology" (UL2)

Some interviewees mentioned that when they need to integrate ICT, they seek help from colleagues. For example, UL1, UL6, and UL9 explained that due to their lack of ICT training, they rely on assistance from colleagues within their respective departments.

"The selection of a particular technology to teach English pronunciation depends on the common knowledge and experience of my colleagues; they tell me about an example of technology." (UL9)

"I try to get feedback about it from my colleagues" (UL6)

In summary, the responses above indicate that some university lecturers lack sufficient training in ICT. The results also suggest that some of them have insufficient

sources from which to obtain information and knowledge about the use of ICT in pronunciation teaching.

4.3.2 UNFAMILIARITY WITH EFFECTIVE TOOLS

This subtheme suggests that their lack of familiarity with effective technological tools necessitates ICT training. Most respondents perceived themselves as familiar with only certain presentation-oriented tools for teaching English pronunciation. For example, UL2, UL3, UL4, UL5, and UL6 expressed that they were not competent and not confident in identifying new technological tools for teaching English pronunciation. UL12 mentioned that there was nothing else to compare to since they used only blackboards and PowerPoint. He highlighted that this constituted the entirety of the technology they employed in teaching English pronunciation:

" We do not use other things to compare, as we start with the blackboard and move to the PowerPoint. You might have something better in mind than this [...] I do not know" (UL12)

Similarly, UL6 talked about how she used only PowerPoint and Microsoft Word. Additionally, UL4 spoke about the use of Zoom and said:

"We have no other choice but to use Zoom meetings and the chat board provided by Zoom meetings" (UL4).

What can be gleaned from the responses above is that there was limited use of specific ICT tools in pronunciation teaching, and they believed this limited their ability to effectively teach pronunciation. However, these lecturers were able to use other applications to remediate this apparent issue. For example, UL11 argued that the only tool she was comfortable using was Google Translate to find the correct pronunciation.

UL3 noted that she used only Wikipedia, YouTube, Google Drive, and e-learning for pronunciation. However, UL9 indicated that the only technology he used was PowerPoint slides, commenting that:

"I use only PowerPoint slides. I give them [the students] printed notes and have them write down important points [..] for me, I do not use any other educational tools" (UL9)

In summary, the responses above reveal that university lecturers primarily used basic software, such as PowerPoint, Microsoft Word, Zoom, and traditional blackboards, to support the learning process. However, they perceived themselves as unfamiliar with specialised pronunciation apps and learning tools designed for teaching and learning English pronunciation.

4.3.3 INABILITY TO EVALUATE EFFECTIVE TECHNOLOGICAL TOOLS

When the participants were asked about their ability to determine and evaluate effective technological tools for teaching pronunciation, the majority commented that they had insufficient knowledge of whether the tools were effective. For example, when asked, "Are you able to determine the educational qualities of a technological device or tool?", UL2 said that it would be difficult for her to do this because she is not an IT expert who can evaluate and make good use of software tools for teaching and learning English pronunciation in the medical field.

UL4 and UL5 discussed their evaluation of tools, which was based mainly on their listening to videos for one or two minutes and then making a decision without using any rubrics. Regarding this issue, UL6 stated that it is difficult to determine the quality of educational tools:

"It is supposed to be by specialists, but I still cannot determine the quality of these tools." (UL6)

Surprisingly, a common view amongst interviewees was that they lacked specific rubrics to evaluate the efficiency of the tools. For example, UL7 said:

"But to know about specific rubrics for the evaluation of tools, [………] honestly speaking, no" (UL7)

Another interviewee, when asked about the same issue, said:

"I have no way of knowing whether this tool is professional or not" (UL 10).

4.4 DISCUSSION

This study, the first of its kind, investigates the TPACK Knowledge of in-service university lecturers when teaching English pronunciation in higher education in Jordan. This study also explores the frequency of ICT use and functional activities in pronunciation teaching. Furthermore, it assesses the differences in TPACK knowledge, the frequency of hardware and software tool usage, and their relationship with gender, age, and teaching experience. The study reveals that many participants lacked confidence in their TPACK knowledge, a finding supported by interviews with university lecturers. These results indicate that Jordanian university lecturers generally lack essential technology and pedagogy knowledge for teaching English pronunciation with ICT, a trend consistent with the findings of previous researchers such as Alharbi (2012), Alnajjar and Al-Jamal (2019), Alsharief (2018), Ajloni (2019), Kafyulilo et al. (2013), Kazoka & William (2016), and Niess (2011). For instance, Al Harbi (2012) reported that Saudi high school teachers had a low to moderate level of TPACK

knowledge. Wang (2022) found that EFL Taiwanese teachers lacked confidence in their TPACK for teaching higher-order thinking skills. In the Jordanian context, Alnajjar and Al-Jamal (2019) identified UNRWA (United Nations Relief and Works Agency for Palestine Refugees in the Near East) EFL school teachers' limited Technological Knowledge (TK), dissociation of TK from Content Knowledge (CK), lack of Pedagogical Knowledge (PK), and absence of TPACK, recommending the need for TPACK-based training workshops to enhance technology integration in teaching. This study distinguishes itself by focusing on the university lecturer community, the subject of pronunciation skills, and the context of private and state Jordanian universities.

Gender and teaching experience were initially considered as factors influencing teachers' TPACK knowledge. However, after a comprehensive analysis, it was determined that there was no statistically significant difference between TPACK knowledge and the gender and teaching experience of university lecturers. These findings are consistent with those reported by Adulyasas (2017), Alghamdi (2017), Alnajjar & Al-Jamal (2019), Akgün (2013), Çoklar (2014), Naaz & Khan (2018), and Karakaya & Yazici (2017.

On the other hand, this finding contradicts the results of previous studies (Alahmari, 2013; Alqurashi et al., 2017; Chai et al., 2013; Cheng, 2017; Sintema & Phiri, 2018), indicating a statistically significant difference due to gender in their samples. Cheng (2017), for example, found that Taiwanese male teachers had more confidence in Content Knowledge (CK) and Technological Knowledge (TK) than female teachers. As the literature on the impact of gender on TPACK remains inconclusive, the results of the current study align with some previous studies while contradicting others. Therefore, further research with a greater focus on gender is recommended. In summary, the results of this study suggest that Jordanian university

lecturers need to improve their knowledge of ICT, particularly TK and PK, irrespective of their gender and teaching experience, to teach English pronunciation more effectively. University lecturers should consider implementing new strategies to teach pronunciation skills that can help students overcome some of the pronunciation challenges they encounter in the medical field.

Regarding university lecturers' access to ICT tools, as reported in Section 4.2.2, this study found that university lecturers had access to presentation-oriented tools such as PowerPoint, projectors, interactive whiteboards, laptops, and desktops inside the classrooms, language labs, and computer labs. These findings are not surprising, given that these tools are essential for creating presentations and visual content. These results align with findings reported by Li and Walsh (2011) and Meo (2013), who found that the trend for using PowerPoint presentations is increasing among EFL teachers. The results also indicate access to some communication tools, such as WhatsApp and Facebook, inside the classrooms. Furthermore, the results revealed that lecturers had higher access to certain management tools, such as Moodle and E-Campus, inside the classrooms, compared to their access to learning apps and pronunciation software tools.

However, despite the rapid growth of computer technologies and their positive impact on both teaching and learning pronunciation, university lecturers had limited access to relevant learning and pronunciation apps. In fact, their access to certain management tools, such as Moodle and E-Campus, was higher than their level of access to learning apps and pronunciation software tools. These findings support the previous study by Pirasteh (2014), which indicated that although effective pronunciation tools had a positive impact, Iranian teachers did not integrate them into their teaching practices. In the Jordanian context, this finding supports Alshare et al.'s (2003) study that investigated the integration of computer technology in three Jordanian universities.

The results revealed that two-thirds of instructors had minimal and limited access to word-processing applications and spreadsheet software. These results are consistent with findings from Jordanian secondary school settings and at the national level, as reported by Abuhmaid (2008) and AlZaidiyeen et al. (2010). These results are also consistent with studies in other countries in the Middle East. Several studies were conducted in the Turkish context. For example, Asan (2003) investigated computer technology use among a group of 252 school teachers and found that many teachers did not integrate ICT in teaching a K-12 curriculum.

In summary, these findings indicate that not all university lecturers have fully implemented the Jordanian government's policy on the integration of digital technology, as stipulated in the Jordanian Vision (2025), to maximize the incorporation of ICT tools inside the classroom.

As reported in Section 4.2.3, the findings revealed that lecturers' teaching experience influenced their frequency of use of hardware tools. Although these results differed from some published studies (Mahdi & AlDera, 2013), they are consistent with those of Egbert et al. (2002), Giordano (2007), Hernandez-Ramos (2005), and Wong & Li (2008), which found that more experienced teachers frequently used ICT tools in their teaching. For example, Egbert et al. (2002) found that teachers who used Computer-Assisted Language Learning (CALL) activities were often those who had experience with CALL.

Regarding the frequency of ICT use and gender, the chi-square test revealed that there was a statistically significant difference between the frequency of use of hardware tools and gender. The findings of this study showed that male lecturers used these tools more often in their teaching than female lecturers. However, there is no significant

difference between the frequency of use of software tools and gender. These surprising findings may suggest that male university lecturers are more diligent because applying ICT in the study process generally requires more time for instructional design and preparation.

Regarding the difference between the frequency of use of ICT tools and age, the results indicated a significant difference between the frequency of use of hardware tools and the age of university lecturers. The results revealed that university lecturers aged 40 and older were more frequent users of hardware tools than other age categories. These results are consistent with those of Yaghi (2001) and Henry (2008). A possible explanation for this might be that older faculty members are more comfortable with their subject matter and teaching methods, allowing them more time and thought when designing learning experiences that incorporate technology for teaching and learning (Henry, 2008).

In summary, these findings indicate that the literature is inconclusive about whether there is a difference between age, teaching experience, gender of the participants, and frequency of ICT use. While the results of the study align with quite a few, a gap in the literature exists that analyzes the effect these variables have on the successful integration of technology into classrooms.

Concerning the functional use of ICT in pronunciation teaching, as reported in Section 4.2.5, this section differs from the access to and frequency of use of ICT tools (Sections 4.2.3 and 4.2.4), which focused on how university lecturers used ICT tools in the three environments (classrooms, language labs, and computer labs). The responses included using the tools for teaching segmental and suprasegmental features, as well as guiding students to do homework and assessing their pronunciation performance. The

findings showed that university lecturers used presentation-oriented and auditory tools, such as computers, laptops, speakers, smartboards, microphones, and projectors for both teaching segmental and suprasegmental features. This is in line with the findings related to lecturers' knowledge of ICT, which showed that the level of lecturers' knowledge of computers and laptops was the highest since university lecturers frequently used them for presenting PowerPoint slides.

The results found that while the availability of auditory tools, such as headsets, microphones, and headphones, was used more in both language labs and computer labs, presentational tools, such as PowerPoint and interactive projectors, were mainly used inside the classrooms. These findings reveal that they must use these tools in their regular classrooms, where they primarily teach subjects, to create presentations and other visual content.

However, only a very small number used pronunciation tools such as Praat software, ShowMe, and WavePad in the three environments. These results are reinforced by the qualitative findings, which revealed that most of the interviewees primarily used presentational tools inside the classrooms (Section 4.2.6.2). According to these results, we can infer that these ICT tools are limited in scope and do not give students and university lecturers much opportunity to practice and teach specific segmental and suprasegmental features with the capability of receiving immediate feedback.

These results reveal that university lecturers reported themselves as unfamiliar with effective pronunciation tools such as Praat and YouGlish. The results of this section appear to be inconsistent with those of other studies (Hincks, 2003; Imber et al., 2017; McCrocklin, 2014; Mitra et al., 2003; Neri et al., 2003; Levis, 2007; Neri et al., 2008;

Wallace, 2016, and others). For example, Levis (2007) pointed out that "Computer-Assisted Pronunciation Teaching (CAPT) applications are tools to meet instructional goals, and the tool should be appropriate to the job" (p. 186). He added that "freely available programs like Praat and WASP, or more costly options like the Computerised Speech Lab (CSL), should supplement any pronunciation training course." He concluded that "CAPT allows teachers to have access to pronunciation teaching that hopefully goes beyond their own skills, providing individualized instruction, and offering additional instructional time in a language laboratory or outside of class" (p.196).

These results may be attributed to university lecturers being unfamiliar and untrained with these effective technological tools that Levis (2007) suggested being used for teaching, introducing pronunciation, and guiding students to do homework outside the classroom borders. To sum up, the results in the interview section found that the participants reported themselves as unfamiliar with effective technological tools that could support their pronunciation teaching. It has been widely reported in the literature that while computer technology has proven to be an efficient means of facilitating L2 learning and is generally seen positively by university lecturers, most do not employ it in their classrooms (Alghazo, 2020; Bauer & Kenton, 2005).

The results of this study agree with those obtained by Al Harbi (2014), Archambault & Crippen (2009), Kazoka & William (2016), Mailizar & Fan (2020), Yoshida (2018), and others. For example, Yoshida (2018) found that although there are many useful technological tools, such as YouGlish, Schoology, and VoiceThread, that can be used for pronunciation teaching, very few employ them in pronunciation teaching. These findings indicate that not all university lecturers have implemented the Jordanian government's policy on the integration of digital technology, as stipulated in

the Jordanian Vision (2025), to maximize the incorporation of ICT tools inside the classroom.

SUMMARY

This section has dealt extensively with the discussion on university lecturers TPACK knowledge about ICT in teaching English pronunciation at university level. The quantitative findings showed that Jordanian university lecturers had insufficient knowledge of TK and PK in pronunciation teaching. The finding of this study is consistent with previous research that used the TPACK framework for investigating teachers' knowledge (e.g., Alharbi, 2012; Alnajjar & Al-Jamal, 2019; Alshareef, 2018). The results revealed that no statistical differences were detected between university lecturers (TKs and PKs) regarding teaching experience and gender. In relation to access to ICT tools, the quantitative findings showed that presentation-oriented tools and auditory tools were more commonly accessed in the three environments for pronunciation teaching. However, they had limited access to pronunciation tools and learning apps. This is supported by the semi structured interviews, where most of the participants asserted that they had access only to basic ICT applications for pronunciation teaching purposes and did not have access to or use pronunciation tools and learning apps. These results agree with Alghazo, 2020; Alqudah, 2012; Alshra et al., 2003; Farhat & Dzakiria, 2017; Li and Walsh, 2011; Meo, 2013; Pirasteh, 2014; and Wozney et al., 2006.

Regarding the frequency of use of ICT tools, it was found that there were statistically significant differences in the frequency of use of hardware tools based on university lecturers age, gender, and teaching experience. These results are in line with those of Danko et al. 2020; Egbert et al. 2002; Giordano, 2007; Henry, 2008; Hernaudez-Ramos, 2005; Tena et al. 2016; Yaghi, 2001; Wong and Li, 2008.

Concerning the functional activities of using ICT tools in teaching segmental and suprasegmental features, guiding students to do homework, and assessing their pronunciation performance, the results found that presentation-oriented tools and auditory tools were used for teaching segmental and suprasegmental features, guiding students in doing homework, and assessing their pronunciation performance. However, only a minority used pronunciation tools and learning apps.

This result is reinforced by the qualitative findings, which revealed that none of the participants indicated using pronunciation tools and learning apps in pronunciation instruction during the semi-structured interviews. This suggests that the results may be attributed to university lecturers being unfamiliar and untrained with the effective technological tools suggested by Levis (2007) for teaching pronunciation and guiding students in doing homework outside the classroom. Hence, the lack of use of pronunciation software in Jordanian pronunciation classrooms, language labs, and computer labs indicates that the university lecturers were unable to leverage the presence of these tools for teaching and learning purposes. The use of general software and hardware tools such as Microsoft PowerPoint and projectors in pronunciation teaching appears to offer few benefits in terms of teaching and learning pronunciation because this digital tool lacks features that facilitate students' work on rich pronunciation tasks.

4.5 IMPLICATIONS FOR THE SECOND PHASE OF THE STUDY

Through the outcomes of this study, it has become evident that university lecturers' TK is an important factor upon which TPACK is built. However, TK was explicitly identified as a domain of knowledge, which is not adequate to support ICT integration in pronunciation teaching in the classroom. This indicates the necessity and importance of training for university lecturers. Teacher professional development and training are geared towards improving the quality of teaching and learning in higher

education. It guides lecturers on how to apply ICT appropriately and successfully within the higher education system as lecturers require ICT pedagogical knowledge (TPACK) to effectively integrate ICT into the pronunciation curricula (Koehler & Mishra, 2006).

University lecturers need to be competent and able to connect their technological, pedagogical, and content knowledge. More importantly, they must be able to integrate all the TPACK domains of knowledge in their design and implementation of ICT-based instructional practices. Building lecturers' learning design capacity is one of the most important factors for successful and sustainable integration of ICT in the classroom (Chai et al., 2013). University lecturers should be provided with opportunities for professional development that allow them to explore digital technologies in relevant pronunciation contexts, enabling them to develop appropriate learning design plans and scenarios, contextually situated in real classroom settings, with the aim of improving students' pronunciation learning.

Previous studies indicate the positive influence of intervention programmes on improving the TPACK knowledge of both in-service and pre-service teachers (e.g., Angeli & Valanides, 2005; Canbazoğlu-Bilici, 2012; Graham et al., 2009; Koehler & Mishra, 2005; Mishra & Koehler, 2006). Therefore, it seems necessary to introduce the university lecturers in this study to intervention programs to improve pronunciation teaching and learning. The lecturers' ICT competence and knowledge are among the factors influencing the extent to which they can integrate their teaching and students' learning. Additionally, lecturers' professional development and training determine the level of their teaching knowledge as well as their willingness and ability to integrate ICT into teaching. University lecturers need to master ICT as an effective tool for developing and improving teaching, learning, and research (Nwokedi & Nwokedi, 2018).

Identifying the training needs will provide the information required to develop plans for designing a targeted training program aimed at bridging the gap between the desired performance and the current performance (Alsabbag, 2014; Nwokedi & Nwokedi, 2018). These important results guided the development of the second phase of the study. To be specific, it is considered both urgent and crucial to develop such programs for in-service lecturers to enhance their TPACK knowledge and conduct the teaching-learning process effectively. Thus, effective professional development programmes should contribute to enhancing lecturers' knowledge of pronunciation software tools and instructional strategies to integrate them into classrooms, language labs, and computer labs appropriately and effectively.

4.6 SUMMARY OF THIS CHAPTER

The aim of the present research was to examine Jordanian university lecturers' TPACK knowledge about ICT in teaching English pronunciation at the university level. The results of this study found that nearly a third of Jordanian university lecturers perceived themselves as not confident about their ability to use ICT, choose suitable tools for teaching English pronunciation, or integrate the communicative approach. Furthermore, there were no statistically significant differences between the university lecturers' TKs and PKs, gender, or teaching experience. Regarding their access, the results revealed that university lecturers had varying access depending on the environment. For example, the availability of presentation-oriented tools and management system tools such as Moodle and E-Campus inside the classrooms. A possible explanation for this is that they made the most of their access to these tools because they needed them to create presentations and other visual content. In both language and computer labs, they mainly had access to auditory tools such as headsets, headphones, and microphones. The results showed that their access to general ICT tools

was higher than their access to specific learning apps and pronunciation tools. Additionally, the chi-square test revealed a significant effect of the frequency of hardware tools use based on gender, age, and teaching experience.

Regarding the functional activities of ICT tools, the results found that the same hardware tools were used with similar frequency for introducing and practicing vowels and consonant sounds, stress, intonation, and connected speech practice. Presentational tools such as PowerPoint were frequently used in the classroom, while in language and computer labs, similar practices were observed with interactive whiteboards and presentation-oriented software like PowerPoint, as well as with auditory tools like headphones, headsets, speakers, and microphones. It is not surprising since more facilities are found in these two environments. However, only a minority of respondents made use of learning apps and specific pronunciation tools.

Moreover, similar tools were used to assign homework to students and assess their pronunciation performance inside the classroom, language lab, and computer lab. The majority of lecturers used PowerPoint and YouTube, but a very small number of participants made use of learning apps and specific pronunciation tools. In their interview responses, most university lecturers mentioned their unfamiliarity with effective technological tools and their inability to evaluate their effectiveness for pronunciation teaching. Taken together, these results suggest that university lecturers need training to effectively employ technological tools and instructional strategies for pronunciation teaching and learning.

In this chapter, I have presented the results and discussions of the quantitative and qualitative aspects of the first phase of the study. In the next chapter, I explore the findings and discussions of the second phase of the research study.

CHAPTER FIVE
Combined Findings and Discussion 2:
THE PERCEIVED IMPACT OF THE TRIPLE E WORKSHOPS ON TEACHING AND LEARNING ENGLISH PRONUNCIATION

5.1 INTRODUCTION

This chapter deals with research question 2: What are the perceived impacts of the TRIPLE E workshop for university lecturers and students when teaching and learning English pronunciation? The perceived impacts refer to the effects and changes that the TRIPLE E training-based workshops have on university lecturers and students in terms of teaching and learning English pronunciation. It encompasses the outcomes, benefits, or alterations in the way pronunciation is taught and learned, as perceived and experienced by the university lecturers who attended the workshop. The findings from the triangulation of instruments and different participants' views (interviews, focus group discussions, classroom observation, and a questionnaire) are presented here. The results are divided into two sections. The first section covers lecturers' and students' benefits as perceived by university lecturers after participating in the TRIPLE E workshops.

This is followed by how these benefits are put into their pronunciation teaching practices in the classroom. The benefits of the TRIPLE E were reported using semi-structured interviews (university lecturers, **N=6 cases**). Subsequently, classroom observations were conducted to investigate how these benefits were incorporated into their pronunciation teaching practices. This addressed the potential impacts of the TRIPLE E workshops on the participants' practices by highlighting changes in the

adoption of new pronunciation apps, learning tools, and instructional strategies in their classroom settings. After observing their classes, the focus group discussions were conducted with one group (**N= 3** lecturers) since the teaching schedule and availability of the other three participants did not permit them to attend the group discussion.

The second section examines university students' perceptions of the perceived impacts of the TRIPLE E training-based workshops which were integrated into their courses by their lecturers, all of whom attended the workshops themselves. It is essential to emphasize that only the lecturers attended these workshops, not the students. In this case, two instruments were employed for data collection: a questionnaire (N=322) and focus group discussions with six groups (N=4 students in each group). The primary focus of these investigations is to investigate the integration of new technological tools such as Youglish, Rose medical, Elsa, Vocaroo and instructional strategies such as share aloud, I do, we do, you do, with a specific focus on their pronunciation learning. Additionally, this chapter provides an in-depth discussion of the findings. The discussion is presented in the same order as the results section, beginning with the TRIPLE E impact as perceived by university lecturers. The issues raised in the discussions are discussed here in light of the relevant literature.

