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وزارة التعليم العالي والبحث العلمي
جامعة أكلي محند أولحاج
- البويرة -

Faculté des Lettres et des Langues

كلية الآداب واللغات
القسم : الآداب و اللغة الإنجليزية

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الشعبة: لغة إنجليزية
التخصص: التعليمية و اللغات التطبيقية

عنوان المذكرة:

Investigating the Impact of ICT-Based Applications on Vocabulary Development among First-Year EFL Students in the English Department at Bouira University.

ملاحظة: تقدم هذه الوثيقة رفقة التصريح الشرفي ليتم ختمهما معا في نفس اليوم

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لم يتم العثور على تلاعبات مشبوهة في النص.

تبحث خوارزميات نظامنا بعمق في المستند بحثًا عن أي تناقضات من شأنها أن تميزه عن الإرسال العادي. إذا لاحظنا شيئًا غريبًا، فإننا نقوم بالإبلاغ عنه لتتمكن من مراجعته.

التنبيه ليست بالضرورة مؤشرًا على وجود مشكلة. ومع ذلك، نوصيك بتركيز انتباهك هناك لمزيد من المراجعة.

Ministry of Higher Education and Scientific Research
University of Akli Mouhand Oulhadj, Bouira
Faculty of Letters and Foreign Languages
Department of English Language and Literature

Investigating the Impact of ICT-Based Applications on Vocabulary Development among First-Year EFL Students in the English Department at Bouira University

A Thesis Submitted to the Department of English Language and Literature - University of Bouira – in Partial Fulfillment for the Requirement of Master's Degree in Didactics and Applied Languages

Candidates
Kadouche Aymene
Lekhal Ikram

Supervisor
Dr. Otmani Ilhem

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Academic Year
2025/2026

Dedication

To my beloved parents, whose love, sacrifices, and unwavering faith made this work possible.

To my family and close friends, who stood beside me at every step.

To all those who, through their knowledge and example, inspired me to pursue excellence.

Kadouche Aymene

I would like to dedicate this work to my beloved parents, who were the reason for what I have become now.

To my two wonderful sisters Imane and Amira and two amazing brothers Abderrahmane and Mohamed, thank you for your support and for always standing by my side.

To my two beautiful nieces, Ilyne and Letissia, and my dear nephew, Mamine, your innocence has always brought joy to my life.

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Abstract

This study investigates the impact of Information and Communication Technology (ICT)-based applications on vocabulary development among first-year EFL students at the University of Akli Mouhand Oulhadj, Bouira, Algeria. Vocabulary is widely recognized as a core component of language proficiency, yet first-year students at Algerian universities consistently arrive with significant lexical gaps that hinder academic performance. At the same time, the rapid proliferation of smartphones and digital applications offers new, largely supported opportunities for vocabulary learning beyond the classroom. This study adopts a convergent parallel mixed methods approach within a case study design; the data were collected using a cross-sectional time frame. Data were collected from 30 first-year EFL students through a self-designed questionnaire and from six out of eight first-year EFL teachers through a semi-structured interview instrument delivered via Google Forms. Quantitative data were analyzed using descriptive statistics, and qualitative data were analyzed through manual thematic analysis. The findings reveal that 80% of students are using ICT applications for vocabulary learning independently. All 30 students agree that ICT applications help them learn more vocabulary, and 90% report increased confidence after digital practice. YouTube, social media platforms, and Google Translate are the most widely used tools, reflecting a predominantly incidental and receptive pattern of use. Teachers' data confirm both the significance of the vocabulary gap and the potential of ICT tools while revealing that formal classroom integration remains limited despite positive teacher attitudes. The study identifies a critical gap between students' independent digital vocabulary practices and the structured pedagogical support that would maximize their effectiveness.