5.2 THE PERCEIVED IMPACT OF THE TRIPLE E TRAINING-BASED WORKSHOPS

As an instructor for the TRIPLE E workshops, my main responsibility was to provide the participants with the necessary TPACK knowledge and support them in integrating the new pronunciation apps, learning tools, and instructional strategies into their pronunciation teaching practices. This would enable them to actively incorporate the newly acquired benefits into their pronunciation teaching. As discussed in Chapter 3, Section 3.6.1.3, the TRIPLE E workshop provided an opportunity for university

lecturers to enhance their pronunciation teaching skills. During this workshop, they learned about the TRIPLE E framework, which is based on three components: Engagement, Enhancement, and Extension of learning goals. The TRIPLE E evaluation rubrics for lesson design, educational apps, and lesson evaluation were also introduced. These rubrics served as valuable tools for lecturers to critically evaluate their teaching strategies and the effectiveness of the educational technologies they used. By utilising these rubrics, lecturers could gain insights into areas for improvement and make informed decisions about their instructional approaches.

In addition to the TRIPLE E framework and evaluation rubrics, the TRIPLE E workshop also introduced university lecturers to a range of instructional strategies, including share aloud, software tour, self-reflective practices, I do, we do, you do, turn and talk, modelling navigation of tools, co-engagement, visual representation of learning, active listening, students investigating their pronunciation projects, using authentic tools, and discourse with others. These strategies were specifically designed to enhance student engagement and improve learning outcomes in the context of teaching English pronunciation.

During the TRIPLE E workshop, university lecturers were also introduced to a variety of pronunciation apps and learning tools, including YouGlish, Rose Medical Pronunciation Coach, ELSA, Vocaroo, Quizziz, Forvo, Fraze.it, online dictionaries, and many others specifically designed for teaching and learning English pronunciation. These tools were aimed at enhancing the students' learning experience, both in synchronous and asynchronous learning contexts. Finally, the workshop demonstrated how pronunciation apps, learning tools, and instructional strategies could be used for both formative and summative assessment, allowing the assessment of students' learning outcomes and adjustment of teaching strategies accordingly.

5.2.1 IMPACT OF THE TRIPLE E TRAINING-BASED WORKSHOPS AS PERCIEVED BY UNIVERSITY LECTURER

The analysis of interviews and focus group discussions resulted in the identification of six key impacts arising from the TRIPLE E workshop attended by university lecturers. These impacts became intertwined with the personal evolution of the lecturers, subsequently influencing their students. This section explores the changes and enhancements observed in pronunciation teaching and learning practices. The perceived impacts are presented as follows:

IMPACT 1: ENHANCING PRONUNCIATION TEACHING PRACTICE THROUGH THE INTEGRATION OF ICT TOOLS AND INSTRUCTIONAL STRATEGIES

One of the perceived impacts identified by the thematic analysis was that university lecturers were able to better integrate the new technological tools and instructional strategies such as share aloud, I do, we do, you do, reading aloud into their pronunciation teaching following the TRIPLE E workshops. For instance, UL2 integrated the new technological tools into her pronunciation teaching in order to improve her students' ability to correctly pronounce words. She created interactive and engaging activities using these tools, providing her students with ample opportunities to practice and refine their pronunciation skills. UL2 believed that this approach would be more effective in helping her students achieve better outcomes in pronunciation learning. She said:

"By incorporating the new ICT tools and instructional strategies, I have been able to create a more dynamic learning experience for my students. I provided students with additional resources and opportunities for practice that enhanced their pronunciation learning skills" (UL2).

UL3 reported that the new tools she learned following the TRIPLE E workshops have enabled her to enhance her pronunciation teaching practices. By incorporating these tools into her lectures, UL3 has given her students access to valuable resources that can assist them in improving their pronunciation skills. She said:

"I was able to integrate the new technological tools such as YouGlish, Rose Medical, Elsa, Quizziz, the Oxford dictionary, and Vocaroo into my pronunciation teaching. I have added links to my lectures where students can learn how to pronounce the harder and the new words, especially for the freshmen." (UL3)

In light of the responses above, UL5 emphasised the effectiveness of integrating the new ICT tools into her pronunciation teaching. She said:

"I have found that the integration of ICT tools has made my pronunciation teaching more effective, as I was able to provide a wider variety of resources and support to my students" (UL5).

UL6 has taken a proactive approach to enhancing her students' pronunciation skills by utilising e-learning Moodle to provide them with a list of medical terms before each lecture. By doing so, UL6 has enabled her students to familiarise themselves with the terms and practice their pronunciation beforehand, thus enhancing their ability to comprehend and use the terminology accurately during lectures. UL6's efforts reflect her commitment to improving her students' pronunciation skills. She said:

"I now attach a link via e-learning Moodle [.......] with a list of medical terms before each lecture. Then, at the start of each lecture, I ask students to share their pronunciation inside the classroom" (UL6).

UL1 demonstrated a willingness to integrate new teaching strategies and a dedication to providing an enhanced learning experience for his students. The TRIPLE E workshops were effective in facilitating innovative teaching strategies that benefited both UL1 and his students. UL1 recognised the value of incorporating new technological tools and instructional strategies into his teaching, which allowed him to engage his students more effectively and improve their pronunciation skills. He said:

"The TRIPLE E helped me expand my pronunciation teaching strategy repertoire as a lecturer. I integrated new strategies such as share- aloud, software tour, I do, we do, you do, and visual representation of learning, and all these strategies are new for me. I can say that after integrating these strategies, my classes are reinforced with pictures, videos, and audio recordings that made my teaching more enjoyable and enabled my students to receive pronunciation content in a better way " (UL1).

In summary, the responses above indicate a recognition of the benefits of new pronunciation tools and instructional strategies such as share-aloud and software tour in supporting pronunciation teaching and learning. The lecturers emphasised the importance of actively engaging students in the learning process to improve their pronunciation skills, and all expressed a positive view regarding the effectiveness of the new tools and instructional strategies in enhancing pronunciation teaching and learning. Overall, there was a consensus among the interviewed lecturers that the TRIPLE E workshops provided valuable knowledge and skills that are applicable in the classroom to support pronunciation teaching practices and enhance pronunciation learning outcomes.

IMPACT 2: RUBRICS IMPACT PRONUNCIATION TEACHING PRACTICES AND STUDENTS LEARNING

The second perceived impact identified by the participants was the impact of the TRIPLE E evaluation rubrics that assisted university lecturers in assessing educational

apps designed for teaching and learning English pronunciation. The rubrics are designed to evaluate the effectiveness, efficiency, and engagement of educational apps in facilitating students' improvement of their pronunciation skills. The majority of respondents perceived that they benefited from the TRIPLE E rubrics shared during the workshops, which enhanced their ability to choose effective and appropriate pronunciation apps and learning tools to support their teaching and their students' learning. UL1, for example, highlighted the impact of the TRIPLE E rubrics on his ability to evaluate and select effective technological tools for teaching English pronunciation. The rubrics helped him make more informed decisions about which tools to use in his classroom, ultimately resulting in a more effective and efficient teaching approach that positively impacted his students' pronunciation learning performance. He said:

"What else do I know about is the TRIPLE E rubrics that have been instrumental in helping me evaluate any technological tools when teaching English pronunciation by ticking the ones that are most relevant and useful for my students and which ones need to be worked on again " (UL1).

Similar to UL1, UL2 also recognised the value of the TRIPLE E rubrics in supporting ongoing self-reflection and improvement in pronunciation teaching practices. UL2 expressed her intention to use the rubrics as a checklist to identify areas for improvement in her own teaching practices, with the goal of enhancing her students' pronunciation learning outcomes. By using the rubrics as a tool for self-evaluation and improvement, UL2 demonstrated a commitment to continuously improving her pronunciation teaching practices and providing high-quality pronunciation instruction to her students. She said:

"Yes, exactly. I now have the TRIPLE E rubrics that have helped me to streamline my approach to teaching English pronunciation by ticking off the parts that I need to work on or the ones that have already been completed." *(UL2)*

UL4 admitted the significance of assessing the efficiency of pronunciation apps and learning tools and the necessity to develop explicit criteria for evaluation, ensuring that they are aligned with the learning objectives. She emphasised that the TRIPLE E rubrics will be included in the syllabus, indicating that she is aware of the evaluation criteria. She said:

"How to evaluate educational tools using the rubrics. By making these rubrics a part of my pronunciation teaching syllabus, I am able to ensure that my students are receiving a well-rounded and effective pronunciation learning experience." *(UL4)*

It can be inferred from the responses above that university lecturers derived significant benefits from the utilisation of the TRIPLE E rubrics subsequent to their participation in the TRIPLE E workshops. By employing the TRIPLE E rubrics, lecturers were able to adopt a more discerning approach in selecting the most effective educational tools that enhance engagement, thereby leading to an improvement in pronunciation teaching practices and subsequent enhancements in student learning outcomes.

IMPACT 3: CHANGING LECTURERS' ROLES

After attending the TRIPLE E workshops, university lecturers obtained another benefit that shifted their roles since the new effective technological tools and instructional strategies entered their classes and began to play an increasing role in supporting lecturers' and students' pronunciation practices. This resulted in the impact

of adopting a more student-centred approach and becoming a facilitator in supporting students' pronunciation practices.

According to UL1, the role of lecturers after the integration of pronunciation tools has shifted following the TRIPLE E workshops to that of a facilitator of the pronunciation teaching process who supports students' pronunciation practices inside and outside the classroom. This has allowed us to create more student-centred and interactive learning environments that focus on the individual needs of each student. UL1 no longer plays the traditional role of transferring knowledge to students but instead supports students in acquiring knowledge and developing their pronunciation skills. This approach enabled students to take responsibility for their learning, become active participants in the learning process. He said:

> *" The TRIPLE E workshop has helped me shift my focus in pronunciation teaching from just delivering content to creating meaningful pronunciation learning experiences that promote student engagement. My role as a facilitator of the pronunciation teaching process supported students' pronunciation practices inside and outside the classrooms. They can learn at their own convenience." (UL1)*

UL2 also highlighted the transformation in her pronunciation teaching approach towards a more student-centred method, where her students learned independently and actively participated in their pronunciation learning. This strategy enabled students to create more engaging and effective learning experiences that are tailored to their individual needs and preferences, which can be more effective in developing their pronunciation skills. Her instructional style has been modified to be more focused on student autonomy and self-directed learning, in which students have more control over their pronunciation learning process. This shift in approach can lead to greater engagement, motivation, and improved students' pronunciation.

" Attending the TRIPLE E workshops has transformed my teaching practice by helping me to become a facilitator of learning. I started to take a student-centred approach. They should learn on their own. There is nothing called spoon feeding" (UL2).

Similar to the responses above, UL3 emphasised that the new ICT tools have shifted teachers' roles to facilitators, enabling their students to learn independently. This approach is beneficial in several ways. Firstly, it promoted her students' engagement and motivation, as students are likelier to participate actively in their pronunciation learning. Secondly, it allowed students to learn at their own pace and according to their needs, leading to a more personalised learning experience. Finally, it improved students' pronunciation skills by enabling them to focus on the areas that required improvement. She said:

"With the new tools, our roles as teachers have shifted to those of facilitators. Our focus on scientific and pronunciation teaching and learning, especially English proficiency, as this will support their studies. The new tools are beneficial because students can learn on their own" (UL3)

"The TRIPLE E has changed our styles from a teacher-centred approach to a student-centred one. Students started to take an active role in their pronunciation learning" (UL3).

Similarly, UL5 indicated that the TRIPLE E workshop she undertook had been successful in engaging students and making the learning experience more interesting and interactive. Furthermore, she stressed that the use of these pronunciation tools has caused a shift in her role from a traditional teacher to a facilitator of the learning process, suggesting that they are now providing more opportunities for student-led and independent learning. She said:

" I have learned new strategies and techniques that have allowed me to become a more effective and impactful lecturer in teaching pronunciation in the classroom. The new tools attracted students' attention and changed my role to that of a facilitator of the pronunciation teaching process." (UL5)

UL6 commented on how the TRIPLE E workshops efficiently changed the roles of the teacher and the students in the classroom, emphasising the importance of student-centred learning approaches. She said:

"After the TRIPLE E workshops, I have become more aware of my students' individual needs and have learned to adjust my pronunciation teaching approach accordingly. I changed my role from a teacher-centred to a student-centred learning efficiently." (UL6)

To summarise, the responses from the lecturers highlighted that the TRIPLE E workshops helped them shift their focus towards a more student-centred approach in pronunciation teaching, allowing students to learn independently, at their own pace, and according to their individual needs. This approach promoted students' engagement and motivation and improved learning outcomes. By becoming facilitators of learning, lecturers were able to promote a more engaging and effective pronunciation learning experience for their students.

IMPACT 4: ONGOING PRONUNCIATION LEARNING BEYOND THE CLASSROOM BORDERS

According to the university lecturers, the new pronunciation apps and learning tools were perceived to be efficient in extending students' pronunciation learning beyond the confines of the traditional classroom borders. This provided students with authentic learning experience and resulted in better long-term and sustainable learning outcomes. The flexibility of these tools allowed students to learn and practice at any time and place, leading to a more comprehensive and continuous learning experience. Many of the

participants emphasised the importance of extending learning beyond the classroom environment, and the new pronunciation tools provided students with this opportunity. UL2 highlighted this benefit in the focus group discussion, emphasising how the new technological tools allowed students to continue their learning outside the classroom setting.

"What they learned using these pronunciation tools such as YouGlish, Rose Medical, and ELSA is 24 hours and seven days beyond the classroom borders because, in the university, they stopped interaction after two to three hours; they had nothing to continue, but at home, they used these tools in the comfort of their homes, so the thing was far better for them as a continuous education process." (UL2)

UL3 emphasised that after attending the TRIPLE E workshops, her students utilised different pronunciation tools to improve their pronunciation outside of the traditional classroom setting. These tools, including YouGlish, Rose Medical Pronunciation Coach, and Elsa, enabled them to search for medical terminology and practice pronunciation at any time of the day, seven days a week. Such flexibility and autonomy allowed for personalised learning that could be tailored to their own pace and schedule. UL3 further stated that using these new pronunciation tools by students outside the classroom borders resulted in a culture of ongoing learning and self-empowerment among her students, who took ownership of their own pronunciation learning.

Similar to the responses above, UL5 stated that the TRIPLE E workshops have been useful in helping her students practice their pronunciation outside the classroom borders. With the new tools, her students had opportunities to take charge of their own learning and develop their pronunciation skills, which made it easier and more engaging for them. She said:

"The new tools and resources we learned in the TRIPLE E workshops have helped me encourage my students to practice their pronunciation outside the classroom. They can continue to improve their pronunciation skills using these tools at their own time and pace". (UL5)

The same participant asserted that the reduced lecture time due to COVID-19 has likely played a role in encouraging self-learning and ongoing pronunciation practice among her students. With less time spent in traditional lecture-style teaching, students were forced to take more responsibility for their own learning, which was a positive thing in the long run. She said:

"When talking about an extension, students investigated and checked their projects and discovered with others how medical terms are pronounced using the new tools as they became self-learners, especially since the lecture time is cut down because of COVID-19. By providing them with the tools, we are helping them to continue ongoing pronunciation practice and become more independent and motivated learners" (UL5).

UL6 highlighted the fact that the new ICT tools are available 24 hours a day and 7 days a week, which helped her students continue practicing their pronunciation skills whenever they had time without being limited by class schedules or access to resources. This flexibility was important for her students, who had busy schedules and needed to balance their pronunciation learning with other commitments.

To sum up, the responses revealed that the best way to enhance students' pronunciation learning was to allow them to apply what they learned in the classroom to real-life experiences outside the classroom setting This supports the notion that students were likely to move to a level where their pronunciation learning could become differentiated, personalised, and more relatable, taking control of their learning, and

helping them develop the pronunciation skills they need to communicate effectively in the medical field.

IMPACT 5: USING AUTHENTIC PRONUNCIATION TOOLS

Using more authentic tools with better engagement was another benefit that university lecturers reported following the TRIPLE E workshops that their students achieved after attending the TRIPLE E workshops. These benefits were highlighted, for example, in discussions with most of the participants, who stressed how much students benefited from using authentic English videos for pronunciation and presentation practice, such as YouGlish. For example, UL2 stated that incorporating the new pronunciation tools into their pronunciation teaching provided her students with opportunities to practice their pronunciation skills in a more natural context. The integration of YouGlish, Rose Medical, and ELSA has deepened their understanding of how medical terms are pronounced and prepared them for the challenges they will face in the real world. The new tools helped her students learn the correct pronunciation of words, especially medical and scientific terms, which were not correctly pronounced before. The availability of original videos in context provided a better learning experience for her students.

UL3 provided a practical reason for students to achieve the same goal of improving English pronunciation. Her selection of YouGlish was a sound pedagogical decision behind it, as she stated that using authentic and accurate tools is far better for enhancing students' pronunciation in the medical field since the use of unreliable sources can lead to mispronunciation of words, which can have serious consequences. She said:

"Yes, by incorporating the new tools, students started using authentic tools like YouGlish instead of YouTube or Google Translate. They are not accurate in their pronunciation and sometimes mispronounce words, especially when discussing scientific or medical terms. They began to use more reliable websites, such as YouGlish, to check the pronunciation of some medical terms." *(UL3)*

In terms of getting the correct model for pronunciation, UL3 stated that using tools like YouGlish can help students pronounce words correctly without any negative effects or interference. She said:

"So, by providing students with the new tools like YouGlish, they started to pronounce medical words correctly without any negative effect or interference. [...] This is the best way to hear [...] to listen, I mean, even from the whole video- because they did not use to hear the correct pronunciation before. This allowed them to search for any word, and YouGlish provides authentic videos where the word is used in context. So, if they got the word from these videos, they got the correct pronunciation". *(UL3)*

Commenting on authenticity, UL5 stated that after the TRIPLE E workshops, students were able to use more authentic tools without any distraction and were confident in their beneficial impact on pronunciation learning with 100% accuracy.

UL6 emphasised that using ICT tools like YouGlish and ELSA helped her students get access to a wealth of authentic, real-world examples of pronunciation, which developed more accurate and natural-sounding pronunciation skills in the medical field. These tools have become an indispensable part of her pronunciation teaching toolkit.

It can be inferred that the use of authentic and accurate tools with more engagement in pronunciation learning, specifically YouGlish, Rose Medical, and ELSA, helped to make the pronunciation learning experience for university students more

engaging and interactive, without distractions. The integration of these tools has resulted in a more dynamic and stimulating learning environment, which has likely contributed to the positive outcomes reported by university lecturers.

IMPACT 6: IMPROVING STUDENTS' CONFIDENCE AND ATTITUDE TOWARDS PRONUNCIATION TOOLS

Another common perceived impact that the participants talked about was how students' confidence and attitude changed after integrating the new pronunciation apps and learning tools. For instance, UL3 asserted the benefits of the new pronunciation tools that have helped her students overcome the fear of making mistakes and encouraged them to search for the correct pronunciation of medical terms without any embarrassment. She added that her students are now more confident and motivated than ever before, and they are eager to learn and improve their pronunciation skills. Similarly, UL4 pointed out that by letting her students use the new tools to practice their pronunciation, she gave them a safe place where they could work on their skills. The ability to listen to the pronunciation multiple times and practice independently helped enhance her students' confidence and reduce any feelings of embarrassment. She said:

"I found that after incorporating the new pronunciation tools, my students became more motivated and more confident when they used these online tools to practice English pronunciation. They can listen to the pronunciation multiple times and practice independently without feeling embarrassed or self-conscious" (UL4).

UL5 stated that integrating specific tools, such as YouGlish, Rose Medical, Elsa, and Vocaroo, has led to a more positive attitude towards pronunciation learning among her students. These tools have provided her students with new ways to practice and improve their pronunciation skills, such as interactive exercises, getting feedback, and

recording their own voices. This enhanced their confidence and encouraged them to continue practicing at their own pace. She said:

> *"Through the use of the new ICT tools, I have been able to provide my students with more opportunities to practice and receive feedback on their pronunciation skills. They can use the tools on their own time and at their own pace, which has increased their confidence and motivation to practice pronunciation in the medical field " (UL5).*

To sum up, the results reported that participation in the TRIPLE E workshops led to a noticeable change in university lecturers' pronunciation teaching approach. These workshops successfully enhanced students' motivation and attitudes towards learning pronunciation. Consequently, the integration of effective pronunciation apps and learning tools can positively impact student engagement and learning outcomes.

5.2.2 EVIDENCE FROM CLASSROOM OBSERVATIONS

To get a full picture of how the TRIPLE E workshops that lecturers went to affect their teaching, this section looks at how university lecturers teach pronunciation in their classrooms, with a focus on how they use the new apps, learning tools, and teaching strategies that are in line with the TRIPLE E framework. As previously explained in Chapter 3 (3.7.3), the observations were conducted by the researcher, employing the TRIPLE E observation rubric as a guiding instrument to explore the lecturers' employment of the new pronunciation apps, learning tools, and instructional approaches in pronunciation teaching. The data collection process encompassed written notes and the lecturers' scheme of work. Subsequently, a content analysis approach was adopted to scrutinise the data, discern underlying patterns, and identify prevailing themes. The ensuing findings, derived from the observations of six university lecturers (UL1, UL2, UL3, UL4, UL5, and UL6) who successfully completed the TRIPLE E

workshops, are presented herein, illuminating the perceived impact of these workshops on their pedagogical practices (Refer to Figure 24: UL4 - integration of technology and instructional strategies in pronunciation teaching).
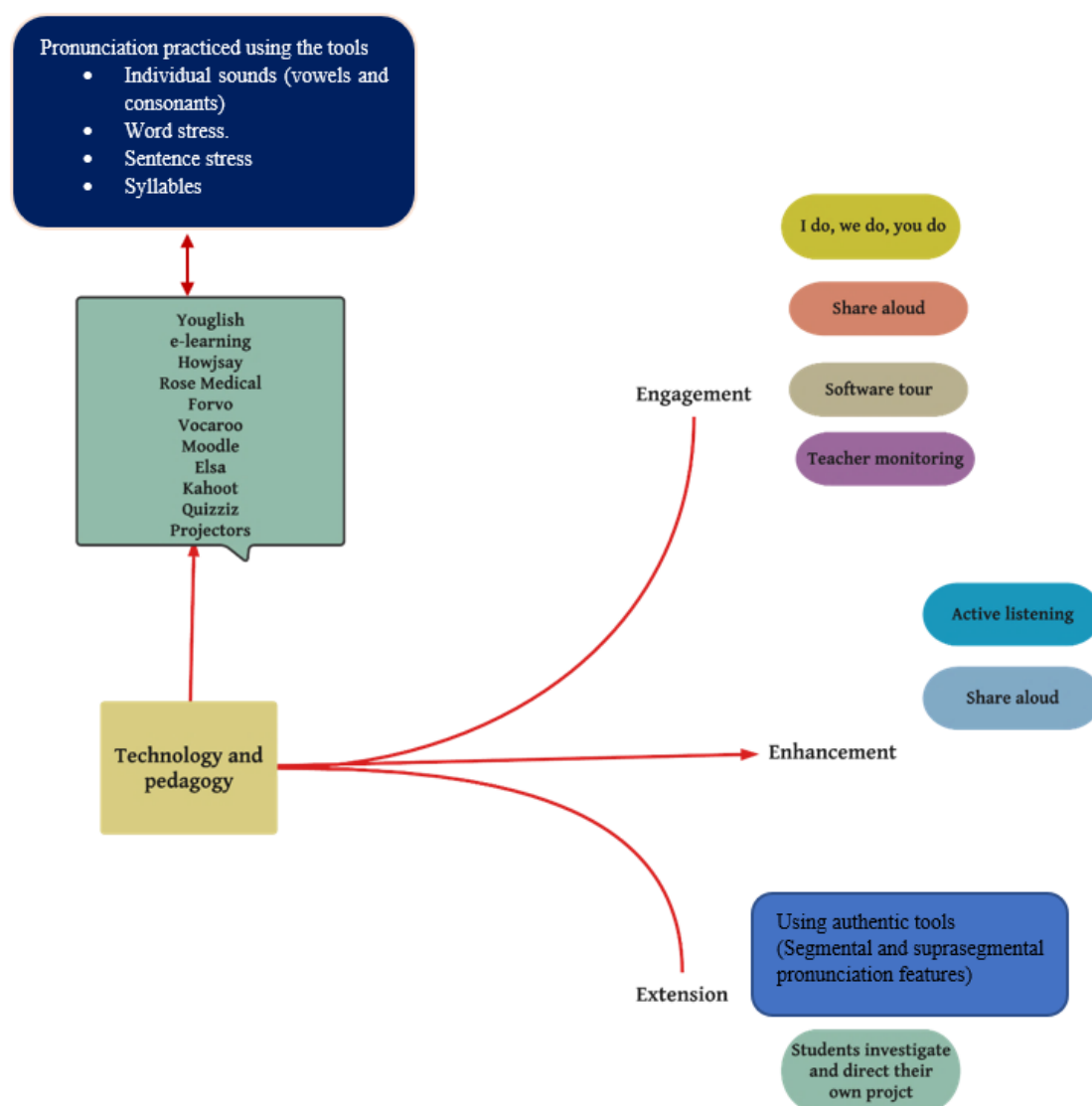
Figure 24: UL4 use of ICT and instructional strategies to enhance students'
pronunciation learning inside and outside the classroom borders.

As reported by the lecturers in the interviews and focus group discussions (5.2.1 and .2.1.2), they have perceived various personal implications stemming from their participation in the TRIPLE E workshops. These encompassed the enhancement of pronunciation teaching practices by incorporating pronunciation apps, learning tools,

and instructional strategies, the impact of the TRIPLE E rubrics on pronunciation teaching practices, and changes in lecturers' roles.

In addition, noteworthy benefits to their students included the extension of pronunciation learning beyond the confines of the classroom borders, the utilisation of authentic tools, and the enhancement of students' confidence and attitudes towards pronunciation apps and learning tools. During classroom observations of the six university lecturers who participated in the TRIPLE E workshops, it was evident that they effectively implemented the majority of the pronunciation apps and learning tools, and instructional strategies acquired from the workshops (see appendix L below). As an example, UL1 demonstrated exemplary expertise in creating an optimal learning environment in the classroom, effectively addressing the diverse needs of students with varying levels of motivation and attitudes towards learning. A range of pronunciation apps and learning tools, such as YouGlish, Rose Medical Pronunciation Coach, and ELSA, were employed by UL1 to enrich students' comprehension and utilisation of pronunciation resources. Emphasis was placed on developing both segmental elements, including individual sounds and phonemes, as well as suprasegmental features like word stress, sentence stress, and intonation.

Furthermore, UL1 incorporated the Vocaroo tool into the classroom setting, assisting his students to record their own pronunciation and share it with the lecturer. This incorporation highlighted UL1's dedication to embracing the new instructional methods, giving students more chances to practice and enhance their pronunciation skills. By combining these new pronunciation apps and learning tools into his teaching, UL1 demonstrated a commitment to fostering a dynamic, effective, and ongoing learning environment that nurtures students' pronunciation competence.

UL2 incorporated a range of pronunciation apps and learning tools, including YouGlish, Rose Medical, Vocaroo, Quizziz, and Oxford and Cambridge dictionaries, into the classroom. By incorporating YouGlish and Rose Medical, UL2 provided students with authentic pronunciation examples and practical exercises, promoting their understanding and application of segmental and suprasegmental features. Vocaroo allowed students to record their own pronunciation and receive feedback, fostering self-assessment and improvement.

In addition, UL2 utilised Quizziz as an interactive platform for pronunciation quizzes and assessments, reinforcing students' understanding and enabling progress evaluation. The integration of the Oxford and Cambridge dictionaries ensured accurate pronunciation and expanded vocabulary resources. UL2 maximised the effectiveness of these tools. She used a high level of praise to encourage students to use the tools through software tours, modelling navigation, and guided practice methods, facilitating students' navigation and utilisation of the pronunciation apps and learning tools. By providing guidance and support, she helped her students feel more comfortable and confident in using the new tools. This created a positive atmosphere within the classroom setting that contributed to an affirmative learning environment.

During the lesson, UL3 provided her students with a list of educational tools (YouGlish, Rose Medical, and the Oxford Dictionary) to record their English pronunciation (vowels, consonants, and word stress). The lecturer and her students agreed on the selection of a standard British accent (RP), a standard American accent (GA), or both as pronunciation models. She used a "software tour" strategy of the tools through a practical search for some of the medical terms: "pharmacokinetics" and "compartment". By doing so, she guided students to listen to and practice individual

vowels and consonant sounds, word stress, and syllables using natural contexts on YouGlish.

UL4 demonstrated effective instructional strategies in teaching pronunciation skills to a large class of fourth-year students. By utilising a variety of educational tools such as Moodle, e-learning, PowerPoint slides, and online pronunciation tools like YouGlish, Rose Medical Pronunciation Coach, Howjsay, Forvo, and Vocaroo, UL4 engaged students in learning tasks that helped them develop their segmental and suprasegmental pronunciation features. UL5 taught a second-year chemistry class in a lab setting with 50 students. She utilised a computer, a projector, and a whiteboard. She toured YouGlish and the Oxford dictionary with a focus on both segmental and suprasegmental features (word stress) and asked her students to use their mobile phones and listen to authentic videos.

UL6 was observed teaching a practical course in pharmaceutical instrumental analysis to a class of 40 fourth-year students in a lab setting. She used a digital projector, a PC, YouGlish, Rose Medical, and Elsa, and students used their mobile phones, practicing both segmental and suprasegmental pronunciation features. By incorporating the new pronunciation apps, learning tools, and instructional strategies following the TRIPLE E workshop, university lecturers successfully integrated what they perceived in the interviews and focus group discussions into their pronunciation teaching practices.

Changing lecturers' roles and increasing students' confidence and attitude towards pronunciation apps and learning tools were other benefits the researcher observed inside the classes. UL1 employed the role of a supportive agent, offering unwavering feedback and actively motivating students to explore and utilise the new

pronunciation apps and learning tools. Going beyond the traditional boundaries, UL1 continuously monitored students' progress, assigned relevant activities, and kept them motivated and engaged. This transition from a mere knowledge provider to a facilitator of student pronunciation learning not only empowered students but also fostered their independence and autonomy. UL2 integrated a social strategy to enhance co-engagement among students. By encouraging peer interaction through the use of pronunciation tools, she created an inspiring and inclusive learning environment that facilitated the development of students' pronunciation skills and practical abilities. She embraced the role of a facilitator, nurturing a collaborative learning community and enabling students to harness the power of collective knowledge.

UL3 employed a software tour strategy to guide students in mastering individual vowel and consonant sounds, word stress, and syllables using tools like YouGlish and Vocaroo. She emphasised active listening strategies and focused on both segmental and suprasegmental features, ensuring a comprehensive approach to pronunciation development. UL3's unwavering support and guidance transformed the lecturer into a mentor, empowering students to leverage these tools for their own progress.

UL4 embraced a student-centred approach, leveraging the power of Moodle, e-learning platforms, and the newly employed pronunciation and learning tools. By actively engaging students in diverse learning tasks that encompass both segmental and suprasegmental pronunciation features, UL4 fostered interaction, provided ample opportunities for voice recording, and promoted collaborative learning. She created a vibrant and dynamic learning environment where students took centre stage. UL5 effectively managed a large class by incorporating pronunciation tools such as YouGlish and the Oxford dictionary. By emphasising both segmental and suprasegmental

pronunciation features and adopting a social strategy, she created a student-centred and engaging learning environment. She struck a balance between teacher talking time and student participation, fostering an environment where students actively contributed to their own pronunciation development.

UL6 exhibited an extraordinary commitment to enhancing pronunciation teaching in a practical course on pharmaceutical instrumental analysis. By guiding students in the search and compilation of medical words using YouGlish, Rose Medical, and Elsa pronunciation tools, she enabled active student engagement and unleashed their potential. By doing so, she embraced the role of facilitator, guiding students through the exploration of accurate pronunciation resources.

In all these cases, the integration of pronunciation apps, learning tools, and instructional strategies not only enhanced students' pronunciation learning experiences but also transformed the lecturers' roles. They evolved from being traditional knowledge providers to facilitators who actively guided, supported, and empowered students in their pronunciation journey. This shift created a more interactive and engaging learning environment, fostering students' confidence and autonomy in pronunciation learning.

Additionally, the potential impact of these practices extended beyond the boundaries of the classroom. Ongoing pronunciation learning practices allowed the lecturers to extend their pronunciation teaching beyond the traditional classroom setting. These lecturers assigned pronunciation-focused activities and leveraged e-learning platforms to provide students with resources and instructions. Students were prompted to record lists of words and full sentences, with a specific focus on both segmental and suprasegmental features. By sharing their recordings with the lecturers through platforms like Vocaroo, students received personalised feedback and guidance on their

pronunciation. This approach encouraged students to actively engage in independent practice and take responsibility for their own pronunciation learning journey. By applying pronunciation concepts in authentic contexts, students gained a deeper understanding of pronunciation principles. These activities facilitated independent learning, growth in pronunciation proficiency, and active engagement outside the traditional classroom setting. By leveraging e-learning platforms and pronunciation apps and learning tools such as Vocaroo, YouGlish, Elsa, Rose Medical, and dictionaries, students had access to resources, reliable references, and guidance for practicing and refining their pronunciation skills.

5.3 IMPACT OF THE TRIPLE E TRAINING-BASED WORKSHOPS AS PERCEIVED BY UNIVERSITY STUDENTS

This section presents an investigation into the potential perceived impact of the TRIPLE E training -based workshops on university students which was attended by their lecturers, employing a comprehensive research approach that incorporates both questionnaires and focus group discussions. The questionnaires were utilised to assess the effectiveness of the newly implemented pronunciation apps and learning tools introduced by university lecturers. Concurrently, the focus group discussions provided an opportunity for a thorough exploration of students' personal experiences and perspectives pertaining to the utilisation of these pronunciation apps and learning tools. Through this meticulous methodology, valuable insights were obtained, revealing the impact of the TRIPLE E workshops on enhancing students' pronunciation learning.

5.3.1 THE TRIPLE E IMPACT AS PERCEIVED BY UNIVERSITY STUDENTS

Following the administration of questionnaires to university students, a focus group discussion involving six groups of students was conducted, with each group comprising four students from diverse classes and academic levels. The aim of this data

collection method was to complement the findings from the students' questionnaires and gain a deeper understanding of university students' perceptions regarding the utilisation of new technological tools by university lecturers to improve their pronunciation learning, as well as the advantages they offer. The group discussion approach facilitated the emergence of various viewpoints, opinions, contributions, agreements, and disagreements that would not have been observable through one-on-one interviews.

IMPACT 1: BETTER ENGAGEMENT WITH PRONUNCIATION LEARNING MATERIALS

The interviewees of the study identified the impact of using accurate and authentic tools that enhanced their engagement (time on task) following the TRIPLE E workshops that their lecturers attended. A range of perspectives were expressed by the participants, for example, US1 highlighted in FG 2 the efficacy and efficiency of YouGlish as a pronunciation learning tool in comparison to other tools like YouTube. Specifically, YouGlish's ability to explore different accents and display only one video at a time without any distractions or interference was emphasized, suggesting that this feature enhanced their ability to focus on and learn from the given videos with more time on tasks which made a big difference in their pronunciation performance. Similarly, US2 and US3 in FG 2 and 5 emphasized the benefit of using the new effective tools that improved and enhanced their ability to accurately listen to and pronounce medical words and provided an authentic learning experience. They also found the new ICT tools to be efficient and effective in their pronunciation learning process. Below are some of the responses:

"Yes, the tools that we used this semester provided us the chance to listen and pronounce the medical words accurately. It was a great way to improve our listening skills." (US2, FG 5)

"YouGlish and other tools we used this semester helped us learn how to pronounce medical words and use English in context quickly and accurately. The use of these tools did not waste our time. They are great tools with more time to focus on pronunciation." (US2, FG 2)

"YouGlish is the best tool we used; it is more accurate and authentic" (US3, FG 3).

US4 highlighted in FG4 the importance of using the new tools to improve the pronunciation of medication names. She stated that the pronunciation tools used during the semester were effective in helping them correctly pronounce these words with a focus on individual sounds and stress, which is crucial for effective communication in the medical field. The new tools helped us spend less time searching for medical words and more time practicing. She said:

"Yes, specifically, the use of the new pronunciation tools that we used this semester helped us pronounce the names of the medication correctly. They are accurate and reliable tools with more efficient use of time on tasks. " (US4, FG 4).

Similar to the above responses, US3 asserted the usefulness of using accurate and efficient tools such as YouGlish and Rose Medical. She emphasized that these tools provided a reliable reference for checking the pronunciation and meaning of new words, which is valuable for language learners. US3 and US4 in focus group 4 asserted the effectiveness of using Rose Medical as an accurate tool for medical terms. They perceived themselves as more confident using this tool since it is an efficient tool that provides accurate pronunciation, and immediate feedback and is tied to the medical industry.

It can be gleaned from the responses above that university students found the pronunciation tools provided by their lecturers to be accurate, authentic, and time-efficient, which led to improvements in their pronunciation of medical terms and English in context that provide immediate feedback. Using these tools resulted in students feeling more engaged and confident in their ability to communicate effectively in the medical field. Overall, the use of these tools was seen as a valuable and effective way to support pronunciation learning and enhance communication skills.

IMPACT 2: SELF-DIRECTED PRONUNCIATION LEARNING OUTSIDE THE BORDERS OF THE CLASSROOM

A key finding from the focus group discussion was the potential for self-directed pronunciation learning outside of the classroom. Many students expressed the belief that the use of new pronunciation-effective tools, such as YouGlish and Rose Medical, outside of the classroom setting allowed them to take ownership of their own learning and improve their pronunciation skills at their own pace. This was seen as a significant benefit, as it gave them the flexibility to work on their pronunciation in their own time and in a way that suited their individual learning needs. Overall, the focus group discussion highlighted the importance of providing students with the tools and resources they need to take control of their own learning and develop their pronunciation skills beyond the confines of the traditional classroom setting. For example, US1 in FG 5 further emphasised the convenience of working from home by using these pronunciation tools. She highlighted the fact that the new tools have helped her to pronounce medical terms since they are easy to access outside of the classroom setting and said:

"I loved being able to use YouGlish and Rose Medical on my own time. It is so convenient and allows me to practice my pronunciation skills whenever and wherever I want. I feel like I am really taking ownership of my own pronunciation learning in the medical field" (US1, FG 5).

US1 in FGs 3 & 5 pointed out that the new pronunciation tools have increased their pronunciation learning by allowing them to watch, listen, and record their pronunciation while having access to the written words outside the borders of the classroom and said:

"Yes, absolutely, we can use the new tools such as YouGlish and Rose Medical that our teachers gave us this semester from the comfort of our homes. We can watch, listen, repeat, and record our pronunciation; every word is written under the video" (US1, FG 3)

"Yes, the tools have helped us to pronounce medical terms outside the classroom and at home. They allowed us to watch other apps to listen and check the manner of pronunciation, and these things had not existed before" (US1, FG 5).

Similar to the above responses, US1 and US2 highlighted in FG 4 the benefits of using pronunciation tools for learning medical terminology outside of the traditional classroom setting. She emphasised that these tools provided an opportunity to listen to native speakers, practice pronunciation in a more relaxed environment, and receive immediate feedback on their accent. This helped them feel more confident in their ability to communicate effectively in the medical field and enhance their overall pronunciation skills.

To sum up, it was revealed that the integration of new effective tools in their pronunciation learning allowed for self-directed learning outside the classroom. This type of learning empowered students to take control of their own learning and practice at their own pace, which ultimately improved their confidence in pronunciation in the medical context. Students found that being able to use these tools outside of the classroom setting provided a more relaxed learning environment, which led to an increase in motivation and engagement in their pronunciation practice.

5.4 DISCUSSION

Reviewing existing literature yielded no prior research on the perceived impact of TRIPLE E training-based workshops for university lecturers and students in teaching and learning English pronunciation. This research study is the original examination of the influence of TRIPLE E workshops on pronunciation teaching and learning practices. Data was collected from interviews, focus group discussions, classroom observations with lecturers, as well as questionnaires and focus group discussions with students. This diverse data collection approach provided a comprehensive understanding of the perceived impact of TRIPLE E training-based workshops.

As outlined in Section (5.2.1), this investigation focused on assessing the outcomes of TRIPLE E workshops for university lecturers and students. Interviews and discussions with university lecturers revealed their positive feedback regarding the TRIPLE E workshop. They noted that it created a supportive learning community, boosting their confidence and effectiveness in using effective pronunciation apps, learning tools, and instructional strategies. This transformed their ability to present pronunciation materials effectively, fostering an authentic learning environment that wasn't typically found in traditional teaching methods.

The analysis of these interviews, focus group discussions, and classroom observations revealed several expected impacts on university lecturers. These included improvements in pronunciation teaching practices, changes in lecturers' roles, and the beneficial effects of TRIPLE E evaluation rubrics on pronunciation teaching and student learning. The TRIPLE E evaluation rubrics played a crucial role, equipping lecturers with valuable resources to make well-informed decisions regarding the implementation of pronunciation apps and learning tools. This alignment with pronunciation teaching

objectives increased engagement and extended learning beyond the traditional classroom setting.

Additionally, it is noteworthy that the perceived influence of the TRIPLE E training workshops on university lecturers and students extended beyond the confines of the classroom, nurturing self-directed pronunciation learning. This motivation encouraged students to engage in pronunciation practice through authentic tools and resources beyond class, thus boosting their confidence and attitudes towards the new pronunciation apps and learning tools.

The affirmative impact of integrating pronunciation apps and learning tools aligns with prior research advocating for computer-assisted pronunciation training (CAPT) as superior to traditional pronunciation instruction (AlQudah, 2012; Baradaran & Davvari, 2010; Elimat & AbuSeileek, 2014; Liu & Hung, 2016; Mehrpour et al., 2016; Seferoglu, 2005; Tai, 2013). For instance, in a study by Elimat & AbuSeileek (2014), the efficacy of ASR-based software, such as "Tell Me More English" by Rosetta Stone, in CAPT classrooms was compared to traditional pronunciation instruction. The research revealed substantial differences in favor of the experimental groups employing ASR-based CAPT, underscoring the effectiveness of individual practice within CAPT instruction.

In the context of enhancing pronunciation instruction, Seferoglu (2005) and Neri et al. (2003) demonstrated the effectiveness of computer-based pronunciation tools. Seferoglu's study found that Pronunciation Power outperformed traditional instruction by focusing on sounds, using animated visuals, and sound-focused exercises. Teachers adopted this program to enhance new sound introduction. Neri et al. (2003) found computer technology's benefits in providing unlimited, realistic second language input,

automated feedback, and the use of pre-recorded materials for pronunciation improvement. University lecturers favored tools with simulated target language voices over traditional methods, motivating them to enhance pronunciation instruction, making it more enjoyable for students.

In the Iranian context, Pourhosein Gilakjani (2018) found that computer technology enhanced teachers' interest due to its interactive and enjoyable environment, improving pronunciation acquisition, and instructional quality. It boosted teacher confidence and student motivation, transforming teaching practices. In Jordan, Alghazo (2020) noted that integrating computer technology in higher education language instruction could boost student confidence and motivation in speaking English. University lecturers adopted student-centered approaches and technology for pronunciation mastery.

Additionally, it is important to note that university students benefited from TRIPLE E workshops, gaining authentic learning experiences. They used the YouGlish website for shadowing, imitating sounds and intonation. This aligns with previous studies (Derwing & Munro, 2015; Goodwin, 2008) emphasizing the significance of shadowing and repeated imitation of one-minute videos to improve pronunciation.

Syunina et al. (2017) found that students improved speaking skills using authentic video materials, like YouGlish (Kozhevnikova, 2014). Other researchers (e.g., Roschelle et al., 2000; Kolb, 2017) noted ICT's role in supporting higher-order thinking and problem-solving. Ramsden (1992) emphasized deep learning through authentic contexts, as did Lave & Wenger (1991) in real-world professional experiences. Boud & Soloman (2001) highlighted effective apprenticeships in medical science and education. Taken together, these studies confirm the significant role that ICT plays in enabling the

creation of authentic tasks and contexts, connecting students with outside experts, and fostering collaboration across geographic distances (Herrington et al., 2010).