Keywords: vocabulary development, ICT-based applications, EFL, Bouira University

ملخص

تهدف هذه الدراسة إلى التحقيق في أثر تطبيقات تكنولوجيا المعلومات والاتصالات على تنمية المفردات لدى طلاب السنة الأولى في قسم اللغة الإنجليزية بجامعة أكلي محند أولحاج، البويرة، الجزائر. تُعدّ المفردات ركيزةً أساسية من ركائز الكفاءة اللغوية، غير أن طلاب السنة الأولى في الجامعات الجزائرية يعانون في الغالب من ثغرات معجمية واسعة تُعيق أداءهم الأكاديمي. في الوقت ذاته، يُتيح انتشار الهواتف الذكية والتطبيقات الرقمية فرصاً جديدة لتعلم المفردات خارج الفصل الدراسي، وإن كانت غير موجَّهة في أغلب الأحيان. اعتمدت الدراسة تصميم دراسة الحالة بإطار زمني مقطعي، مستخدِمةً منهجاً مختلطاً متوازياً تقاربياً. جُمعت البيانات من ثلاثين (30) طالباً من طلاب السنة الأولى عبر استبيان أعدَّه الباحثان، ومن ستة (6) أساتذة من أصل ثمانية (8) أساتذة للسنة الأولى عبر دليل مقابلة شبه منظمة وُزِّع إلكترونياً. خلصت النتائج إلى أن 80٪ من الطلاب يستخدمون هذه التطبيقات باستقلالية لتعلم المفردات، وأن جميع الطلاب الثلاثين أقرُّوا بأن هذه التطبيقات تُساعدهم على تعلم مفردات أكثر، فيما أبدى 90٪ منهم ثقةً أكبر في توظيف المفردات الجديدة. ويتصدر يوتيوب ووسائل التواصل الاجتماعي وترجمة جوجل قائمة التطبيقات الأكثر استخداماً. وقد أكد الأساتذة حجم الفجوة المعجمية وإمكانية التطبيقات في معالجتها، غير أنهم أشاروا إلى أن الدمج الرسمي لهذه الأدوات في التدريس لا يزال محدوداً. تكشف الدراسة عن فجوة جوهرية بين الممارسات الرقمية المستقلة للطلاب والدعم البيداغوجي المنظَّم الكفيل بتعظيم فاعليتها.

الكلمات المفتاحية: تنمية المفردات، تطبيقات تكنولوجيا المعلومات والاتصالات، اللغة الإنجليزية كلغة أجنبية، جامعة البويرة

List of Abbreviations

CALL	Computer-Assisted Language Learning
EFL	English as a Foreign Language
ESL	English as a Second Language
ICT	Information and Communication Technology
L1	First Language / Mother Tongue
L2	Second Language / Target Language
MALL	Mobile-Assisted Language Learning
MCQ	Multiple-Choice Question
RQ	Research Question
SA	Strongly Agree
SD	Strongly Disagree
SLA	Second Language Acquisition
VLS	Vocabulary Learning Strategy / Strategies
VST	Vocabulary Size Test

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General Introduction

General Introduction

Language learning, at every stage and in every context, depends fundamentally on vocabulary. Without a sufficient lexical repertoire, learners cannot interpret spoken or written input, cannot produce intelligible output, and cannot access the content knowledge their academic studies demand. This reality is particularly acute in the English as a Foreign Language (EFL) context of Algerian universities, where first-year students regularly arrive from secondary school with vocabulary gaps that affect their performance across all language modules from the very first weeks of study.

At the same time, the digital landscape has placed vocabulary learning resources directly in the hands of every student who owns a smartphone. Applications such as Duolingo, YouTube, Quizlet, and Google Translate, as well as social media platforms, podcasts, and AI-based tools, are available at no cost and at all times. The question is no longer whether these resources exist but whether first-year EFL students at Algerian universities are using them, what impact they perceive these tools to have on their vocabulary learning, and why a persistent gap remains between students' autonomous digital practices and the structured pedagogical guidance that would maximize their effectiveness.

This dissertation investigates precisely these questions in the specific institutional context of the English Department at the University of Akli Mouhand Oulhadj, Bouira, Algeria. By collecting data from thirty first-year EFL students and six first-year EFL teachers, it aims to produce locally grounded empirical evidence that can inform vocabulary instruction practices and ICT integration at the departmental level.

Statement of the Problem

Despite the widely recognized centrality of vocabulary in language proficiency and the unprecedented availability of digital vocabulary learning tools, first-year EFL students at Bouira University continue to demonstrate lexical deficiencies. Teachers across multiple specializations consistently report that students arrive with limited vocabulary size, poor retention of newly learned words, over-reliance on first-language translation, and weak collocation and word-use knowledge. Meanwhile, although students own smartphones and engage daily with digital content in English, this engagement is largely unstructured and unsupported by formal teacher guidance. No study has previously examined the specific ICT tools first-year EFL students at Bouira University use for vocabulary purposes, the frequency and nature of their digital vocabulary practices, or the extent to which teachers integrate ICT into their vocabulary instruction. This absence of local empirical data means that pedagogical decisions about vocabulary instruction are

made without evidence of what students are already doing or what is effective for them. The present study addresses this gap.