Furthermore, university students benefited from pronunciation apps and learning tools beyond the classroom due to their lecturers' TRIPLE E workshop involvement. This aligns with prior studies (e.g., Anderson, 2011; Duarte, 2013; Kember & McNaught, 2007; Liu & Hung, 2016; Newman et al., 2004; Wright & Reju, 2012) supporting autonomous learning. For example, Liu and Hung (2016) demonstrated MyET's effectiveness in sentence-level pronunciation practice, leading to significant improvement in students' pronunciation skills and active involvement in learning.

Furthermore, several authors have explored the constructivist approach's impact on academic performance in tertiary education (e.g., Cox et al., 2011; Essack et al., 2012; Galbraith et al., 2012; Weimer, 2010). They advocate for student-centered, interactive learning, promoting learner autonomy and engagement for better educational outcomes. These findings, along with prior research, underscore the value of incorporating autonomous learning and constructivist approaches in tertiary education.

Another perceived impact is that the TRIPLE E workshop transformed lecturers' roles into facilitators or coaches of learning, guiding students in pronunciation tools and providing feedback instead of traditional lectures (Pourhosein Gilakjani & Rahimy, 2020). This shift aligns with the impact of technology integration reported in the literature (e.g., Baradaran & Davvari, 2010; Chien et al., 2012; Dalal et al., 2017; Levin & Schrum, 2012; McKnight et al., 2016; Peled et al., 2015; Pourhosein Gilakjani, 2013; Pourhosein Gilakjani & Sabouri, 2014; Riasati et al., 2012; Vidal & Sánchez, 2013). Chapman (1997) added that computer technology shifts from teacher-centered lectures

to student-centered strategies, where students seek information, analyze data, and draw their conclusions.

Chien et al. (2012) and McKnight et al. (2016) highlighted that integrating technology shifted teachers' roles from knowledge transmitters to learning facilitators or coaches. This aligns with the constructivist approach, as observed in the TRIPLE E workshop, where university students construct their pronunciation knowledge. Alrumaih (2004) studied the integration of technology in Saudi Arabian pronunciation teaching. The findings revealed that participating teachers' positive attitudes influenced their motivation to use technology, resulting in changes to their teaching methods and roles, as well as their students' roles.

These studies collectively support the effectiveness of a student-centered approach in enhancing university students' pronunciation performance, enabling them to learn beyond the classroom (Kolb, 2020). Alghazo (2021) further emphasized that students' use of pronunciation learning strategies outside the classroom enhances autonomy and self-directed learning. A seminal paper (Acton, 1984, as cited in Alghzo, 2021) argued that "the most important learning and change must go on outside of the class, not inside" (p. 73

Overall, university lecturers favored modern teaching methods, aligning with recent studies (Hermans et al., 2017; Nguyen et al., 2021) showing that lecturers are motivated to change their practices after using computer-assisted teaching tools for English pronunciation (Niess, 2008). However, Alghazo's study in Jordan found limited technology use by lecturers and students, resulting in a disconnect between digital natives and digital immigrants (Prensky, 2001).

In summary, university lecturers effectively applied TRIPLE E benefits to their pronunciation teaching. To enhance lecturers' technology integration, TPACK development is recommended (Guzey & Roehrig, 2009). This would bridge the gap identified by Alghazo (2021) and align with Tai's emphasis on classroom observation as a data source in CALL teacher education courses (Tai, 2013). These findings can serve as a model for further research and training to enhance computer technology use in teaching and learning (Alghazo, 2020).

5.5 SUMMARY OF THIS CHAPTER

In this chapter, I have presented my findings and situated them in light of relevant international and Jordanian literature. The second aim of this study was to investigate the impact of the TRIPLE E workshops from different perspectives (university lecturers and students). Returning to the question posed at the beginning of this study, it is now possible to state that the results of the interviews, focus group discussions, questionnaire, and classroom observation indicated a positive impact of the TRIPLE E workshops on lecturers' TPACK knowledge and pronunciation teaching and learning practices in and outside the classroom setting.

The TRIPLE E PD training workshop was designed to have a transformative effect on lecturers' pronunciation teaching practices, with a focus on shifting from a controlling role of the curriculum to a facilitator role because the new pronunciation tools, learning tools, and instructional strategies provided opportunities for university lecturers to change their classes into student-centred classes. This involves empowering students to take control of their own pronunciation learning, promoting active engagement, and providing students with immediate feedback on their pronunciation. This reinforced what they had learned in class and promoted independent learning. It also enhanced students' behaviours from passive learners who depended solely on their

teachers, to active learners who were able to independently learn and practice their pronunciation skills. For example, the use of an online video pronunciation dictionary and YouGlish helped learners progress in their segmental and suprasegmental performance and made them more active and self-directed learners inside and outside the borders of the classroom setting, allowing them to work more independently and not depend too much on their lecturers. This provided an opportunity for lecturers to move from the role of dispensers of knowledge to facilitators and permitted them to motivate their students to become active learners.

Moreover, university lecturers were observed to demonstrate TPACK knowledge in their actual pronunciation teaching, which indicated that the TRIPLE E PD workshops served the purpose of preparing them to transform the knowledge learned into actions. By combining quantitative and qualitative data from both university students and professors, it was clear how the participants' TPACK was developing. They also seemed to be in line with the workshop's goals, which were that technology should be thought about and used in ways that cover the TRIPLE E framework (engagement, enhancement, and extension). This involved using pronunciation apps, learning tools, and instructional strategies that supported the teaching of phonological features such as phonemes and stress patterns as well as creating a supportive and interactive learning environment for university students to practice and develop their pronunciation skills. Students were empowered to take control of their own learning, leading to increased engagement in their pronunciation practice. These tools provide audio and visual examples of how words and phrases are pronounced by providing authentic exposure to the target language in real-world contexts.

Further to this, a range of interactive exercises, including word stress and intonation patterns, shadowing exercises, and personalised feedback, enabled students

to record their own voice and compare it to the correct pronunciation, enabling them to identify and correct their pronunciation errors. Overall, the implementation of TRIPLE E workshops proved to be effective in enhancing both pronunciation teaching and learning practices. Promoting a student-centered approach and providing effective pronunciation apps and learning tools allowed students to achieve more accurate and natural-sounding speech in the medical field. Further to this, enhancing ongoing pronunciation learning outside the confines of the classroom setting with better engagement with the tools.

The outcomes of this study have optimistically provided a starting point for making changes not only at Jordanian universities but also in the Middle East and across the global academic community. This study highlights the importance of employing effective pronunciation tools and instructional strategies in pronunciation teaching within the medical field. The implications and recommendations from this research can be valuable to institutions worldwide. By embracing these findings, universities worldwide can enhance their pronunciation instruction in medical education and other contexts, thereby benefiting students and professionals in these fields on a global scale.

The following chapter aims to investigate the barriers and propose solutions for effectively integrating technology into pronunciation teaching and learning. This exploration is based on the perceptions of both university students and lecturers, establishing a cohesive connection between the TRIPLE E impact and the need to understand the obstacles hindering ICT integration. By identifying these barriers and presenting viable solutions, the chapter strives to facilitate the smooth adoption and optimal utilisation of technology, ultimately enhancing the overall quality of pronunciation teaching and learning experiences.

CHAPTER SIX:
Combined Findings and Discussion 3:
BARRIERS AND FACILITATORS OF ICT INTEGRATION (LECTURERS AND STUDENTS' PERCEPTIONS)

6.1 INTRODUCTION

The chapter addresses research question 3: What do university lecturers and students perceive as barriers and solutions to the integration of technology in pronunciation teaching and learning? The findings from the focus group discussions and the views of different participants (university lecturers and students) are presented. The chapter is divided into two sections. The first section covers the perceptions of the same lecturers mentioned in the previous chapter (one group, N= 3 university lecturers) regarding the barriers that impeded their ICT integration in pronunciation teaching. The section also explores possible solutions that could facilitate their use of ICT in pronunciation practices. In the second section, students' perceptions who participated in the previous chapter (six groups, N=4 students in each group) are presented on the same topic (barriers and solutions in pronunciation learning and teaching). In addition, this chapter provides an in-depth discussion of the qualitative findings.

6.2 RESULTS

6.2.1 BARRIERS TO ICT INTEGRATION ACCORDING TO LECTURERS' AND STUDENTS' PERCEPTIONS

In accordance with the previous discussions outlined in Chapter 3, the participation of lecturers in the focus group discussions was limited to three out of the six lecturers whose classes were observed due to scheduling conflicts. This section aims

to present the findings derived from a thematic analysis, focusing on the perspectives of both lecturers and students, concerning the barriers impeding the successful integration of ICT in teaching and learning English pronunciation at the tertiary level (see Figure 25 below). Barriers faced by lecturers will be presented first, and subsequently, we will delve into the barriers experienced by students. The figure presented below illustrates the barriers as perceived by both university lecturers and students.

Barriers as percieved by lecturers	• Barrier 1: Challenges of ICT access for teaching English pronunciation. • Barrier 2: Lack of effective and useful ICT training in pronunciation teaching. • Barrier 3: Class size roadblock • Barrier 4: Lack of time and high workload • Barrier 5: Students' negative attitudes and low level of ICT skills.
Barriers as percived by students	• Barrier 1: Limited accessibility or poor network connection in university and at home. • Barrier 2: Inconsistent integration of ICT and pronunciation in assessment. • Barrier 3: Lack of time and high workload.

Figure 25:Barriers of ICT as perceived by both lecturers and students.

6.2.1.1 BARRIERS IDENTIFIED BY UNIVERSITY LECTURER

The perceptions provided by lecturers shed light on five key barriers that hindered their integration of ICT in pronunciation teaching. These barriers encompassed challenges related to ICT access, the inadequacy of effective and useful ICT training in pronunciation teaching, the constraints imposed by large class sizes, the scarcity of time, and a high workload, as well as students' negative attitudes and low level of ICT skills.

BARRIER 1: CHALLENGES OF ICT ACCESS FOR TEACHING ENGLISH PRONUNCIATION

During discussions on barriers to integrating ICT tools into teaching English pronunciation at the university level, lecturers identified the challenge of accessing and

utilising adequate technology and resources as a major obstacle. Specifically, UL2 mentioned the challenge of outdated computers as a significant hindrance to effectively using ICT tools in pronunciation teaching. Sometimes, due to the scarcity of resources, they had to bring their own laptops as a workaround. UL3 emphasised that the unavailability of resources, such as subscriptions to technological websites, was also a significant challenge that impeded their successful implementation of ICT:

"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)

UL3 emphasised the lack of technological advancements in the classroom, except for a data projector and Wi-Fi, hindering effective student engagement in pronunciation learning. UL5 identified limited computer availability and unstable internet connections as major barriers to ICT utilisation in pronunciation teaching, impacting access to online resources.

The responses above suggest that the lecturers' identified obstacles that include a lack of adequate technology and resources, a lack of subscriptions to technological websites, a lack of technological advancement in the classroom, and problems with computer accessibility and internet connections. These challenges hinder the effective integration and utilisation of pronunciation apps and learning tools in teaching English pronunciation at the university level.

BARRIER 2: LACK OF EFFECTIVE AND USEFUL ICT TRAINING IN PRONUNCIATION TEACHING

The lack of effective and pertinent ICT training for pronunciation teaching was a significant barrier that lecturers identified. UL2 emphasised the problem of insufficient training courses, which were optional and had low participation rates. To

address this, UL2 recommended making the training courses mandatory for all lecturers. UL3 pointed out the inadequacy of current ICT workshops, suggesting the need for more tailored and advanced training that meets the specific needs of lecturers in pronunciation teaching. These workshops should offer the latest and most effective technology tools and techniques to enhance their pronunciation teaching:

"In fact, there are limited ICT training workshops at the university. They taught us how to make accounts on Google Scholar and Research Gate. How to make a link [...] and how to make an account, but we do not need something like this... We need something new (UL3)

Based on the responses above, lecturers expressed dissatisfaction with the limited ICT training courses provided by the university for teaching English pronunciation. The lack of sufficient and ongoing training in ICT tools hindered their ability to fully utilise technology's benefits in pronunciation teaching.

BARRIER 3: CLASS SIZE ROADBLOCK

A large class size was also identified as a barrier to the effective integration of ICT in pronunciation teaching. UL3 emphasised the challenges 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, crucial for effective English pronunciation practice:

"One of the barriers that I faced 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 challenges posed by large class sizes in integrating ICT into pronunciation teaching. She emphasised the difficulty of

evaluating and providing feedback to a large number of students in different contexts. 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. By creating a conducive environment for effective pronunciation practice, smaller class sizes foster improved interaction and communication between lecturers and students.

To sum up, the study found that large class sizes presented a significant obstacle to the lecturers' ability to integrate ICT effectively. The inability to provide individualised attention and support to each student made it difficult to effectively utilise ICT tools and resources.

BARRIER 4: LACK OF TIME AND HIGH WORKLOAD

Insufficient time and a high workload emerged as key barriers to the effective utilisation and acceptance of ICT tools in English pronunciation teaching. Lecturers expressed a lack of available time to learn and master the diverse range of technologies used in tertiary education, alongside their existing teaching responsibilities. The abundance of available technologies added to the perceived burden on their already overloaded schedules. Some interviewees highlighted the time-consuming nature of familiarising themselves with these pronunciation tools through hands-on experience, while UL2 criticised the inadequate time allocated for dedicated ICT training. The negative impact of COVID-19 on students' proficiency level further exacerbated the time constraints:

"The most common constraints that I encountered were time constraints and student level constraints. The time of the lecture during COVID-19 was too

UL3 highlighted that the integration of ICT tools in pronunciation teaching posed time-related challenges, as she was able to integrate the tools only to some extent within the duration of the 4-month teaching period after the TRIPLE E workshop. She expressed that using these tools required additional time and effort compared to traditional methods, as it involved extra planning and preparation for lessons. Similarly, UL5 emphasised the limited time available for university lecturers, which made it challenging to effectively integrate ICT tools and resources into pronunciation teaching. Moreover, the demanding workload of the curriculum further hindered lecturers' ability to provide comprehensive instructions for utilising pronunciation tools and resources effectively.

Despite these challenges, it is important to note that both UL3 and UL5 recognised the potential benefits of integrating ICT tools into pronunciation teaching. They acknowledged that these tools could enhance the learning experience and improve students' pronunciation skills. However, time constraints and workload pressures presented significant barriers to their consistent integration.

From the responses above, it is clear that lecturers' lack of time and large amounts of work make it hard for them to use ICT tools and resources to teach pronunciation in an effective and consistent way. The demanding curriculum requirements often limit the opportunities for exploring innovative teaching methods and incorporating ICT effectively. Lecturers face challenges in finding sufficient time for planning, preparation, and incorporating ICT tools into their lessons, which can hinder the full realisation of the potential benefits of technology in pronunciation instruction.

BARRIER 5: STUDENTS' ATTITUDES AND LOW LEVEL OF ICT SKILLS

Students' attitudes and low level of ICT skills were identified as significant barriers to the integration of ICT in pronunciation teaching. UL3 emphasised that students' pronunciation level and lack of motivation hindered the effective integration of ICT in pronunciation teaching. These barriers may be attributed to students feeling overwhelmed by technology, finding it difficult to use, or not perceiving 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 and competence in using technology, particularly with websites, posed a significant barrier to effective integration. These factors contribute to negative attitudes, a lack of motivation, and challenges in engaging with technology, discouraging lecturers from incorporating ICT into their pronunciation teaching.

6.2.1.2 BARRIERS IDENTIFIED BY UNIVERSITY STUDENTS

Let us now examine the barriers to integrating ICT tools into pronunciation learning as perceived by university students. Through their perspectives, three primary barriers were identified:

BARRIER 1: LIMITED ACCESSIBILITY OR POOR NETWORK CONNECTION IN UNIVERSITY AND AT HOME

University students across the whole group shared common concerns regarding technological constraints that impeded the effective integration of ICT tools in

pronunciation learning. The major issues they faced 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 frustrating. It is crucial to provide equitable and affordable internet facilities to ensure successful ICT integration in pronunciation learning. Despite the provision of some technology by the department, students had varying perceptions of accessibility. Specifically, students in FG 4 and 5 consistently cited unstable internet connections as a significant barrier to acquiring English pronunciation skills, 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)

The responses above reveal that unequal access and poor internet connectivity consistently hindered students across all FGs from effectively integrating ICT tools for pronunciation learning. These challenges have a negative impact on their ability to utilise tools and make progress in their studies.

BARRIER 2: INCONSISTENT INTEGRATION OF ICT AND PRONUNCIATION 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).

The results above reveal that the participants identified inconsistent integration of ICT tools and pronunciation in assessments as a significant barrier. They expressed dissatisfaction with the lack of formal feedback and assessment on pronunciation, which made it challenging for them to gauge their progress in this area. Additionally, students felt that pronunciation was not given enough attention during the assessment process, leading to a lack of priority in the classroom.

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. University students 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)

Considering the responses above, other participants highlighted the same issue of not having enough time to integrate ICT tools, given their heavy workload of

assignments. They also mentioned that the curriculum is extensive, leaving little time to focus on pronunciation. Below is an example from US3:

> *"I think one of the biggest barriers is a lack of time. Sometimes it feels like we have so much to cover in class that there is just not enough time to focus on pronunciation. Also, with all the other work we have to do outside of class, like assignments and preparing for quizzes, it can be difficult to find the time to practice pronunciation on our own"* (US3).

The responses above show that students' heavy academic workload and time constraints hindered their ability to effectively integrate pronunciation apps and learning tools into the pronunciation learning process. Difficulties in managing time and finding opportunities both in and out of class pose challenges to fully incorporating ICT tools for pronunciation learning.

SUMMARY OF THIS SECTION

The integration of ICT tools in teaching and learning English pronunciation presents consistent barriers for both university lecturers and students. Lecturers commonly face challenges related to inadequate technology access and resources, such as outdated computers and limited availability, which hinder the effective utilisation of ICT tools. They express dissatisfaction with the lack of relevant and effective ICT training, emphasizing the need for tailored and advanced workshops to enhance their pronunciation teaching skills. The large class sizes prevalent in universities pose a significant obstacle, as lecturers struggle to provide individual attention and feedback to students, thereby hindering the integration of ICT. Furthermore, time constraints and heavy workloads restrict lecturers' ability to fully explore and incorporate ICT tools in pronunciation teaching.

Similarly, students encounter barriers to ICT integration in pronunciation learning. Limited accessibility and poor network connections, both within the university and at home, impede their access to online resources and create frustration in the learning process. Inconsistent integration of ICT tools in assessments and a lack of emphasis on pronunciation assessment further hinder their progress. Moreover, students face difficulties in allocating time for using new tools amidst their academic commitments, limiting their ability to effectively incorporate ICT in pronunciation learning.

Despite some variations, the challenges faced by both lecturers and students converge on common themes, such as limited resources, poor internet connections, limited time, and a high workload for effective ICT integration in pronunciation teaching and learning. These differences highlight the specific concerns and perspectives of lecturers and students in the context of integrating ICT tools for English pronunciation teaching and learning. Recognising and addressing these differences can help develop targeted strategies and support systems to overcome the barriers faced by both parties.

The following section introduces the potential solutions that enhance the integration of ICT in pronunciation teaching as perceived by university lecturers and students.

6.2.2 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. These solutions aim to overcome barriers, improve technology use, and

create a more effective learning environment. By implementing these solutions, both lecturers and students can address the challenges they face and enhance pronunciation learning outcomes. Solutions suggested by university lecturers will be presented first, followed by solutions proposed by students.

The presented figure below illustrates the solutions as perceived by university lecturers and students.

Solutions as percieved by lecturers	• Solution 1: Leadership support and lecturers' effort in promoting ICT integration in pronunciation teaching and learning • Solution 2: Easy access and affordability of ICT tools in pronunciaiton teaching • Solution 3: The value of providing basic ICT training courses for students • Solution 4: Consistent integration of ICT tools in assessment and curriculum
Solutions as percieved by students	• Solution 1: The importance of university lecturers' support. • Solution 2: Integration of mobile devices at any time and from any location. • Solution 3: Providing ICT training courses for students. • Solution 4: Class size to enhance ICT integration. • Solution 5:Consistent integration of ICT tools into the curriculum and assessment. • Solution 6: Accessability of ICT tools in pronunciation learning • Solution 7: The desire for having a preparatory year program and a course in pronunciation.

Figure 26: Solutions of ICT as perceived by both lecturers and students.

6.2.2.1 SOLUTIONS IDENTIFIED BY UNIVERSITY LECTURER

SOLUTION 1: LEADERSHIP SUPPORT AND LECTURERS' EFFORT IN PROMOTING ICT INTEGRATION IN PRONUNCIATION TEACHING AND LEARNING

Leadership support and lecturer effort are indeed crucial for the successful integration of ICT tools into pronunciation teaching. This solution is justified in terms of recognising 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 emphasising 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 aligned with maintenance and troubleshooting, offering ICT training courses, and establishing appropriate assessment practices. The lecturers emphasised 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. They also commanded the importance of technical support, funding, and access to resources as essential elements for effective ICT integration in pronunciation teaching. One specific suggestion from UL2 was a demand for implementing professional development-based competitions and rewards to motivate student engagement. These initiatives can create a positive learning environment that encourages students to actively participate and take ownership of their pronunciation 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.UL5 emphasised 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. UL5 suggested that providing additional technological resources in classrooms would enhance students' access to tools and facilitate their engagement in pronunciation learning.

"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" (UL5)

It can be extracted from the responses above that Effective ICT integration in pronunciation teaching requires collaboration among stakeholders, including lecturers, university leadership, and other relevant departments. This collaboration involves providing technical assistance, ensuring resource availability, and promoting proactive efforts from individual lecturers. Technical assistance ensures smooth operation and troubleshooting, while resource availability includes necessary equipment and software. By fostering collaboration and providing support, effective ICT integration can enhance student learning outcomes.

SOLUTION 2: EASY ACCESS AND AFFORDABILITY OF ICT TOOLS IN PRONUNCIATION TEACHING

Accessible and affordable ICT tools are crucial for successful technology integration in pronunciation teaching. University lecturers emphasised 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 and said:

"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)

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

UL5 emphasised the necessity of a reliable and high-speed internet connection to avoid disruptions. She also noted the importance of having a budget for paid websites, as students tend to prefer free alternatives. Furthermore, UL5 suggested ensuring the tools can be downloaded and used on mobile phones or laptops. This flexibility allows students to access pronunciation tools and resources on various devices, especially when laptops are not readily available. By enabling mobile access, students can utilise these tools outside the classroom, enhancing their learning experience.