Aims of the Study

The study is designed to achieve three objectives. Firstly, to determine the extent to which the application of ICT-based software can be beneficial to first-year EFL students at Bouira University in terms of their vocabulary acquisition according to both students and teachers. Secondly, to highlight the ICT-based applications that first-year EFL students are frequently using and their usage of the selected applications for the purposes of vocabulary learning and acquiring. Thirdly, to investigate students' and teachers' perceptions and attitudes toward the application of digital software in the teaching and learning of vocabulary.

Significance of the Study

The study is significant on three different levels: Firstly, at the theoretical level, the study adds new data to a limited but growing number of studies that address technology-enhanced vocabulary acquisition in the North African context and in the specific case of the Algerian EFL context, which is not yet deeply researched internationally. Secondly, at the pedagogical level, this research offers useful pedagogical recommendations for EFL teachers, syllabus designers, and department managers of Bouira University. At the practical level, the study offers first-year EFL students a clear perspective of what is positive and negative about their existing digital learning experiences.

Research Questions and Hypotheses

This study is guided by the following three research questions:

RQ1: To what extent do ICT-based applications impact the vocabulary development of first-year EFL students at Bouira University, as perceived by students and teachers?

RQ2: What are the attitudes and perceptions of first-year EFL students and teachers at Bouira University toward the use of ICT-based applications for vocabulary learning?

RQ3: What are the most commonly used ICT-based applications for vocabulary learning purposes among first-year EFL students at Bouira University?

On the basis of these questions, the following hypotheses are proposed:

H1: ICT-based applications have a positive perceived contribution to the vocabulary development of first-year EFL students at Bouira University.

H2: Both first-year EFL students and teachers at Bouira University hold positive attitudes toward the use of ICT-based applications for vocabulary learning.

H3: General-purpose digital platforms, including YouTube, social media applications, and Google Translate, are the most commonly used ICT tools for vocabulary purposes, more so than dedicated language learning applications.

Research Techniques and Methodology

This study adopts a case study design with a cross-sectional time frame, situated within a convergent parallel mixed-methods approach. The case is defined as the first-year EFL student cohort enrolled at Bouira University during the academic year 2025/2026. Both qualitative and quantitative data were collected simultaneously, analyzed independently, and merged at the interpretation stage to produce a comprehensive account of ICT-based vocabulary practices at the departmental level.

Data were collected from two participant groups using two self-designed instruments. A fifteen-item questionnaire, combining closed-ended, Likert-scale, and open-ended items, was administered to thirty first-year EFL students via Google Forms during February and March 2026. A semi-structured interview guide, delivered as an asynchronous written instrument through Google Forms due to teacher availability constraints, was administered to six out of eight first-year EFL teachers. Quantitative data was analyzed using descriptive statistics, and qualitative data were subjected to manual thematic analysis conducted independently by us.

Structure of the Study

This dissertation is organized into three main chapters, preceded by this general introduction and followed by a general conclusion.

Chapter One provides the theoretical framework. It reviews the key concepts of vocabulary in EFL learning, including definitions, types, dimensions of knowledge, significance, and learning strategies. It then traces the history of ICT in language learning from CALL to MALL and reviews previous empirical studies on ICT-based vocabulary learning, closing with the identification of the research gap.

Chapter Two presents the research design and methodology. It describes the case study design and cross-sectional time frame, the convergent parallel mixed-methods approach, the population and sample, the data collection instruments, pilot testing, data analysis procedures, key variables and their measurement, ethical considerations, and the study's scope and limitations.

Chapter Three presents and interprets the results of the student questionnaire and the teacher interview. It proceeds section by section through the student data, provides a thematic analysis of teacher responses, and closes with a cross-reading of both data sets in relation to the three research questions, identifying patterns, convergences, and divergences.

The general conclusion summarizes the key findings, evaluates the research hypotheses, presents pedagogical recommendations, and identifies directions for future research.