The responses above reveal that university lecturers expressed a preference for user-friendly and cost-free websites that are compatible with mobile phones and laptops. This preference stems from the belief that such tools facilitate the integration of ICT into pronunciation teaching, making it more accessible and convenient for students and lecturers alike. The availability of high-quality ICT tools that can be easily used on multiple devices further enhances the learning experience.

SOLUTION 3: THE VALUE OF PROVIDING BASIC ICT TRAINING COURSES FOR STUDENTS

Providing basic ICT training courses for students is another solution that can enhance students' integration of pronunciation tools in their learning process. For example, UL2 and UL5 highlighted the importance of effective ICT training courses, especially for students lacking proficiency in this area. They 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. UL3 stressed the significance of mandatory ICT courses for all students, focusing on fundamental skills and knowledge before they commence their majors.

Although some students are heavy users of technology, it is obvious from the lecturers' perceptions how much students need to be trained in terms of technology literacy. Further to this, it is suggested that, while digital skills are important, they should not be the sole focus of educational programmes. Instead, a holistic approach that considers both digital skills and pronunciation learning, should be taken to ensure that students receive a well-rounded education.

SOLUTION 4: CONSISTENT INTEGRATION OF ICT TOOLS IN ASSESSMENT AND CURRICULUM

University lecturers highlighted the importance of standardisation in ICT integration for pronunciation teaching. This involves applying consistent standards and evaluation methods to ensure a structured and objective learning experience. For

example, UL2 emphasised using 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 maximising the use of e-learning tools to enhance extracurricular activities for students when learning English pronunciation. UL5 emphasised 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 utilise ICT effectively. In summary, the responses above reveal that standardisation in ICT integration is valuable for equal access to learning materials and fair assessment.

6.2.2.2 SOLUTIONS IDENTIFIED BY UNIVERSITY STUDENTS

Now, let us turn to the perceptions provided by university students regarding ICT solutions in pronunciation learning. These students have identified seven strategies that can effectively address challenges, enhance their learning experience, and improve their pronunciation skills. These solutions are as follows:

SOLUTION 1: THE IMPORTANCE OF UNIVERSITY LECTURERS' SUPPORT

Most of the participants perceived the support they received from their lecturers as important for ICT integration in pronunciation learning. US3 in FG 5 expressed the need for lecturers to provide assistance in accessing technology resources, even suggesting the idea of lecturers bringing their own personal Wi-Fi to connect devices in the classroom. It is worth noting that this suggestion reflects the students' desire for a conducive learning environment, but its implementation might be unusual and place a

financial burden on lecturers. US4 highlighted the benefits of standardising the use of ICT tools, as this can enhance their pronunciation learning. Below are the responses:

"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)

" 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).

Similar to the responses above, US1 stated that university lecturers should encourage them to use the new ICT tools to enhance their pronunciation learning and provide them with the necessary guidance and support to effectively use these tools.

The quotes above emphasised the benefits of using ICT tools in pronunciation learning and the importance of collaboration and cooperation between university lecturers and students to overcome barriers and optimise their use. This highlights the need for a joint effort between university lecturers and students to identify challenges, develop strategies, and work together to implement effective solutions that can enhance the integration of technology in pronunciation learning.

SOLUTION 2: INTEGRATION OF MOBILE DEVICES AT ANY TIME AND FROM ANY LOCATION

Incorporating mobile devices into pronunciation learning has been a popular solution for university students, providing them with greater access to technology and flexibility in their learning. Students in Jordan, in particular, have faced challenges with unstable internet connections and limited resources, making the use of mobile devices a crucial resource for their pronunciation learning. Mobile apps, such as those on tablets

and smartphones, have been preferred by some students over laptops and PCs due to their convenience and accessibility. US2 and US3 highlighted the importance of considering students' needs and preferences when selecting and implementing ICT tools, emphasising the potential benefits of using mobile apps to enhance pronunciation learning.

In summary, using mobile devices in 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: PROVIDING ICT TRAINING COURSES FOR STUDENTS

FG4 expressed a desire for free ICT training courses specifically tailored to pronunciation learning. They emphasised the need for training in using ICT tools effectively for pronunciation improvement. This suggests the potential need for specialised workshops that focus on utilising pronunciation apps and learning tools for pronunciation practice. This insight highlights the need to go beyond general ICT training and develop targeted programmes that provide students with the necessary skills and knowledge to effectively use technology to improve their pronunciation skills. Whether the responsibility of providing such training lies with the lecturer or the university as a whole is a significant consideration that should be addressed. Additionally, it is worth noting that the students' interest in receiving free ICT training courses aligns with the lecturers' recognition of the lack of effective and relevant ICT training in pronunciation teaching.

US2 emphasised the importance of addressing the needs and concerns of students regarding the integration of technology in pronunciation learning and the need

for the leadership to provide effective training programmes to ensure that students have the skills and knowledge necessary to utilise these tools effectively, saying:

"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 highlighted the idea of providing private ICT training courses modelled after those found in Western universities that could provide students with a more structured and comprehensive approach to developing their ICT skills for pronunciation learning.

Upon reflection, focus Group 4, comprising senior students, emphasised the significance of ICT training courses in improving their integration of technology tools for pronunciation learning. However, other groups did not mention it.

SOLUTION 4: CLASS SIZE TO ENHANCE ICT INTEGRATION

University Students proposed reducing class sizes to facilitate effective ICT integration in pronunciation learning, enabling better monitoring and support for students' progress and engagement with technology tools. US3 in FG 3 emphasised the need to minimise the number of students in the classroom to achieve this goal. Similar to the response above, US2 and US5 in FG 4 stressed the positive impact of reducing class sizes on enhancing the integration of technology in pronunciation learning, saying:

"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, FG 4)

To summarise, university students expressed concerns about the large class size and highlighted it as a barrier to the effective integration of ICT tools in pronunciation learning. They emphasised the challenges of managing many students, providing individual feedback, and maintaining the quality of education. The students recommended reducing class sizes as a solution to facilitate the effective integration of ICT tools in pronunciation teaching.

Both university lecturers and students shared their concern about large class size hindering the integration of ICT tools. They recognised the importance of providing individualised 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, emphasising the difficulties of managing a large number of students in terms of individualised learning experiences. This common perspective highlights the alignment between lecturers and students regarding the potential benefits of smaller class sizes for successful integration of ICT tools in pronunciation teaching.

SOLUTION 5: CONSISTENT INTEGRATION OF ICT TOOLS INTO THE 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.

To sum up, consistent integration of ICT tools in the curriculum and assessment process is crucial for improving university students' pronunciation skills. Regular and structured use of these tools allows students to become familiar with them and gradually enhance their pronunciation abilities.

SOLUTION 6: ACCESSABILITY OF ICT TOOLS IN PRONUNCIATION LEARNING

University students highlighted the accessibility of ICT tools for pronunciation learning as a valuable solution. They expressed motivation and enthusiasm towards the usefulness of these technological tools in their pronunciation practice. Specifically, US3 in FG 3 emphasised the benefits of ICT tools in specialised fields like medicine, where accurate pronunciation of medical terms is crucial. She highlighted how these tools have been highly valuable in helping students correctly pronounce challenging medical terminology.

University students stressed the significance of choosing appropriate ICT tools for pronunciation learning, as the effectiveness of these tools can greatly influence their

progress. They emphasised the need for students in specialised fields, like medicine, to carefully evaluate the advantages of each tool to maximise their learning experience. For instance, US2 in levels 3 and 5 highlighted that incorporating new ICT tools in pronunciation learning improved their focus and minimised distractions, and said:

"Yes, for pronunciation learning, YouGlish is far better than YouTube or other tools, as it just shows one video for you without any distraction." (US2, FG 3)

"Yes, these tools provided the chance to listen, pronounce, and speak in the correct way in the medical filed." (US2, FG 5)

US2 in level 5 emphasised the benefits of the YouGlish website that provided multiple videos for each word and emphasised self-assessment, repetition, reinforcement, and self-monitoring. This is rather an interesting result from most of the interviewees in FG 5, who asserted the functionality and practicality of the new technological tools:

"Yeah, the integration of the new tools this semester gave us an opportunity to watch other apps to listen and check the manner of pronunciation, and these things have not existed before." (US3, FG 5)

"Yes, for me, YouGlish and Rose Medical were great tools because they provided feedback, and they are related to the medical field of our major." (US1, FG 4)

"Yes, we now have a good reference to go and check for any new word and how to pronounce it" (US4, FG 5)

The responses above indicate that the new pronunciation apps and learning tools offer a potential solution to improving university students' pronunciation skills. These tools have the capability to address pronunciation challenges and enhance the overall learning experience. By providing valuable feedback, increasing motivation, and

promoting active engagement, these tools can contribute to improved pronunciation performance among students. Their integration into pronunciation teaching can offer 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. They viewed these initiatives as potential solutions to address the barriers they faced in utilising ICT tools effectively and improving their pronunciation skills.

SUMMARY OF THIS SECTION

The analysis of the data revealed both similarities and differences in the suggestions provided by university lecturers and students for enhancing the integration of ICT tools in pronunciation teaching and learning. Both groups emphasised the importance of leadership support and effort in promoting ICT integration, as well as the need for affordable and user-friendly ICT tools. They also recognised the significance

of incorporating ICT tools into the curriculum and assessment process to ensure comprehensive learning.

Additionally, they acknowledged the value of standardisation in creating a fair and equitable learning environment. However, there were some differences in their suggestions. Students specifically highlighted the importance of lecturers providing support and guidance in using ICT tools effectively, while lecturers focused more on the need for leadership support and resource allocation. Students also emphasised the integration of mobile devices to enhance pronunciation learning, while lecturers emphasised the affordability and accessibility of ICT tools. Moreover, students recommended ICT training courses to improve their skills, whereas lecturers suggested basic ICT training as a prerequisite for students entering their majors. Lastly, students mentioned the significance of reducing class sizes, while lecturers did not address this point directly.

In conclusion, the suggestions put forth by both university lecturers and students underscored the key factors for successful ICT integration in pronunciation teaching and learning. While there were some differences in their perspectives and priorities, the overarching aim was to foster an effective and inclusive learning environment through support, training, consistent use of ICT tools, and standardisation.

6.3 DISCUSSION

This discussion delves into the perceptions of in-service university lecturers and students regarding barriers to and solutions for integrating ICT into pronunciation teaching and learning at the university level. The discussion section follows the same order as the results section, beginning with the barriers preventing lecturers and students

from integrating ICT into their pronunciation teaching and learning. It is followed by a comprehensive review of the relevant literature.

According to the study's findings, various obstacles impeded the integration of ICT tools into pronunciation teaching and learning, while both lecturers and students proposed solutions to enhance this integration. These factors contribute to a better understanding of the reasons for the low adoption of ICT in teaching and learning, as evidenced by previous studies (Al-Mamary, 2022; Becta, 2004; Bingimlas, 2009; Mumtaz, 2000).

In Section 6.2.1, it was mentioned that both lecturers and students perceived barriers when it came to integrating ICT into English pronunciation teaching and learning. The barriers faced by lecturers include challenges in accessing ICT resources for pronunciation instruction, a lack of practical and effective training in utilizing ICT tools, large class sizes that hinder individualized attention and interactive ICT-based activities, time constraints, heavy workloads, students' negative attitudes towards ICT, and their limited proficiency in using ICT tools effectively. Students, on the other hand, expressed concerns about limited access to ICT resources, time constraints due to heavy workloads, and frustration over the inconsistent integration of ICT in pronunciation assessment.

The issue of lack of accessibility and poor internet connection emerged as significant barriers consistently identified by both lecturers and students. This finding is supported by several research studies conducted by Alamri (2019); Alharbi (2014); Al-Marwani (2018); Al-Mulhim (2014); Aljarf (2005); Alsmadi et al., (2021); Azhari & Ming (2015); BECTA (2004); Benjamin et al., (2021); Heyberi (2012); Hismanoglu (2012); Ja'ashan (2020); Mumtaz (2000); Rani & Kant (2016). These studies have

emphasized the limitations posed by insufficient infrastructure, including the lack of internet access and the unavailability of necessary devices, which hindered teachers' and students' effective use of ICT.

Mumtaz (2000) stressed that the availability of computers and software is crucial for educators to effectively integrate ICT in the classroom. The lack of these resources can significantly limit what teachers can achieve in terms of ICT integration. To address these barriers, a comprehensive plan is required, including ensuring stable internet access, providing additional software and hardware resources in each classroom, and offering technical support (Johnson et al., 2016; Mumtaz, 2000; Selwyn, 2011). Maabreh and Hanandeh (2015) also recommended investing in upgrading internet connectivity and providing better access to ICT resources like computers and mobile devices. Additionally, it's worth noting that some participants reported insufficient internet access at home, aligning with recent research indicating a lack of internet access among a significant percentage of students in Jordan (Al-Smadi et al., 2022).

The findings highlight the critical importance of addressing barriers related to limited accessibility and slow internet connections to enhance ICT integration in pronunciation teaching and learning. While universities cannot solve nationwide internet connectivity issues, they can take practical steps at the institutional level to improve access to ICT resources. Bingimlas (2009) emphasized the need for instructors to have access to up-to-date technology without being hindered by slow internet speeds or unreliable connectivity. Therefore, universities should invest in improving internet infrastructure on their campuses and advocate for broader improvements in the country's internet connectivity.

Additionally, universities can support lecturers by providing training and resources to effectively utilize ICT tools, even with limited resources. This includes offering workshops and professional development programs to enhance lecturers' digital skills and prepare them for alternative teaching approaches in case of technology failures. Furthermore, universities can create incentives, share best practices, and foster a culture of innovation (Markova et al., 2017) to encourage staff to make the most of available ICT tools. Alasmari (2015) recommended focusing on classroom settings, equipping them with technology-enhanced tools, such as network access, computers, and dynamic tables for flexible group activities.

Another prominent barrier identified was the lack of effective and useful ICT training for lecturers in integrating ICT into pronunciation teaching. This finding aligns with previous studies (Alabadi, 2019; Alasmari, 2011; Albugami & Ahmed, 2015; Al-Marwani, 2018; Fuente & Biñas, 2020; Hakami et al., 2013; Mumtaz, 2000; Suárez-Rodríguez et al., 2018; Wu et al., 2022) that identified inadequate ICT training as a limitation to teachers' technology integration.

To overcome this barrier, university leadership in Jordan should invest in high-quality ICT training programs for lecturers. This proactive approach will equip lecturers with the necessary skills and knowledge to effectively integrate ICT tools into pronunciation teaching. Regularly scheduled professional development opportunities, as emphasized by Adams (2005), are essential to keep teachers informed and up-to-date with the evolving ICT landscape.

The required training programs should cover both technical and pedagogical aspects of ICT integration. This includes training on basic ICT tool operations, integrating ICT into curricula, classroom management strategies using ICT, modifying

and evaluating courseware, utilizing computers for various instructional purposes, aligning courseware with student abilities and learning styles, addressing copyright protection issues, and implementing scaffolding techniques during ICT-mediated lessons.

Involving lecturers in planning these programs is essential, following the suggestion of Caena and Redecker (2019). This collaborative approach ensures that the content aligns with lecturers' specific needs, empowering them and enhancing their proficiency in integrating ICT into pronunciation teaching, ultimately improving pronunciation teaching and learning within the university. Additionally, addressing class size issues is crucial, as highlighted by previous research (Al-Hamran & Ajloun, 2009; Alrabai, 2011; Beta, 2010; Chen & Goh, 2011; Mushimiyimana et al., 2022). Crowded classrooms hinder effective ICT integration, especially when infrastructure, technical support, and leadership are limited. To mitigate this challenge, universities can consider implementing flipped classrooms and blended learning approaches that combine face-to-face instruction with online learning. Providing teaching assistants or learning facilitators to assist with classroom management and individualized student support can also be beneficial. Moreover, offering professional development programs tailored to teaching in large classes equips lecturers with effective strategies.

The issue of time constraints and high workloads, consistently identified as significant impediments for both students and lecturers, aligns with previous studies (e.g., Becta, 2004; Bingimlas, 2009; Galanouli & McNair, 2001; Gharieb, 2007; Sicilia, 2005). Teachers often face the challenge of finding time to plan technology lessons, explore various educational tools, and manage their workload effectively (Sicilia, 2005).

Lecturers in this study also expressed being overburdened with schedules, exam preparations, and student activities, which made it difficult for them to attend ICT training sessions and integrate ICT tools into their teaching practices. This finding is in line with previous studies (Alghazo, 2020; Dang, 2011; Ja'ashan, 2020; Jacobsen & Lock, 2005; Mulhim, 2014; Mushimiyimana et al., 2022; Rababah et al., 2012; Rakhyoot, 2017; Raman & Yamat, 2014) that identified time constraints as a significant barrier discouraging lecturers from implementing ICT.

To address these challenges, several researchers have provided recommendations. Alghazo (2020), Hinostroza (2018), Kilinc et al. (2018), and Lawrence and Tar (2018) proposed that effective time management can be achieved through collaboration between lecturers and students, who can work together to optimize time usage both inside and outside the classroom. Goktas et al. (2009) suggested that institutions should allocate more time for teachers to integrate ICT into their teaching practices. This allocation of time allows teachers to effectively incorporate ICT tools and strategies into their lessons.

Similarly, Birch and Burnett (2009) recommended providing teachers with manageable teaching schedules that allow for the integration of technology in education. This flexibility in timetables enables teachers to allocate sufficient time to plan and deliver ICT-mediated lessons effectively. However, for these recommendations to be successfully implemented, educational institutions need to have access to new and up-to-date equipment, resources, and reliable internet connections, which can significantly save time for both lecturers and students when implementing ICT applications in the classroom setting.

Furthermore, lecturers identified students' negative attitudes and low ICT skills as barriers. These findings align with previous studies (Alghazo, 2020; Aung & Khaing, 2015; Bingimlas, 2009; Hedayati & Marandi, 2014; Kanwal & Rehman, 2017; Mulhanga & Lima, 2017) that identified students' inadequate ICT skills as a serious barrier to effective ICT integration, along with their negative attitudes towards the additional workload associated with ICT use in education.

It is important to note that Chapter 5 observations didn't reveal student anxiety or negative attitudes towards technology. This is crucial in avoiding the perpetuation of stereotypes that may impact how educators approach technology in university teaching. Lecturers' positive attitudes towards technology can enhance student perceptions, so it's important to create a supportive learning environment that makes ICT tools accessible and relevant to students' learning needs and abilities (Cahaya et al., 2022).

Inconsistent integration of ICT tools in pronunciation assessment was a significant obstacle. Many teachers lack the knowledge and access to appropriate tools for effective pronunciation assessment, as noted by Macdonald (2002), Celce-Murcia et al. (2010), and Cox (2012). To address this, more efficient feedback strategies facilitated by ICT integration are needed. Hsu et al. (2022) recommend a collaborative approach involving continuous feedback and support mechanisms to enhance students' pronunciation abilities. University leadership, lecturers, and technology specialists should work together to develop guidelines for leveraging ICT tools in pronunciation assessment. Lecturers can explore diverse instructional strategies and methodologies that effectively use technology for pronunciation instruction, such as interactive multimedia materials, online platforms, and pronunciation software applications that offer personalized feedback and practice opportunities. This aligns with students' familiarity with technology in their daily lives, as highlighted by Chapelle (2010).

In Section 6.2.2, both lecturers and students provided insights into integrating ICT into English pronunciation teaching. Lecturers stressed the importance of university leadership and fellow lecturers' support, affordability and accessibility of ICT tools, basic ICT training for students, and consistent ICT integration into assessments and the curriculum.

Students emphasized the need for lecturer support, mobile device usage, specific ICT training for pronunciation learning, consideration of class sizes, and consistent ICT integration. They highlighted the value of ICT in improving pronunciation and desired preparatory year programs and a dedicated pronunciation course.

This study underscores the vital role of university leadership and lecturer support in facilitating ICT integration. Alghazo (2020) emphasized leadership's role in creating an environment that encourages lecturers to embrace ICT, providing training and resources. The IT department and deans play essential roles, as highlighted by Ghavifekr & Rosdy (2015), Habibi et al. (2020), Korte & Hüsing (2007), and Rani & Kant (2016), who stressed ICT support's significance.

Comprehensive technical support is critical, as per BECTA (2004) and Ja'ashan (2020). University leadership should provide targeted training, accessible resources, and encouragement, supported by Zhao and Song (2021). Habibi et al. (2020) found that ICT support and maintenance help teachers and students integrate ICT effectively. Leadership support and a supportive infrastructure create an environment for ICT integration, as recommended by Leung et al. (2005) and Ertmer and Otternbreit-Leftwich (2010). Initiatives such as ongoing training, technical assistance, resources, and maintenance protocols enhance lecturer confidence and competence in ICT integration, benefiting students' pronunciation learning (Li, 2014).

In our thematic analysis, one key finding was that easy access and affordability of ICT tools were crucial in encouraging university lecturers to integrate technology into pronunciation teaching. Davis (1989) defines "perceived ease of use" as the belief that using a system is effortless. Robinson (2009) suggests that simpler ideas and innovations are adopted more quickly than complex ones.

Our study aligns with previous research, including George & Ogunniyi (2016), Wu & Lederer (2009), and Yoshida (2018), which emphasized the perceived usefulness of ICT and its ease of use as influential factors in teachers' intention to adopt computer-assisted learning (CAL). Participants in our study found new technological tools to be rich in knowledge, up-to-date, easily accessible, and free (e.g., YouGlish website, Vocaroo). The low skill complexity, user-friendly interfaces, and quick access to information predicted tool usage, as noted by Grosseck (2009), Adcock & Bolick (2011), and Liu & Dig (2016). Yoshida (2018) advises teachers to choose tools that work best for them and their students, rather than merely chasing the newest or flashiest options. This aligns with Perbawaningsih's (2013) findings that ICT's effectiveness is in achieving communication goals while being cost-effective, time-saving, and effortless. Therefore, it is essential for university leadership to provide affordable and accessible ICT tools to overcome financial barriers for lecturers and students. This investment can enhance ICT skills, benefiting their academic and professional pursuits.