Chapter One: Theoretical Framework

Introduction

It has long been acknowledged that vocabulary is recognized as the cornerstone of language acquisition. Learners cannot effectively speak, understand texts, or develop any of the four language abilities without a sufficient lexical base. Vocabulary is one of the most enduring and important issues in the EFL context, where students have little exposure to the target language outside of the classroom. Particularly among first-year university students, there are significant lexical gaps that have an immediate impact on their performance in all language modules. In applied linguistics and language pedagogy, addressing this challenge has become one of the most urgent priorities in the field.

At the same time, learners' approaches to language study have changed due to the rapid development of information and communication technology. Electronic dictionaries, gamified vocabulary platforms, multimedia tools, and social media are just a few examples of ICT-based applications that give students dynamic and accessible learning environments that are beyond the capabilities of a typical classroom. For EFL students in Algerian universities, who carry smartphones and have regular access to digital resources, these programs represent a largely unexplored option for vocabulary growth. Thus, it has become crucial to understand how students use these tools, how often they do so, and what impact they have. The pertinent theoretical and empirical literature that supports the current investigation is reviewed in this chapter.

This chapter provides the theoretical framework of the study as it highlights the foundation of vocabulary in EFL and the emergence of information and communication technology (ICT) in language learning. It also presents vocabulary development through technology.

1.1 Vocabulary in EFL Learning

1.1.1 Definition of Vocabulary

Vocabulary is widely regarded as an essential part of acquiring a language, forming the basis of comprehension and meaningful communication. Several scholars have provided various definitions to clarify its importance, generally agreeing that vocabulary development is essential for learning English since words are the fundamental building blocks of communication that allow one to successfully express ideas, emotions, and facts (Zuhriya et al., 2024). Alqahtani (2015) also states that learning vocabulary is a highly important element of learning a foreign language; this is because the significance of new terms is often stressed, whether in books or in classrooms.

Numerous authors offer closely aligned definitions of vocabulary. Alfaki (2015) and Ur (2022, p. 6) emphasize that vocabulary is not just made up of single words; it also consists of phrases and multi-word expressions that have the same meaning as individual words.

Building on these definitions, scholars have also highlighted various aspects of vocabulary learning. According to Lado (1995, as cited in Nur Rahmah, Tahir, & Talib, 2023), key aspects of vocabulary learning include meaning, spelling, pronunciation, and word class. Each of these aspects plays a central role in vocabulary acquisition and how learners can develop their word knowledge effectively.

Vocabulary supports vocabulary in speaking, listening, reading, and writing. It is one way of conveying meanings and concepts (Alamri & Hakami, 2022). Without a sufficient stock of words, learners are unable to interpret what they hear or read, and they lack the means to express themselves in speech or writing. Put simply, no language skill can function independently of vocabulary. This is why Nation (2001) describes vocabulary knowledge as central to all language use and why the study of vocabulary acquisition remains one of the most active areas of research in applied linguistics.

1.1.2 Receptive and Productive Vocabulary

Vocabulary has been classified by numerous scholars into different categories. In this regard, Hiebert and Kamil (2005) distinguished between two main types: receptive vocabulary and productive vocabulary. Receptive vocabulary, also known as recognition vocabulary, encompasses the words that learners can identify and interpret during listening and reading activities. These lexical items are less accessible and less familiar to learners than the words they actively produce. In contrast, productive vocabulary, or expressive vocabulary, refers to the collection of words that are accessible for expressive output; it is usually more common, recognizable, and regularly used. Similarly, Zhou (2010) compared the two categories, explaining that receptive vocabulary is the capacity to decode and understand the meaning of the language when it is presented visually or auditorily. While productive vocabulary refers to a set of words that is used when speaking or writing. Pikulski and Templeton (2004, p. 2) categorized vocabulary in two ways: receptive versus expressive (productive) and oral versus literate. Receptive vocabulary involves understanding words through listening and reading, while productive vocabulary involves producing words through speaking and writing.

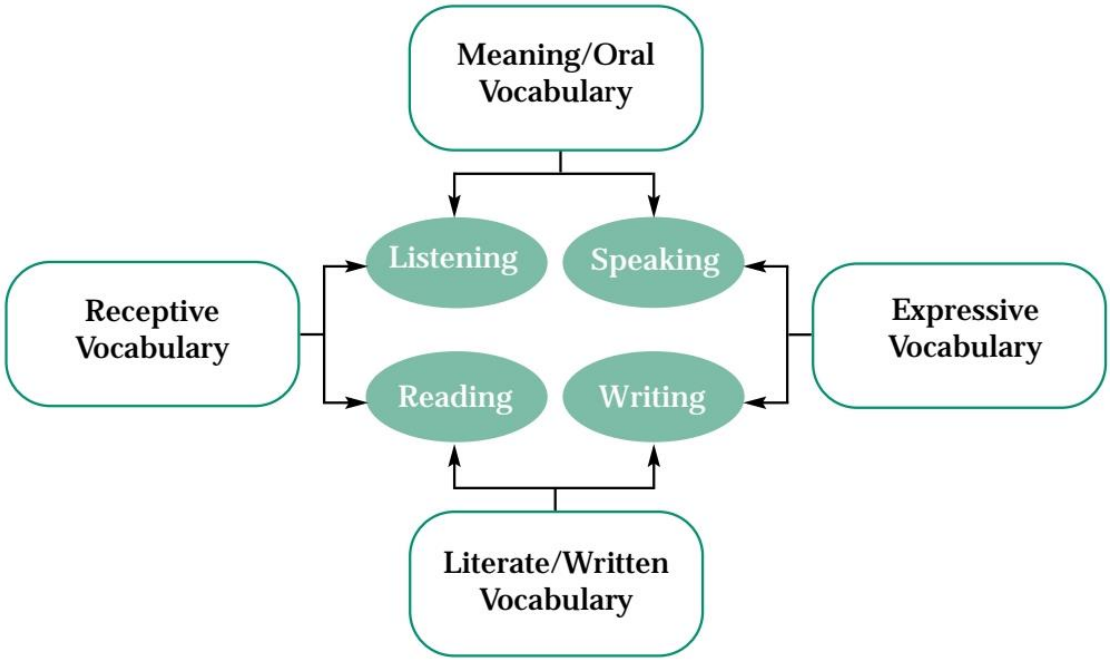

Figure 1: *Receptive and expressive (productive) vocabulary (adapted from Pikulski and Templeton, 2004, p. 2)*

Based on Webb's (2005) analysis, receptive learning mainly contributes to the development of a learner's recognition of meaning, while productive learning can lead to gains in both receptive and productive vocabulary knowledge. His findings show that productive tasks like writing tend to result in greater overall gains in word knowledge than receptive tasks such as reading, based on the nature of learning and exposure.

1.1.3 Definition of Vocabulary Knowledge

"Vocabulary is the knowledge of words and word meanings" (Diamond & Gutlohn, 2006, para. 1), which implies that vocabulary knowledge requires being aware of every element of that word that enables one to use it efficiently. According to Milton (2009), knowing a word requires knowledge of its orthographic (its visual spelling) and phonological forms (its unique sound pattern).

Vocabulary knowledge involves more than just knowing a word's basic meaning; it requires a better understanding of how the word works and how to use it effectively. Nation (2022) stated that knowing a word involves knowing three major dimensions, which are the word form, meaning, and use. This demonstrates that vocabulary knowledge requires more than understanding what a word means but also knowing how it works in different situations and how it is set up.

Dale (1965, as cited in Beck, McKeown, & Kucan, 2013) classified word knowledge into four main stages:

Stage 1: Total absence of knowledge.

Stage 2: The word is recognized as existing, but the meaning remains unknown.

Stage 3: Identifying the word when it appears in context.

Stage 4: Reaching the most advanced stage of word knowledge.

Vocabulary knowledge requires understanding how words function in different contexts.

Vocabulary knowledge is closely linked to language development and usage, as Nation and Waring (1997, p. 6) stated that "vocabulary knowledge enables language use; language use enables the increase of vocabulary knowledge; knowledge of the world enables the increase of vocabulary knowledge and language use, and so on."

1.1.4 Breadth and Depth of Vocabulary Knowledge

Breadth and depth of vocabulary knowledge are widely recognized. Researchers commonly use the two complementary dimensions to describe vocabulary knowledge. According to Bardakçi (2016), vocabulary breadth of knowledge refers to the number of words a learner knows. Depth of vocabulary knowledge refers to how learners understand those words, including their meanings, associations, and grammatical uses. Another definition was provided by Zheng (2024, p. 33), who defined breadth, also known as vocabulary size, as the quantity and range of words a person is familiar with. Whereas depth was defined as the degree to which a learner understands a word and is familiar with it.