Both lecturers and students stressed the importance of providing basic ICT training courses as part of ICT integration in pronunciation teaching and learning. Research by AlGhazo (2020), Jonson and Jonson (2013), Jung (2005), and Lai et al. (2016) emphasized the significance of such courses for students. Students themselves expressed the need for comprehensive ICT training courses to enhance their skills and effectively use ICT tools in pronunciation learning. This is supported by Ben Youssef et al. (2022),

which found that ICT training boosts students' confidence in using ICT. Research by Albion et al. (2015), Byungura et al. (2016), Prestridge (2010), and Wang et al. (2014) highlighted the broader benefits of ICT in education, including improved critical thinking, cognitive development, and academic achievements. ICT training enables students to engage in autonomous learning, using technology beyond the classroom (Tominaga, 2009, as cited in Alghazo, 2020).

By implementing ICT training for students, universities can effectively facilitate ICT integration in pronunciation learning. University leadership and lecturers, as proposed by Price (2015), should offer unwavering support and recognition for these initiatives, considering both lecturers' and students' perspectives and needs. This collaborative effort creates an enriching learning environment that fosters critical thinking and academic achievements, equipping students with the skills for future academic and professional endeavors. It empowers them to navigate the digital landscape, enhancing their technological competencies (Shelby-Caffey et al., 2014).

Consistent integration of ICT tools in assessments and the curriculum is vital for enhancing ICT integration in pronunciation teaching. Hayati (2010) emphasized that this approach offers new possibilities, creates a successful language environment, and facilitates active communication between teachers and learners (cited in Pourhosein Gilakjani & Sabouri, 2014a). Lecturers stressed the importance of standardization to achieve effective ICT integration, ensuring uniform standards and evaluation methods among staff members for a structured learning experience.

Previous research by Hsu and Ching (2009), Koehler and Mishra (2009), Sadik (2008), and Hsu and Ching (2013) highlighted the benefits of consistent ICT integration, enhancing student engagement, learning outcomes, and teacher effectiveness. Golonka

et al. (2014) found that integrating ASR technology in CALL consistently improved students' pronunciation accuracy and motivation.

Incorporating ICT tools such as mobile apps, websites, social networks, and blogs in classroom and out-of-class activities, as suggested by Karakas and Kartal (2020) and Wilkinson (2016), is an effective approach to teaching pronunciation. This integrated approach adds variety to the class and motivates students. Baker and Burri (2016) found that English for Academic Purposes (EAP) teachers believe feedback is crucial for achieving comprehensible pronunciation. They employ various feedback approaches, aligning with their belief that feedback significantly contributes to learner development. University leadership should develop clear policies and strategies for ICT integration in pronunciation teaching, providing guidance on effective tool integration into the curriculum.

Lecturers play a vital role in enhancing ICT integration, creating a supportive learning environment, and offering opportunities for effective ICT tool utilization. Cuban (1986) emphasized that teachers are the gatekeepers of instructional technology, making them critical in implementing technological advancements in the classroom. Pettenai et al. (2001) pointed out that teachers, as key promoters of innovation in education, require support for successful ICT integration. Lecturers bridge the gap between university plans and student benefits. Albadri (2012) and Alzahrani (2017) supported this idea, emphasizing teachers' central role in successful ICT integration.

In the Jordanian and Iranian contexts, Al-Khasawneh (2018) and Jafari et al. (2015) stressed the pivotal role of university lecturers in integrating technology into teaching and learning. Educators should actively engage in designing and facilitating technology-based student activities in pronunciation teaching, fully harnessing ICT

benefits. Collaborative group activities, discussions, and peer feedback through technology platforms foster meaningful interaction and collaboration. Consistently implementing these strategies leads to heightened student engagement and enhanced pronunciation skills, as noted by Burri et al. (2017) and Wang (2020). Hattie's meta-analysis (2009) aligns with this perspective, highlighting the stronger association between teachers' activities and support with student achievements compared to the influence of technology itself.

Incorporating mobile learning is crucial for enhancing ICT integration in pronunciation instruction, as emphasized by students' strong desire for mobile technology integration. Lai et al. (2022) also found students interested in using mobile devices for self-directed language learning due to portability, individuality, and social connectivity. Research by Haggag (2018) and others, including Okunbor and Retta (2005), Fleischer (2012), O'Bannon and Thomas (2015), and Alemi et al. (2012), demonstrates the positive effects of mobile learning on English phonetics. It enhances students' phonetic competence, self-development, and creative work. Luo et al. (2015) and Miangah and Nezarat (2012) highlighted additional benefits, including creating a suitable learning atmosphere, providing access to resources, and engaging with the target language's cultural aspects.

To fully leverage mobile learning in pronunciation instruction, university leadership, IT staff, and lecturers should actively promote mobile device use in the classroom (McKnight et al., 2016). Professional mobile tools should be developed for accurate pronunciation practice and instant feedback, with consideration for specific phonetics areas (Xiao & Luo, 2015). Support and resources from university stakeholders are essential to maximize mobile learning benefits.

Incorporating mobile learning as an integral part of pronunciation instruction enhances engagement, autonomy, and pronunciation proficiency (Jing, 2017). Mobile devices' flexibility and accessibility enable personalized, self-directed learning (Alghazo, 2020). Specialized mobile tools tailored to phonetics instruction offer targeted feedback and practice opportunities, improving pronunciation skills (Eksi & Yesilcinar, 2016; Kim & Kwon, 2012).

Reducing class sizes emerged as a significant solution for enhancing ICT integration in pronunciation learning. Advocates like Jepsen (2015) and Wang (2022) argue that smaller classes create a conducive learning environment and allow teachers to focus on individual student learning. Chrastina (2019) points out that smaller classes enable students to engage more actively in lessons. On the contrary, Blatchford & Russell (2020) found that larger class sizes pose challenges for teachers, impacting their well-being and retention. Research by Agasisti and Soncin (2021) and Vega-Hernández et al. (2018) suggests that reducing class sizes can enhance ICT integration and potentially improve student performance.

To leverage ICT tools effectively in pronunciation learning, university leadership and lecturers should embrace active and collaborative learning activities in reduced class sizes (AbuSeileek, 2012). This can involve group work and project-based approaches to engage students with technology and practice their pronunciation collaboratively. Establishing support mechanisms, like help desks and technical support teams, can assist lecturers in addressing integration challenges. These systems provide guidance, troubleshooting assistance, and access to necessary resources for effective pronunciation teaching with ICT.

A well-structured plan for consistent ICT integration is essential. University lecturers should follow this plan to effectively integrate ICT tools into the curriculum and assessment, as highlighted by university students who desire improvements in ICT integration. For example, they suggest conducting oral exams to enhance pronunciation learning and express a need for change and innovation. Findings align with Smith et al. (2013) and Planas Lladó et al. (2014), highlighting students' active participation in assessments to enhance their skills and prepare for future employment. Self-assessment, as suggested by Fallows and Chandramohan (2001), fosters self-directed learning among university students. To ensure ICT integration and enhance pronunciation performance, university lecturers and leadership, as suggested by Baker and Burri (2016), should collaborate and incorporate oral assessments that involve ICT tools, motivating and engaging students.

Clear guidelines and assessment criteria for oral assessments, aligned with pronunciation course objectives, provide students with a structured framework for self-assessment and improvement (Baker & Burri, 2016). Perceived usefulness is crucial for the acceptance of ICT tools in pronunciation learning, consistent with Davis (1989) and Robinson (2009). Students in focus group discussions perceived new technological tools as useful for feedback and relevant to their field, increasing time on tasks inside and outside the classroom.

Perceived usefulness and ease of use are influential factors in integrating computer-assisted learning (George & Ogunniyi, 2016; Yoshida, 2018). Students appreciate ICT tools' vast knowledge, up-to-date, easily accessible, and cost-free nature. The user-friendly interfaces and quick access further encourage usage (Grosseck, 2009; Adcock & Bolick, 2011). Yoshida (2018) suggests choosing tools that work best for

teachers and students, emphasizing ICT effectiveness in achieving communication objectives, time-savings, and effort reduction (Perbawaningsih, 2013).

Belief in the enhancement of performance by ICT tools increases their adoption (Silviyanti & Yusuf, 2015). In the teaching and learning context, effective ICT integration motivates and gains acceptance among lecturers and students. Students, using ICT tools outside the classroom, can transfer their pronunciation learning to real-world situations, capturing videos, checking pronunciation, and editing recordings (National Research Council, 2000). ICT usage fosters autonomy in learning and reduces dependence on lecturers (Tominaga, 2009, as cited in Alghazo, 2020).

To optimize ICT tool usage in pronunciation learning, Alghazo (2020) recommends that university leadership, lecturers, and students take specific measures. Leadership should prioritize resources for ICT training and infrastructure development, fostering collaboration between departments and IT support services. Lecturers should engage in continuous professional development, adapt teaching methods, and create a supportive learning environment. Students should embrace technology, familiarize themselves with ICT tools, and actively use them for self-directed learning and collaboration, enhancing accessibility and utilization in pronunciation learning.

University students expressed a desire for a preparatory year program and a pronunciation-focused course, particularly for medical terms. This desire aligns with research by Derwing (2003), Derwing and Munro (2015), Field (2005), Levis (2005), and Thomson and Derwing (2015, highlighting the importance of explicit pronunciation training in improving oral communication skills, intelligibility, and language proficiency. Jenkins (1998) suggested focusing on core areas of pronunciation instruction. The demand for more pronunciation instruction in the curriculum is

supported by prominent researchers, including Celce-Murcia et al. (2010), Darcy et al. (2012), and Derwing and Munro (2015), recognizing the importance of providing extensive and focused opportunities for pronunciation skill development.

6.4 SUMMARY OF THIS CHAPTER

This study set out to investigate the challenges and potential solutions for integrating ICT tools into pronunciation teaching and learning at a Jordanian university. The findings have provided valuable insights into the barriers faced by both university lecturers and students, as well as the potential solutions that can enhance the integration of ICT tools in this context.

The study revealed that several barriers hindered the seamless integration of ICT tools into pronunciation teaching and learning. Limited ICT accessibility and inadequate infrastructure were identified as significant challenges. Insufficient or ineffective ICT training for both lecturers and students posed additional obstacles. Large class sizes and high workloads for lecturers further impacted the successful incorporation of ICT tools. Students also faced challenges related to inconsistent integration of ICT in pronunciation assessment and a lack of time due to heavy academic demands.

Despite these challenges, both lecturers and students recognised the importance of leadership support, the provision of ICT training, and the consistent integration of ICT tools in curriculum and assessment as potential solutions. There were notable similarities and differences between the perspectives of lecturers and students regarding barriers and solutions. Both groups acknowledged the need for ICT training and highlighted the significance of leadership support and consistent integration of ICT tools. However, lecturers focused more on teaching context-related barriers, such as

large class sizes and high workloads, while students emphasized challenges specific to their learning experiences.

Taken together, these findings suggest a role for universities and educational institutions in promoting ICT accessibility and infrastructure. By investing in the necessary resources, institutions can create an environment that supports the effective integration of ICT tools. This includes ensuring reliable internet connectivity, providing access to relevant hardware and software, and establishing technical support mechanisms. The implications of this finding extend beyond the context of pronunciation teaching and learning, as ICT integration is a prevalent trend in education across various disciplines.

Furthermore, the study stresses the importance of comprehensive and ongoing professional development for both lecturers and students. Lecturers need training not only in the technical aspects of using ICT tools but also in pedagogical strategies that effectively incorporate technology into pronunciation instruction. By equipping lecturers with the necessary skills and knowledge, institutions can enhance their capacity to leverage ICT tools and promote engaging and effective pronunciation learning experiences. Similarly, students should receive training and guidance on how to use ICT tools for self-practice and improvement. Moreover, the study underscores the significance of collaboration among stakeholders, including lecturers, university leadership, and technology specialists. By working together, stakeholders can ensure consistency and coherence in incorporating ICT tools, thereby maximising their impact on student learning outcomes.

Overall, the implications of this study call for a holistic approach to integrating ICT tools into pronunciation teaching and learning. This involves addressing barriers, providing comprehensive training, and fostering collaboration among stakeholders. By

embracing these implications, institutions can harness the full potential of ICT tools to enhance pronunciation instruction, improve student engagement and motivation, and ultimately contribute to the advancement of knowledge in the field of pronunciation teaching and learning.

The next and final chapter outlines the overall conclusions developed from the results discussed so far and discusses the study limitations and directions for future research.

CHAPTER SEVEN
CONCLUSION AND
RECOMMENDATIONS

7.1 INTRODUCTION

This study commences with an assessment of the TPACK knowledge held by Jordanian university lecturers, specifically in the context of teaching English pronunciation at the university level. It aims to investigate their understanding of ICT and its effective utilization in pronunciation instruction. Subsequently, the research pivots to evaluate the perceived impact of TRIPLE E based-training workshops on university lecturers and students engaged in pronunciation teaching and learning. This analysis encompasses the development and practical application of TPACK knowledge among university lecturers.

Additionally, it explores the benefits experienced by university students due to their lecturers' participation in these workshops. In conclusion, the study delves into identifying obstacles and proposing solutions for integrating ICT into pronunciation teaching and learning. This exploration is informed by the perceptions of university lecturers and students and involves a detailed analysis of the barriers and facilitators related to the incorporation of TPACK knowledge and ICT tools in pronunciation instruction, shedding light on the challenges and opportunities faced by educators and learners in this context.

Subsequently, a concise and comprehensive summary is presented, encapsulating the pivotal outcomes derived from the application of both quantitative and qualitative research methodologies pertaining to the three central research questions. Furthermore, this study's distinctive characteristics, which significantly

contribute to the advancement of theoretical and practical aspects related to the incorporation of ICT in pronunciation teaching and learning, are emphasized, specifically within the context of Middle Eastern literature and the broader international academic landscape. Moreover, evidence-based recommendations, extrapolated from the research findings, are provided, aiming to foster the effective utilisation of ICT and promote enhanced instructional practices across diverse educational environments seeking to cultivate language proficiency.

In parallel, this study addresses its limitations, providing a comprehensive evaluation of its scope and potential constraints. Additionally, it outlines future research directions for the researchers, offering a roadmap for further scholarly exploration. Finally, conclusions are presented, providing a discerning assessment of the study's findings and implications.

7.2 SUMMARY OF RESEARCH FINDINGS
This section summarizes the findings of three research questions:

7.2.1 RESEARCH QUESTION 1

What TPACK knowledge do Jordanian university lecturers have about ICT in teaching English pronunciation at the university level? In Chapter 3, a mixed-methods approach, including a questionnaire and semi-structured interviews, was used to gather perceptions about university lecturers' integration of ICT tools in pronunciation teaching. The study found that around one-third of the participants lacked confidence in choosing appropriate pronunciation apps and learning tools for pronunciation teaching and integrating the communicative approach. Furthermore, nearly half of the lecturers felt not competent in selecting effective teaching strategies, and around one-third expressed uncertainty about facilitating pronunciation instruction using different

instructional approaches. No significant differences were found between gender, teaching experience, and technological and pedagogical knowledge.

Regarding access to hardware and software tools, lecturers had access to interactive whiteboards, desktops, laptops, projectors, and communication tools like Moodle, Facebook, WhatsApp, and Zoom. On the other hand, access to specific pronunciation apps and learning tools was limited, with only a few participants having access to tools like Praat software, WavePad, and VoiceTube. Audiovisual equipment, such as microphones, speakers, headsets, and headphones, was more accessible in language and computer labs than in classrooms.

When it came to the frequency of tool usage, lecturers frequently employed presentational tools like PowerPoint, interactive whiteboards, desktops, and laptops. Audiovisual equipment and communication and management tools were also frequently used in labs and classrooms. As expected, the usage frequency across different environments was inconsistent, with some audiovisual tools such as microphones, speakers, headsets, and headphones being used frequently in labs but not in classrooms. Overall, the use of pronunciation software apps and learning tools was limited, but some general tools such as projectors, YouTube, Moodle, E-Campus, Facebook, and Interactive whiteboards were frequently employed.

Taken together, the study revealed that lecturers had good knowledge of general hardware and software tools but lacked competence in learning tools and pronunciation-specific apps. Insufficient awareness and knowledge of pronunciation software functions hindered their effective use. The lack of ICT training courses in pronunciation teaching was identified as a significant obstacle. The findings underscored the need for support and guidance in implementing ICT tools for pronunciation teaching.

In conclusion, the study found that university lecturers had limited knowledge and competence in using pronunciation-specific tools and learning apps, despite their familiarity with general hardware and software tools. Insufficient awareness and training hindered their effective use of pronunciation tools. Support and guidance are crucial to enhancing their implementation of ICT in pronunciation teaching. These findings align with previous research highlighting the importance of instructional strategies in technology integration and the need for teachers to develop new skills in ICT usage and instructional design. This provided the rationale for running the TRIPLE E workshop for university lecturers in order to enhance their implementation of ICT and instructional strategies in pronunciation teaching. These results are in agreement with those obtained by Kolb, 2020; Mishra & Koehler, 2008; Sife et al., 2007; and Yoshida, 2018. For example, Sife et al. (2007) highlighted the need to develop lecturers' new skills not only in ICT usage but also in instructional design. Researchers such as Montrieux et al. (2015) and Okojie et al. (2006) pointed out that the tools used by instructors are not nearly as important as the instructional strategies developed by the teacher while using the tools. Instead of tossing out efficient teaching methodologies, teachers who are using technologies efficiently can incorporate instructional strategies to leverage improved learning by utilising digital resources (Kolb, 2020).

Hence, it is evident that the competence and professional development of lecturers significantly impact the effectiveness of their teaching. Gandara et al. (2005) stated that "the more competent teachers feel, the more successfully they teach" (p. 12). Avalos (2011) defined teachers' professional development as "teachers learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students' growth" (p. 10). Therefore, the TRIPLE E workshop was designed to address the identified knowledge and skill gaps, aiming to enhance university lecturers'

integration of pronunciation apps, learning tools, and instructional strategies into their pronunciation teaching.

7.2.2 RESEARCH QUESTION 2

What are the perceived impacts of the TRIPLE E workshop for university lecturers and students when teaching and learning English pronunciation? This study employed interviews, focus group discussions, classroom observation, and a student questionnaire to examine the impact of the TRIPLE E workshops on university lecturers' development of TPACK knowledge and its effect on pronunciation teaching and learning. The workshops were found to have a positive impact, enhancing lecturers' use of pronunciation apps, learning tools, and instructional strategies that engage, enhance, and extend pronunciation teaching. This supports the notion that increased lecturers' knowledge leads to better teaching.

The TRIPLE E workshops also empowered the participants to step out of their comfort zones and improve their ICT integration. Benefits reported by lecturers included improved pronunciation teaching practices, the impact of the TRIPLE E rubrics on pronunciation teaching and learning, and a shift towards a more student-centred approach. These results agree with previous observational studies, which found that a third of teachers were moved to change their teaching practices as a result of incorporating ICT tools into their classes (Kim et al., 2013). Researchers like Hermans et al. (2017) and Nguyen et al. (2021) found that lecturers are extrinsically motivated to change their teaching behaviour and classroom practices after using a computer-assisted teaching tool to teach English pronunciation. Tai, (2013) found that TPACK-in-Action CALL workshops had a strong and positive impact on elementary English teachers in Taiwan.

The study also revealed benefits for university students, as perceived by the lecturers who attended the workshops. The new educational tools extended students' pronunciation learning beyond the confines of the classroom borders and provided authentic and accurate resources, resulting in increased engagement. Students' confidence and attitude towards pronunciation learning improved with the integration of new pronunciation apps and learning tools. Classroom observations suggested that the TRIPLE E training-based workshops might have had a notable impact on lecturers' TPACK competencies in pronunciation teaching after the workshops, aligning with previous studies that found technology integration influenced teachers' practices (Guzey & Roehrig, 2009; Tai, 2013). The study observed the integration of various tools and instructional strategies, supporting the efficacy of the workshops.

The feedback from students reflected the positive outcomes experienced by their lecturers as a result of participating in the TRIPLE E workshops. This included the use of accurate, authentic, and time-efficient tools that enhanced their pronunciation skills, particularly in medical terms and English in context. These tools enabled self-directed learning outside the classroom setting, empowering students to take control of their learning pace and enhancing their confidence in pronunciation in medical contexts. Overall, the findings suggest evidence of a connection between the perceived benefits of the TRIPLE E workshops on teaching practices and students' learning, for both lecturers and students.

7.2.3 RESEARCH QUESTION 3

What do university lecturers and students perceive as barriers and solutions of ICT integration in pronunciation teaching and learning? This study employed focus group discussions with lecturers and students to explore barriers as well as potential solutions to ICT integration in pronunciation teaching and learning. Barriers faced by

lecturers included limited ICT accessibility, inadequate training on effective ICT tools, large class size, insufficient time for integration due to heavy workloads, and negative attitudes and low ICT skills among some students. These findings align with previous studies that also identified limited access, insufficient training, a heavy workload, and negative attitudes as barriers to effective technology integration (Alabadi, 2019; Alamri, 2019; Alharbi, 2014; Alghazo, 2020; Bingimlas, 2009; Mumtaz, 2000).

Solutions suggested by lecturers to overcome these barriers included leadership support, efforts to promote ICT integration, quick and affordable access to ICT tools, basic ICT training for students, and consistent integration of ICT tools in assessment and curriculum. These findings are consistent with those of recent studies (Almutairi, 2018; Becta, 2004; Davis, 1998; Lawrence & Tar, 2018; Korhonen, 2010; Korte & Hüsing, 2007; Parkman et al., 2018; Rani & Kant, 2016; Wang, 2022; Wang et al., 2014), which have also underscored the importance of leadership support, ICT training courses, and consistent integration of ICT tools for effective ICT integration in teaching and learning.

Barriers proposed by university students included limited accessibility, inconsistent integration of ICT in assessment, a lack of time, and a high workload. These findings are consistent with previous studies (Alharbi, 2014; Alghazo, 2020; Lawrence & Tar, 2018; Qureshi's, 2015; Robinson, 2009), which have also highlighted the challenges encountered in integrating ICT in language learning. To solve these barriers, university students proposed solutions including support from lecturers, integration of mobile devices, ICT training courses for students, class size considerations, consistent integration of ICT tools, and the usefulness of ICT tools in pronunciation learning. They also expressed a desire for preparatory year programmes and dedicated pronunciation courses. These solutions highlight the importance of creating a supportive learning

environment that promotes effective integration of ICT in pronunciation learning. These findings are in agreement with those of recent studies (such as Alghazo, 2020; Becta, 2004; Habibi et al., 2020; Jaashan, 2020; Jonson & Jonson, 2013; Parkman et al., 2017; Wang, 2022; Wang et al., 2014), which have also emphasised the importance of leadership support, ICT training courses, and consistent integration of ICT tools for effective ICT integration in teaching and learning.

The study revealed that students reflected similar barriers to those of lecturers, including a lack of support, access, resources, time, and ICT literacy. Thus, it was recommended by students that it would be useful for the leadership to provide support through ICT training, access to resources, and technical assistance to ensure effective ICT integration in students pronunciation learning. The findings confirm that both students and lecturers face similar barriers to ICT integration in pronunciation teaching and learning but propose different solutions, with students offering additional suggestions to enhance ICT integration in pronunciation learning.

Taken together, the findings of this study align with previous research, highlighting the limited knowledge and competence of lecturers when using pronunciation-specific ICT tools. However, the study introduces a unique perspective by focusing on Jordanian lecturers and proposes the TRIPLE E workshops as a solution. These workshops positively impacted lecturers' TPACK knowledge and instructional practices, benefiting students with extended learning opportunities and increased engagement. The study highlighted the importance of addressing these limitations and providing ongoing support to enhance ICT integration into pronunciation teaching.

7.3 IMPLICATIONS OF THE RESEARCH FINDINGS

7.3.1. THEORETICAL IMPLICATIONS

1.   This study has provided significant contributions to the use of specific theoretical frameworks as a lens through which to understand developments in pronunciation teaching practices. By utilising the TPACK and TRIPLE E frameworks, this study was able to establish a strong framework of analysis that allowed for a more comprehensive understanding of how technology integration was taking shape within the context of specific variables. This integration of two theoretical frameworks enabled a more holistic view of the "big picture of technology integration" (Spires et al. 2012, p. 13), which may have been missed if the focus had solely been on individual classroom activities. The study also provided an in-depth analysis of university students' and lecturers' perceptions of those who attended the TRIPLE E workshops to enhance their TPACK knowledge and pronunciation teaching practices. Furthermore, the study identified barriers to ICT integration and potential solutions to overcome these obstacles. Overall, this study made significant contributions to the field by placing TPACK and TRIPLE E in a broader context and structure and demonstrating how the two frameworks complemented each other rather than contradicting or constraining one another.

2.   Expanding the role of technology in pronunciation teaching: This research study broadens the theoretical framework surrounding the role of technology in pronunciation instruction. Traditionally, pronunciation teaching has often been seen as a primarily oral and auditory skill. However, this study highlights how technology can play a crucial role in enhancing the teaching and learning of pronunciation by providing visual and interactive elements that can improve learners' accuracy and fluency.

3.   The results of this study indicate that university lecturers need to change both their practices and practice-based perspectives to successfully implement new

technological tools and innovative instructional strategies aligned with the TRIPLE E framework. This encourages university lecturers to engage in reflective practice, fostering a continuous improvement culture in their teaching methods and strategies, as they shift from passive to active learning models through effective technology integration.

4.   Focusing on synergy in language education: By emphasizing the need for synergy between technology, pedagogy, and content, this research study contributes to a more holistic approach to language education. This theoretical perspective is valuable not only for pronunciation but also for language teaching in general. It highlights the interconnectedness of these elements and their collective impact on effective instruction.

5.   The findings from my research study show that in adopting the TPACK and the TRIPLE E frameworks, it is critical for teacher educators to understand the needs of the lecturers in a specific context before making decisions on what technology, pedagogy and content to include in the workshops.

6.   This study employed a mixed-methods approach, using four methods (questionnaires, semi-structured interviews, classroom observations, and focus group discussions). Observational data were triangulated with self-reported data to provide a more in-depth understanding of how the lecturers integrated ICT tools into pronunciation teaching. Without observations, researchers have only part of the story of how university lecturers integrate ICT. Evidence from this study, therefore, suggests that the impact of the TRIPLE E workshops on promoting ICT integration cannot be based only on questionnaires, semi-structured interviews, and focus group discussions. Thus, it is the first study in which university lecturers were observed regarding their integration of ICT in pronunciation teaching in tertiary education in

Jordan. This study confirms that since there are no culture specific issues that would prevent the generalisation of the research results to other contexts in the Arab world or the world, this is a significant contribution to the field. This emphasises the relevance of the study's findings not only to tertiary education in Jordan but also to other educational contexts worldwide. Thus, the need for a synergy of technology, pedagogy, and content is as relevant for primary school educators as it is for lecturers or for postgraduate trainees undertaking a certificate in further education. Although some aspects of context and many aspects of activity are going to be different in every situation, the underlying principles, going back to Shulman (1986), seem to be consistent.

7.   The study's findings on the perceived impact of the TRIPLE E training -based workshops on university lecturers and students could serve as a valuable starting point for further research and the development of professional development programs in similar contexts in Jordan, the Middle East, and other countries worldwide.

8.   Promoting inclusivity and accessibility: This research study indirectly underscores the importance of making educational technology and resources accessible to all students, regardless of their background or abilities. Future research could delve into how technology can be tailored to meet the diverse needs of students, promoting inclusivity and ensuring that technology enhances education for everyone.

9.   The findings of this study could serve as a valuable foundation for future research projects that aim to compare how technology integration in language education varies across different countries or regions. By conducting such comparative studies, researchers can explore how cultural, societal, or linguistic factors influence the adoption and effectiveness of technology in language education.

This not only contributes to a deeper understanding of technology's impact but also promotes cultural awareness and inclusivity in education.

10. The findings from this research study can inform educational policies and initiatives related to technology integration in Jordan and other similar educational contexts. Policymakers can use this information to design strategies that support university lecturers and students in leveraging technology effectively for improved learning outcomes. Further to this, this study might promote cross-disciplinary collaboration between educational technologists, language educators, and instructional designers. This collaborative approach can lead to the development of innovative teaching materials, tools, and methods that benefit a wide range of educational disciplines.

11. Finally, the contribution of this study in opening doors for other researchers and teacher education programmes to investigate and develop areas of practices and pedagogy is important because it can lead to ongoing improvement in the field of education. By sharing the findings and insights from this study, other researchers and educators can build on the knowledge and recommendations presented to advance their own practices and develop more effective approaches to teacher education. Moreover, the sense of educator community that was created through this study can lead to increased collaboration among colleagues, which can facilitate the sharing of best practices and lead to a more innovative and self-directed approach to professional development. This can be done by conducting conferences, workshops, or online platforms where university lecturers can learn from each other and collectively contribute to the improvement of instructional practices. Additionally, exploring a wider range of instructional strategies and learning tools can continuously improve and adapt their teaching practices to meet the evolving needs of their students.

Through collective efforts, university lecturers can promote effective ICT integration, and ultimately improve the teaching and learning experiences of their students. This approach not only leads to professional growth but also contributes to the improvement of the field of education as a whole.

7.3.2 PRACTICAL IMPLICATIONS

This section explores the practical implications for leadership in integrating ICT tools into pronunciation teaching and learning within Jordanian universities. The findings of the study offer valuable recommendations that extend beyond the national context and have relevance for educational institutions worldwide. The implications discussed here focus on leadership strategies and actions that support effective ICT integration, ranging from adopting the TRIPLE E framework to providing essential resources and support mechanisms. Further to this, the importance of incentives, recognition, and personalised training for lecturers, as well as ICT's role in pandemic resilience, are highlighted.

1. **LEADERSHIP**

The current study provides several practical implications for leadership, particularly in the context of Jordanian universities and beyond. These implications include:

1. The TRIPLE E framework is recommended for all university lecturers in Jordanian universities, as implementing TRIPLE E training supports the improvement of lecturers' ICT skills and knowledge. This framework can serve as a practical model for all Jordanian institutions and can be adapted to similar contexts worldwide.

2. This study highlights the importance of selecting appropriate technological tools for integration in the TRIPLE E workshops. The chosen tools should align with the

TRIPLE E framework's emphasis on students' engagement and active learning. Factors such as user-friendliness, cost-effectiveness, and relevance to the medical field should be considered when selecting tools for pronunciation lessons.

3. Based on the results, integrating ICT in the classroom enhances students' learning outcomes. To facilitate this integration, university leadership should provide essential resources and infrastructure, including hardware and software, and offer regular mandatory ICT training workshops to improve ICT literacy among students and lecturers. Ongoing monitoring and evaluation of the impact of ICT integration on student learning outcomes are crucial for identifying areas for improvement in pronunciation teaching and learning.

4. Based on what the participants said, university leadership might want to consider providing continuous support to lecturers and students to overcome their perceived barriers to ICT implementation. This includes ensuring reliable assistance from well-trained technicians in all teaching buildings and facilitating seamless integration of ICT inside and outside the classroom. This includes high-speed internet, updated computer labs, and other essential technology resources.

5. It is recommended by the researcher that leadership encourages students to provide feedback on the ICT tools and methods used in pronunciation classes. This feedback can be used for continuous improvement, allowing lecturers and university leadership to make informed decisions about which technologies are most effective.

6. According to the researcher's recommendation, the leadership should explore opportunities for international partnerships and collaborations with institutions that excel in ICT integration and pronunciation teaching. These partnerships can lead to knowledge exchange, faculty development, and the adoption of best teaching practices.

7. It is recommended by the researcher that inviting experienced educators from reputable institutions to conduct workshops on the latest technology-enhanced language teaching techniques would be beneficial for university lecturers and students, providing them with new insights and strategies.

8. It is recommended to develop long-term sustainability plans for ICT integration in pronunciation teaching. These plans should consider budget allocation, faculty development programs, and technology upgrades to ensure that ICT remains a consistent and effective part of the learning environment.

9. Granting lecturers more autonomy and flexibility in managing their classrooms and integrating ICT can be advantageous (Ghavifekr & Rosdy, 2015; Lim, 2007). Allowing lecturers to modify module plans and timetables might be useful in overcoming curriculum inflexibility and time constraints, facilitating effective ICT integration.

10. Based on the researcher's recommendation, it is suggested that it might be useful to assign specialised ICT coordinators to support university lecturers and students in integrating ICT. These coordinators can facilitate discussions on relevant ICT resources, address concerns, and ensure optimal outcomes in pronunciation teaching and learning.

11. Based on the study findings, the MOHE might perceive the benefits of providing incentives for university lecturers who successfully integrate ICT into their teaching. Linking the integration of ICT to performance evaluation and annual appraisals might be useful in enhancing the motivation of lecturers to enhance their ICT skills and contribute to improved teaching practices.

12. The COVID-19 pandemic has highlighted the importance of ICT in education. The incorporation of ICT has become crucial in enhancing long-term resilience

against future pandemics and addressing secondary issues that arise in a socially distant setting. Thus, it might be useful for university leadership to prioritise the use of ICT at all levels of education, recognising its integral role in the teaching and learning process.

To address the issue of lecturers lacking confidence in using ICT tools and pronunciation pedagogy, it is recommended by the researcher that university leadership might want to consider providing personalized training specifically designed for these lecturers.

2. UNIVERSITY LECTURERS

Based on the researcher's recommendation, it is suggested that:

1. It might be useful for lecturers to enhance their ICT skills and knowledge to effectively integrate ICT into pronunciation teaching.

2. It could be of value for lecturers to collaborate with curriculum developers and instructional designers to ensure that technology integration aligns with the curriculum. This alignment ensures that technology is integrated seamlessly into the learning objectives.

3. It might be of benefit for lecturers to develop flexibility and adaptability in teaching approaches. They should be open to adjusting their strategies based on student needs, technological advancements, and emerging best practices.

4. It might be useful for lecturers to regularly evaluate the effectiveness of technology integration in their teaching. They might seek feedback from students and colleagues to identify areas for improvement and make necessary adjustments.

5. It might be beneficial for lecturers to maximise the use of mobile learning, including smartphones, to enhance students' pronunciation learning goals based on student suggestions.

6.   Lecturers might perceive benefits in developing their time-management skills to handle the additional workload associated with ICT, such as material preparation and exams.

7.   It might be valuable for lecturers to consider implementing a flipped classroom model, where students access instructional content online before class, allowing for more interactive and application-based activities during in-person or virtual sessions.

8.   Lecturers might provide students with authentic, cost-free tools and encourage the use of personal mobile devices to promote ubiquitous learning and increase engagement in the classroom.

9.   It might be advantageous for lecturers to implement technology tools that enable feedback loops, allowing students to receive immediate input on their pronunciation and offering lecturers insights into areas that need improvement.

10.   University lecturers who participated in this study might serve as trainers using the TRIPLE E professional development framework and rubrics to effectively enhance ICT integration, focusing on engagement, enhancement, and extension (Kolb, 2020). Continuous and lifelong professional development programmes should be implemented for all lecturers throughout their careers (Jovanova-Mitkovska, 2010; Obiero, 2020), rather than one-time training sessions (Abuhmaid, 2011; Alebaikan, 2010; Rani & Kant, 2016; Ruales & Adriano, 2011).

11.   It can be beneficial for lecturers to engage in peer observation of colleagues who have successfully integrated technology, fostering collaborative opportunities between lecturers from different disciplines to explore interdisciplinary applications of technology in education.

12. Finally, it might be beneficial for lecturers to strike a balanced approach between technology and traditional teaching methods. They should determine when and how technology is best integrated to enhance, not replace, effective teaching practices.

3. UNIVERSITY STUDENTS

Based on the researcher's recommendation, it is advisable for university students to:

1. University students should actively pursue relevant resources that promote engagement and extend learning beyond the classroom setting. This includes maximizing the use of ICT, actively engaging with institutional technology and digital resources (e.g., learning management systems, online libraries, multimedia tools), and utilizing them to supplement their pronunciation learning.

2. Focus on building confidence and proficiency in ICT. This can be instrumental in enabling them to effectively utilize technological tools and prepare for a successful future in a technology-driven world.

3. It might be useful for university students to consider developing effective time management skills specifically for balancing their academic responsibilities related to pronunciation learning and technology-enhanced learning with other commitments.

4. It is potentially advantageous for university students to actively use feedback from lecturers to identify areas of improvement in pronunciation and technology integration, and work on enhancing these areas.

5. It might be valuable for university students to encourage a balanced use of technology. They should find the right mix of online and offline resources to enhance their pronunciation learning without becoming overly dependent on technology.

6. It might be advantageous for university students to recognize that proficiency in ICT is not only beneficial for their pronunciation learning but also for their future

careers. Developing these skills can improve their employability in a technology-driven job market.

7.4 STRENGTHS AND LIMITATIONS OF THE STUDY

A key strength of the current study is its adoption of a rigorous mixed-methods approach that investigated the integration of ICT in university-level pronunciation teaching and learning. This methodological choice allowed for a multifaceted exploration of the participants' perceptions, practices, strategies, and rationale regarding the integration of ICT in pronunciation teaching and learning. By utilising qualitative methods, rich and detailed data were captured, enabling a deeper understanding of the participants' experiences. Had a purely quantitative approach been employed, valuable insights and nuanced information may have been overlooked. Furthermore, the research project's contextual significance is noteworthy.

The literature review revealed a dearth of studies examining effective ICT integration and instructional strategies specifically within higher education settings, particularly in relation to pronunciation teaching and learning. While computer-assisted language learning and technology-enhanced language learning have been extensively explored (Burston, 2014; PérezParedes, 2019), their application to students and lecturers in higher education remains limited. As a result, this research opens up new avenues for scholarly inquiry, providing researchers with the opportunity to delve into the impact of the TRIPLE E professional training on lecturers' TPACK Knowledge within the unique educational context of higher education.

Another strong point in my research is the choice of case studies, as this provided the study with a wealth of data and insights into the respondents' perceptions, providing important claims about ICT integration to enhance pronunciation teaching and learning.

Most importantly, as identified by Patton (1990), case studies are valuable in creating a deep understanding of particular people in comprehensive ways. According to Cohen et al. (2013), case studies are a "step into action": "They begin in a world of action and contribute to it. Their insights may be directly interpreted and put to use for staff or individual self-development, for institutional feedback; for formative evaluation; and in educational policy making." (p. 292). Thus, the practical nature and direct impact of case studies on practice were true in my research. It was evident from the university lecturers' responses that being able to reflect on the types of professional knowledge and share their pronunciation teaching practices and educational beliefs provided them with a professional development opportunity. Even verbalising and recounting their own practice prompted university lecturers to reconsider how they integrate the new pronunciation apps and learning tools to improve pronunciation teaching; for example, as a result of the COVID-19 pandemic, university lecturers maximised the use of ICT.

Further to this, it was a learning opportunity for me as a researcher because it allowed me to reflect on the professional development opportunities that I have offered to university lecturers. While the current study sheds some light on what effective professional development training entails in terms of design and implementation, as well as their impact on ICT integration in classroom settings, it is important to acknowledge the following limitations that should be considered when interpreting the findings:

1. First, I did not observe university lecturers' teaching and ICT integration prior to the TRIPLE E workshops. However, pre-workshop surveys were administered to establish participants' baseline information on their perceptions of ICT integration, their self-perceived TPACK competencies, and their experience with ICT integration. To be specific, the collected data was based on self-reported data, not observation. However, it would have been beneficial if observations were

conducted before the TRIPLE E workshops. This could have helped identify university lecturers' needs and knowledge of ICT integration, which would contribute to more effective decisions on what to include in the TRIPLE E workshops regarding the selection of content, technology, and pedagogy. The pre-workshop observations would have also helped identify baseline information on participants' teaching styles and ICT integration, which would have contributed to capturing lecturers' ICT integration before the workshop and how that changed afterward.

2. Second, the majority of the participants in this study came from the same department. As noted in the sampling process, in the beginning, 12 lecturers were recruited from two departments, and then six lecturers were observed in one department, including their students. This contributed to the homogeneous nature of the data collected in relation to participants' curriculum requirements, available facilities, resources, support, and other contextual factors. Therefore, it cannot be generalised in other contexts. Even if we compared the results with university lecturers from other universities, contextual information and other variables would need to be taken into account, such as the structure of the curriculum and how it is delivered to university students, the previous TPACK of university lecturers in the programme, as well as their dispositions and attitudes towards ICT.

3. Third, the small number of university lecturers participating in the study could affect opportunities for gaining a wider perspective on the realities of teaching and learning with ICT in a low-technology context. Thus, future studies could probe all university lecturers within a given university or all university lecturers in all universities across a specific area or city, and other research methods would be more applicable to such a focus.

4. The data for this research was originally collected in late 2020 / early 2021 and by the time I was writing the questionnaire, the interview analysis, the workshops, and writing final reflections, a global pandemic caused by the SARS-COVID-19 Virus had hit all nations worldwide. Education was, as expected, deeply affected, as described by the United Nations:

> The COVID-19 pandemic has created the largest disruption of education systems in history, affecting nearly 1.6 billion learners in more than 190 countries and all continents. Closures of schools and other learning spaces have impacted 94 percent of the world's student population, up to 99 percent in low and lower-middle income countries (United Nations, 2020, p. 1).

5. Thus, this adversely affected my data collection and my study, as I was obliged to apply for an extension of my study since it took a long time to be able to conduct the interviews, train university lecturers, and observe them inside classes.

Nevertheless, despite these limitations, it is hoped that this research project contributes to knowledge by addressing gaps in Jordanian literature, in particular, and the world in general, to gain a better understanding of university lecturers' integration of ICT in the Jordanian context.

7.5 SUGGESTIONS FOR NEW DIRECTIONS AND NEXT STEPS FOR FUTURE STUDIES

This research suggests several fruitful areas for further investigation. In terms of context, future research that observes the TRIPLE E framework in other contexts beyond Jordan will enrich our understanding of lecturers' TPACK competencies and ICT integration in pronunciation teaching and learning. Additionally, further research may focus on other participants not included in this study to investigate and validate the findings of this study. It would seem prudent to seek to share findings beyond the EFL community to determine whether it meets their specific needs with minimal

modification. In terms of time, while the TRIPLE E PD workshops were designed to last for four weeks (15 hours in total) during three months of assisting university lecturers to integrate ICT into their pronunciation teaching, a longitudinal study of the impact of the TRIPLE E workshops might document some results that will complement what I have reported in this study. Regarding the population of the study, since in-service university lecturers are equipped with different competencies from those preservice lecturers, a future study could investigate whether the TRIPLE E workshops would have the same impact on pre-service lecturers in preparing them to integrate ICT into their pronunciation teaching.

Further to this, I personally believe in the importance of interviewing the leadership to investigate their views on the current status of ICT use in universities and the procedures and initiatives they are taking to promote supportive factors and reduce the effect of hindrances. Comparing their visions of the future of education with those of lecturers would reveal interesting comparisons and assist in bridging the gap between current policies and preferable futures. need to be further explored. Finally, further investigation of the sociocultural factors that influence and act as a barrier to ICT integration may be needed. Such a study could lead to considerable recommendations for changing negative perceptions of ICT integration and improving its incorporation in both teaching and learning processes in Jordan.

7.6 CONCLUSION

This study aimed to address Research Question 2, which focused on investigating the impact of the TRIPLE E workshops on the teaching and learning of English pronunciation for university lecturers and students. Additionally, the study delved into exploring the perceived barriers and solutions to ICT integration as identified by both lecturers and students. By examining the perspectives of lecturers and

students, the study aimed to propose solutions that would contribute to the successful integration of ICT into pronunciation teaching and learning. As a result, all three research questions were answered, providing comprehensive insights into the impact of the TRIPLE E workshops and addressing existing gaps in the literature.

The findings of this study have significant implications for educational practice and research methodology. They shed light on the benefits and challenges of incorporating ICT in pronunciation teaching and learning, thereby informing future practices and policies in this field. Moreover, the study highlights the importance of effective technological tools and instructional strategies that enhance engagement, extension, and collaboration among teachers and students while transforming their roles within the educational process.

The findings, derived from multiple data sources, including self-report and direct observations, indicate that the TRIPLE E PD workshop met the expectations of university lecturers and students in Jordan. The workshop facilitated effective integration of ICT, resulting in increased engagement and extended learning experiences beyond the traditional classroom. The study revealed a positive impact on participants' perceptions of ICT integration, the development of TPACK, and the implementation of acquired benefits in their actual teaching practices.

Specific technological tools such as YouGlish, Rose Medical, Elsa, and Vocaroo were identified as instrumental in the integration process. Lecturers expressed alignment between the impact of the TRIPLE E workshops and their ability to effectively integrate ICT into pronunciation teaching and learning. These findings highlight the importance of considering content and pedagogy when incorporating technological tools to enhance the overall learning experience. The study appears to add value to the TRIPLE E workshops and their role in facilitating ICT integration in English pronunciation

instruction. It demonstrates the applicability of pronunciation apps, learning tools, and instructional approaches within the TRIPLE E framework, ultimately enhancing the teaching and learning of English pronunciation.

The study provides valuable insights into the effectiveness of the TRIPLE E workshops and their role in facilitating ICT integration in the context of English pronunciation instruction. It highlights the significant positive changes in participants' perception, knowledge, and practical implementation of ICT in their classrooms. These findings contribute to the existing literature by demonstrating the successful application of specific tools and instructional approaches within the TRIPLE E framework, ultimately enhancing pronunciation teaching and learning.

It is my hope that this thesis documents the learning journey made, not only in terms of the studyundertaken directly but also of the philosophical and methodological journey involved in the development of the study. Some researchers (e.g., Kolb, 2020; Montrieux et al., 2015; Okojie et al., 2006) suggested that the fundamental component of effective ICT integration would be contingent upon teachers' support and instructional strategies used in conjunction with the tools, and it is hoped that the study described here goes some distance towards realising this ambition.

It has been demonstrated that the TRIPLE E PD workshops have transformative potential, which can lead university lecturers away from what Vescio et al. (2008) asserted that, in order to be effective, professional learning communities must be specifically focused on developing "knowledge of practise into knowledge for practice" around the issue of student learning (p. 88). Thus, the impact and ongoing potential for transformation of practice due to TRIPLE E-inspired professional development are best summarised in the words of one of the participants in this study, UL1, to whom the final words of this study are given:

"To be honest with you the sessions were very informative, fabulous, and marvelous workshop …. they added some very positive momentum to my way of teaching, especially when I talk about English pronunciation as this skill is considered orphan no one in the university gives it any attention the same to the students".

Finally, it is anticipated that the findings of this study will have a direct impact on the professional setting, influencing instructional practices in the integration of ICT to promote pronunciation learning and teaching at the university level. Furthermore, the study has the potential to contribute to research and policy discussions regarding the effective integration of ICT in educational contexts.

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APPENDICES

Appendix A (a questionnaire Participant Information sheet for participating teachers)

Name of department: *Humanities & Social Sciences/ Applied Linguistics-University of Strathclyde*
Title of the study: *Technology-Based Professional Development Program and its impact on Teachers' knowledge and teaching practices.*

Introduction

I would like to invite you to take part in a research study. The study is part of a Ph.D. project undertaken by Mr. Eyad Almithqal. He is going to provide teachers with a professional development opportunity to integrate technology into teaching and is planning to evaluate the effects of that on your knowledge and actual teaching practices in the classroom.

What is the purpose of this research?

This research aims to identify which technological applications are used by Jordanian University English language instructors in actual English teaching practices. It explores the impact of technology-based professional development activities in enhancing your knowledge. This research will also investigate the impact of professional development activities in enhancing your professional practice.

Do you have to take part?

No, you can decide if you want to take part in the study. You will be asked to read through this participant information and indicate that you are happy to take part before you can open up the online questionnaire. You will always have the right to drop out at any point without any consequences even if you have signed the consent form. You can be assured that your employment will not be affected by completing the survey or interview questions.

What will you do in the project?

You are required to complete an online questionnaire. This questionnaire should take no longer than 15-20 minutes. This will include information about your teaching experiences, prior knowledge, and your current level of integrating technologies in teaching English pronunciation.

Why have you been invited to take part?

You have been invited to take part in this research because you are currently a full-time teacher, and we wish to investigate what technological applications are you incorporating in teaching English pronunciation.

What are the potential risks to you in taking part?

There will be no potential risks. All of your data will be anonymized, and the information will be stored securely on the university server and only the research team and Ph.D. examiners will have access to it.

What information is being collected in the project?

The questionnaire will ask about your prior knowledge of integrating and access to technologies for teaching English pronunciation in the classroom, English language lab, and computer lab.

Who will have access to the information?

Only the researcher, the named supervisors, and Ph.D. examiners will have access to the full data, which will be securely stored on the university server.

Where will the information be stored and how long will it be kept for?

All data will be securely stored on the university server and kept for 10 years after the completion of the project. Please, read the attached Privacy Notice for Participants in Research Projects attached to this PIS.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed in accordance with the provisions of the Data Protection Act 1998, the European General Data Protection Regulation (GDPR), and the UK Data Protection Act 2018 (DPA).

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?

If you are happy to take part in the study, you should click 'yes' below the following consent questions and this will then allow you access to the anonymous survey questions. If you decide that you do not want to take part then will please click 'no' below and thank you for reading this information. Please be assured that there are no repercussions on your work if you choose not to take part.

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This research was granted ethical approval by the University of Strathclyde Ethics Committee.

Appendix B (Interview, focus group, and Classroom observation participant information sheet for participating teachers)

Name of department: *Humanities & Social Sciences/ Applied Linguistics-University of Strathclyde*
Title of the study: *Technology-Based Professional Development Program and its impact on Teachers' knowledge and teaching practices.*

Introduction

I would like to invite you to take part in a research study. The study is part of a Ph.D. project undertaken by Mr. Eyad Almithqal. He is going to provide teachers with a professional development opportunity to integrate technology into teaching and is planning to evaluate the effects of that on your knowledge and actual teaching practices in the classroom.

What is the purpose of this research?

This research aims to identify which technological applications are used by Jordanian University English language instructors in actual English teaching practices. It explores the impact of technology-based professional development activities in enhancing your knowledge. This research will also investigate the impact of professional development activities in enhancing your professional practice.

Do you have to take part?

Your participation in this *study* is completely *voluntary*. If *you* decide not to *participate,* you are free to withdraw without *any* negative *consequences* until your data is anonymized for analysis.

What will you do in the project?

You are required to attend a series of professional development workshops to help you integrate technology into your teaching. The researcher will observe one of the sessions you teach (only notes will be taken) and interview you on different occasions (audio-recorded) to look at the materials you develop during the development phase (e.g., YOUGLISH platform, observation instruments such as lesson planning templates, and evaluation forms. The interview will last no more than 60 minutes. The researcher will observe 40 minutes of instruction for each teacher. We do not anticipate that participation will affect your workload significantly and workshops will be planned to fit into your current work schedule. After observing the classes, you will be invited to the focus group discussions. This will include questions about your perceptions toward the technological tools and instructional strategies implemented in the classes and what else can be done to enhance English pronunciation teaching. This should take no longer than one hour and a half. Your participation in the focus group discussion is completely voluntary.

Why have you been invited to take part?

You have been invited to take part because you indicated in the questionnaire that you are interested in taking part in the rest of the study.

What are the potential risks to you in taking part?

There are no potential risks to participating in this research project. We understand that there are many demands on your time. Therefore, all the employed instruments (e.g., classroom observation, and semi-structured interviews) will be organized at your convenient time. All of your data will be anonymized and the information will be stored securely on the university server and only the research team and Ph.D. examiners will have access to it.

What information is being collected in the project?

The researcher will look at the materials that the participants will produce after the workshop. This will include lesson plans, slides, apps, and designed activities in the classroom. NOTE: These will be scanned and returned to you; if you prefer, you can send them to the researcher via email, all identifying details will be removed). The interview will take place either face-to-face or through an online platform (e.g., Zoom) whenever it is convenient for you. Each interview will be less than one hour long. This will include questions about types of technological applications used, formed and organized lessons and class activities, purposes, ways of use, functions of used applications (teacher-learner interactions, learning motivation), your reflections on the use of technological applications, and learning interactions. This will also include questions about TPACK competency and teaching practice development. The aim of the interview is purely to gather your views rather than to assess your quality as a teacher.

Who will have access to the information?

Only the researcher, the named supervisors, and Ph.D. examiners will have access to the full data, which will be securely stored on the university server. The audio files will be destroyed once the interviews have been transcribed, anonymized, and checked.

Where will the information be stored and how long will it be kept for?

All the obtained data will be used on an anonymous basis without revealing the identity of the participants. In the course of writing the thesis, articles, briefs, or reports, excerpts from the interview may be used, but details or features that might identify participants will not be disclosed. All the data will be securely stored on the university server and kept for 10 years after the completion of the project.

Please, read the attached Privacy Notice for Participants in Research Projects attached to this PIS.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed under the provisions of the Data Protection Act 1998, the European General Data Protection Regulation (GDPR), and the UK Data Protection Act 2018 (DPA).

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?

If you are happy to take part in the study, please send an email to eyad-ahmad-manfi-almithqal@strath.ac.uk and you will be asked to sign a consent form.

Researcher contact details

Mr. Eyad Ahmad Almithqal, a Ph.D. student in Applied Linguistics.

The University of Strathclyde, Glasgow, Mobile number: 07514468578
E-mail: eyad-ahmad-manfi-almithqal@strath.ac.uk

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Telephone:0141 548 3793
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This research was granted ethical approval by the University of Strathclyde Ethics Committee.

Appendix C (A questionnaire participant information sheet for participating students)

Name of department: *Humanities & Social Sciences/ Applied Linguistics- University of Strathclyde*
Title of the study: *Technology-Based Professional Development Program and its impact on Teachers' knowledge and teaching practices*.

introduction

I would like to invite you to take part in a research study. The study is part of a Ph.D. project undertaken by Mr. Eyad Almithqal. He is going to provide teachers with a professional development opportunity to integrate technology into teaching and is planning to evaluate the effects of that on your learning.

What is the purpose of this research?

This research aims to identify which technological applications are used by Jordanian University English language instructors in actual English teaching practices. It explores the impact of the technology-based professional development activities in enhancing their knowledge. This research will also investigate the impact of the professional development activities in enhancing their professional teaching practices.

Do you have to take part?

No, you can decide if you want to take part in the study. You will be asked to read through this participant information and indicate that you are happy to take part before you can open up the online questionnaire. You will always have the right to drop out at any point without any consequences even if you have signed the consent form.

What will you do in the project?

You are required to complete an online questionnaire. This questionnaire should take no longer than 15-20 minutes. This will include information about the used technologies inside and outside the classroom and their effect on enhancing English pronunciation learning.

Why have you been invited to take part?

You have been invited to take part in this study because you are currently a full-time student at Yarmouk University, and we wish to investigate what technological applications are integrated into teaching and learning English pronunciation inside and outside of the classroom.

What are the potential risks to you in taking part?

There will be no potential risks. We understand that there are many demands on your time. Therefore, the questionnaire will be organized at a convenient time. All your data will be anonymized and the information will be stored securely on the university server and only the researcher, the named supervisors, and Ph.D. examiners will have access to it.

What information is being collected in the project?

The data will include your demographic information (e.g., email, gender, age, year of study, and major), apps, tools, and technologies used by your teachers and yourself that enhance your English pronunciation skills inside and outside the classroom.

Who will have access to the information?

Only the researcher, the named supervisors, and Ph.D. examiners will have access to the full data, which will be securely stored on the university server.

Where will the information be stored and how long will it be kept for?

All the obtained data will be used on an anonymous basis without revealing the identity of you. All the data will be kept for 10 years after the completion of the project.

Please, read the attached Privacy Notice for Participants in Research Projects attached to this PIS.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed in accordance with the provisions of the Data Protection Act 1998, the European General Data Protection Regulation (GDPR), and the UK Data Protection Act 2018 (DPA).

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?

If you are happy to take part in the study, you should click 'yes' below the following consent questions and this will allow you access to the anonymous survey questions. If you decide that you do not want to

take part, then please click 'no' below and thank you for reading this information.   Please be assured that there are no repercussions on your study if you choose not to take part.

Researcher contact details

Mr. Eyad Ahmad Almithqal, a Ph.D. student in Applied Linguistics.
The University of Strathclyde, Glasgow, Mobile number: 07514468578
E-mail: eyad-ahmad-manfi-almithqal@strath.ac.uk

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This research was granted ethical approval by the University of Strathclyde Ethics Committee.

Appendix D (focus group) participant information sheet for participating students

Name of department: *Humanities & Social Sciences/ Applied Linguistics-University of Strathclyde*

Title of the study: *Technology-Based Professional Development Program and its impact on Teachers' knowledge and teaching practices.*

Introduction

I would like to invite you to take part in a research study. The study is part of a Ph.D. project undertaken by Mr. Eyad Almithqal. He is going to provide teachers with a professional development opportunity to integrate technology into teaching and is planning to evaluate the effects of that on your knowledge and actual teaching practices in the classroom.

What is the purpose of this research?

This research aims to identify which technological applications are used by Jordanian University English language instructors in actual English teaching practices. It explores the impact of technology-based professional development activities in enhancing your knowledge. This research will also investigate the impact of professional development activities in enhancing your professional practice.

Do you have to take part?

Your participation in this *study* is completely *voluntary*. If *you* decide not to *participate,* you are free to withdraw without *any* negative *consequences* until your data is anonymized for analysis.

What will you do in the project?

You are invited to attend a focus group discussion. This focus group should take no longer than one hour and a half. The discussion will focus on your perceptions about the used technologies and instructional strategies and their effect on enhancing your English pronunciation learning. Furthermore, we will discus what else can be done to enhance your English pronunciation learning?

Why have you been invited to take part?

You have been invited to take part in this research because you are currently a full-time student, and we wish to investigate your perception about the incorporation of the new technological tools and instructional strategies in learning English pronunciation.

What are the potential risks to you in taking part?

There are no potential risks to participating in this research project. We understand that there are many demands on your time. Therefore, this focus group discussion will be organized at your convenient time. All of your data will be anonymized and the information will be stored securely on the university server and only the research team and Ph.D. examiners will have access to it.

What information is being collected in the project?

The focus group will take place either face-to-face or through an online platform (e.g., Zoom) whenever it is convenient for you. Each interview will be approximately one hour and a half . This will include questions about your perceptions about the used tools and instructional strategies. The aim of the focus group is purely to gather your views rather than to assess your performance.

Who will have access to the information?

Only the researcher, the named supervisors, and Ph.D. examiners will have access to the full data, which will be securely stored on the university server. The audio files will be destroyed once the interviews have been transcribed, anonymized, and checked.

Where will the information be stored and how long will it be kept for?

All the obtained data will be used on an anonymous basis without revealing the identity of the participants. In the course of writing the thesis, articles, briefs, or reports, excerpts from the interview may be used, but details or features that might identify participants will not be disclosed. All the data will be securely stored on the university server and kept for 10 years after the completion of the project.

Please, read the attached Privacy Notice for Participants in Research Projects attached to this PIS.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed under the provisions of

the Data Protection Act 1998, the European General Data Protection Regulation (GDPR), and the UK Data Protection Act 2018 (DPA).

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?

If you are happy to take part in the study, please send an email to eyad-ahmad-manfi-almithqal@strath.ac.uk and you will be asked to sign a consent form.

Researcher contact details

Mr. Eyad Ahmad Almithqal, a Ph.D. student in Applied Linguistics.

The University of Strathclyde, Glasgow, Mobile number: 07514468578-009662775309712
E-mail: eyad-ahmad-manfi-almithqal@strath.ac.uk

Chief Investigator details

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Professor, Speech and Language Therapy
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3.Name: Dr. Claire Timmins
Status: Teaching Fellow
Department: Psychological Sciences and Health
Telephone:0141 548 3793
E-mail:claire.timmins@strath.ac.uk
This research was granted ethical approval by the University of Strathclyde Ethics Committee.

APPENDIX E (A Questionnaire Consent Form for participating teachers)

Name of department: *School of Humanities and Social Sciences/ Applied Linguistics - University of Strathclyde*

Title of the study: *Technology-Based Professional Development Program and its impact on Teachers' knowledge and teaching practices.*

Please tick the box if you agree with the statement

1. I confirm that I have read and understood the Participant Information Sheet for the above project and the researcher has answered any queries to my satisfaction.
2. I confirm that I have read and understood the Privacy Notice for Participants in Research Projects and understand how my personal information will be used and what will happen to it (i.e. how it will be stored and for how long).
3. I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences.
4. I understand that I can request the withdrawal from the study of some personal information and that whenever possible researchers will comply with my request.
5. I understand that anonymized data (i.e. data that do not identify me personally) cannot be withdrawn once they have been included in the study.
6. I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.
7. I consent to be a participant in the project.
8. I consent to be a participant in completing the survey.
9. I understand that anonymized data (i.e. data which do not identify me personally) will only be used in publications.

(PRINT NAME) _____ _	
Signature of Participant:_____	**Date:**_____ _

APPENDIX F (Interview/ Focus group and Classroom Observation Consent Form for participating teachers)

Name of department: *School of Humanities and Social Sciences/Applied Linguistics - University of Strathclyde*

Title of the study: *Technology-Based Professional Development Program and its impact on Teachers' knowledge and teaching practices.*

Please tick the box if you agree with the statement

10. I confirm that I have read and understood the Participant Information Sheet for the above project and the researcher has answered any queries to my satisfaction.
11. I confirm that I have read and understood the Privacy Notice for Participants in Research Projects and understand how my personal information will be used and what will happen to it (i.e. how it will be stored and for how long).
12. I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences.
13. I understand that I can request the withdrawal from the study of some personal information and that whenever possible researchers will comply with my request. This includes the following personal data:
    a. audio recordings of interviews that identify me;
    b. my personal information from transcripts.
14. I understand that anonymized data (i.e. data that do not identify me personally) cannot be withdrawn once they have been included in the study.
15. I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.
16. I consent to be a participant in the project.
17. I consent to be recorded with audio or video recording as part of the project.
18. I consent to be observed in the classroom, individually interviewed (interviews will be audio-recorded), being included in a focus group (audio-recorded).
19. I consent to share some of my documents used for this specific investigation. The documents include teaching artifacts (e.g. lesson plans, slides, worksheets, used websites, apps, and technologies).
20. I understand that anonymized data (i.e. data which do not identify me personally) will only be used in publications.
21. I consent to join the WhatsApp group.

(PRINT NAME)	
_____ __	
Signature of Participant:_____	**Date:**_____ _

APPENDIX G (A questionnaire Consent Form for participating students)

Name of department: *School of Humanities and Social Sciences/ Applied Linguistics - University of Strathclyde*

Title of the study: *Technology-Based Professional Development Program and its impact on Teachers' knowledge and teaching practices.*

Please tick the box if you agree with the statement

22. I confirm that I have read and understood the Participant Information Sheet for the above project and the researcher has answered any queries to my satisfaction.
23. I confirm that I have read and understood the Privacy Notice for Participants in Research Projects and understand how my personal information will be used and what will happen to it (i.e. how it will be stored and for how long).
24. I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences.
25. I understand that I can request the withdrawal from the study of some personal information and that whenever possible researchers will comply with my request.
26. I understand that anonymized data (i.e. data that do not identify me personally) cannot be withdrawn once they have been included in the study.
27. I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.
28. I consent to be a participant in the project.
29. I consent to be a participant in completing the survey.

(PRINT NAME)	
Signature of Participant:	**Date:**

APPENDIX H: (focus group) (Consent Form for participating students)

Name of department: *School of Humanities and Social Sciences/Applied Linguistics - University of Strathclyde*

Title of the study: *Technology-Based Professional Development Program and its impact on Teachers' knowledge and teaching practices.*

Please tick the box if you agree with the statement

30. I confirm that I have read and understood the Participant Information Sheet for the above project and the researcher has answered any queries to my satisfaction.
31. I confirm that I have read and understood the Privacy Notice for Participants in Research Projects and understand how my personal information will be used and what will happen to it (i.e. how it will be stored and for how long).
32. I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences.
33. I understand that I can request the withdrawal from the study of some personal information and that whenever possible researchers will comply with my request. This includes the following personal data:
    a. audio recordings of interviews that identify me;
    b. my personal information from transcripts.
34. I understand that anonymized data (i.e. data that do not identify me personally) cannot be withdrawn once they have been included in the study.
35. I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.
36. I consent to be a participant in the project.
37. I consent to be recorded with audio or video recording as part of the project.
38. I consent to be observed in the classroom, individually interviewed (interviews will be audio-recorded), being included in a focus group (audio-recorded).
39. I consent to share some of my documents used for this specific investigation. The documents include teaching artifacts (e.g. lesson plans, slides, worksheets, used websites, apps, and technologies).
40. I understand that anonymized data (i.e. data which do not identify me personally) will only be used in publications.
41. I consent to join the WhatsApp group.

(PRINT NAME)	
_____	
__	
Signature of Participant:	**Date:**_____
_____	_

APPENDIX I: Communication with University students

Dear student,

My name is Eyad Almithqal and I am a Ph.D. student at Strathclyde University in Glasgow, Scotland. I am currently carrying out a research project to identify which technological applications are used by Jordanian University English language instructors, explore the impact of the technology-based professional development activities in enhancing their knowledge and investigate the impact of the professional development activities in enhancing their professional teaching practices. In order to collect the necessary data, I need to observe your teachers in the classroom to see how they employ technologies, tools, and apps. For this purpose, I will sit with you in the classroom for 45 minutes. Please be assured that no information is collected on you as a student, your teacher is the sole focus of this exercise. I will sit at the front of the classroom with my back to you to reassure you of this fact.

I hope you will not have any reservations of me joining your class for this purpose. However, if you have any questions, please contact Mr. Eyad at eyad-ahmad-manfi-almithqal@strath.ac.uk.

Best wishes,

Eyad Almithqal

APPENDIX J: Communication with University teachers

Dear teacher,

My name is Eyad Almithqal. I am a doctoral student from the Department of Applied Linguistics at Strathclyde University. I am kindly requesting your participation in a doctoral research study that I am conducting titled:

"*Technology-Based Professional Development Program and its impact on Teachers' knowledge and teaching practices*". You're eligible to be in this study because you are currently working full-time at your university. I obtained your contact information from the university website.

If you are interested in taking part in this project, just email me at eyad-ahmad-manfi-almithqal@strath.ac.uk expressing your interest and I will provide you with more information (participation information sheet and consent form). Your participation in this research study is voluntary.

Best wishes,

Eyad Almithqal

APPENDIX K: Communication with University students

Dear student,

I am currently in the process of fulfilling the requirements to complete my Doctoral study at Strathclyde University. For my study, I would like to gather your views about the integration of technology in learning English pronunciation in the classroom. This investigation involves conducting a questionnaire that takes no longer than 15 to 20 minutes to complete. Your participation will not demand any extra time from you as we are interested in examining what happens during your regular learning processes.

If you are interested in taking part in this project, just email me at eyad-ahmad-manfi-almithqal@strath.ac.ukexpressing your interest and I will provide you with more information (participation information sheet and consent form). We should stress that your participation is voluntary.

Best wishes,

Eyad Almithqal

APPENDIX L: LIST OF PRONUNCIATION APPS, LEARNING TOOLS AND INSTRUCTIONAL STRATEGIES EMPLOYED BY UNIVERISYT LECTURERS FOWWLING THE TRIPLE E WORKSHOPS