Breadth of knowledge is usually measured through various testing formats, such as the vocabulary size test (VST) by Paul Nation and David Belgar (2007), which was designed to determine the number of word families a learner is familiar with. Another test was proposed by Milton (2009), who measured breadth using the translation test to get a real sense of how many words a student has at their disposal, while depth is measured through the word-association format, which was developed by Read (1993, 1998) to determine the learner's true level of word knowledge, not just if they can recognize it (as cited in Read, 2007).

Breadth and depth are not opposing dimensions but complementary aspects of vocabulary knowledge. Zheng (2024) points out that they are connected to each other, as repeated exposure to language plays a central role in strengthening them.

1.1.5 The Significance of Vocabulary for EFL Learners

Vocabulary is often seen as the driving force behind foreign language learning, with many scholars emphasizing its importance, as Richards and Renandya (2002, p. 255) noted, "Vocabulary is a core component of language proficiency, as it provides much of the basis for how well learners speak, listen, read, and write." This suggests that vocabulary serves as the primary catalyst that empowers learners to master the four language skills more effectively. Wilkins (1972, p. 111) highlighted that "while without grammar very little can be conveyed, without vocabulary nothing can be conveyed." In other words, grammar provides the structure for meaningfully combining

words, but vocabulary contains the main content; even with perfect grammar, without adequate vocabulary, it is difficult to express what you think, want, or feel. Similarly, Krashen (1989) highlights that there are strong reasons to focus on vocabulary, as it plays an essential role in language acquisition, and learners themselves recognize its importance since they tend to rely on dictionaries rather than grammar books due to their limited vocabulary.

Hussain (2018) has also stated that the mastery of vocabulary is fundamental, as it underpins every dimension of communication, from decoding sounds and symbols to producing fluent speech and text. Consequently, it is an essential part of learning a language successfully.

1.1.6 Vocabulary Learning Strategies

According to Asgari and Mustapha (2011), vocabulary learning strategies (VLSs) refer to the techniques employed by the language learners to expand their English vocabulary. Nation (2022) argued that vocabulary learning strategies should not be considered only as tools to improve how well students learn words; they can also be seen as a way to help learners become more responsible for their own learning. Cameron (2001) supplies to some extent a similar definition, emphasizing that VLS refers to the steps learners follow to improve their understanding and solidify their vocabulary knowledge.

Vocabulary learning strategies are classified in various ways, as different researchers have proposed a wide range of taxonomies to describe them. Oxford and Burry-Stock (1995) classified the language learning strategies that are applicable to vocabulary learning into six main categories: memory, cognitive, compensation, metacognitive, affective, and social strategies.

Another taxonomy was developed by Norbert Schmitt (1997, as cited in Craven, 2013, p. 10), who combined the discovery consolidation taxonomy put forth by Cook and Mayer with Rebecca Oxford's (1990) taxonomy, which included memory, cognitive, metacognitive, and social strategies, to present a comprehensive and detailed vocabulary learning strategies taxonomy. Oxford (1990, as cited in Hardan, 2013) defined its taxonomy as follows:

- **Memory strategies:** They are specific tools like mnemonics that help learners connect ideas in their minds, for instance, by using a new word in a sentence in the language they are studying.
- **Cognitive strategies:** They assist students in understanding and actively using the language effectively in real tasks such as writing letters, reports, messages, or notes in the target language.
- **Compensation strategies:** They allow students to express themselves despite limited vocabulary, relying on context or creative ways to overcome difficulties.

- **Metacognitive strategies:** They enable students to gain control over their learning process by setting plans, organizing, monitoring, and evaluating their progress while adjusting their strategies when necessary.
- **Affective strategies:** They enable students to control their emotions and motivation, which makes it easier for them to improve their ability to learn a language.
- **Social strategies:** They help students improve their language learning through interaction with others, as learning a language requires social interaction in the target language.

According to Schmitt (1997, as cited in Tanyer & Öztürk, 2014), discovery strategies, which include social and determination strategies, are the methods used by learners to figure out the meaning of new vocabulary. If a word is unknown, learners try to identify its meaning by analyzing its form, relating it to a similar word in their first language, using context clues, dictionaries, or other resources, and seeking assistance from other people. Consolidation strategies, on the other hand, are grouped into four categories: social, memory, cognitive, and metacognitive. They are employed to help learners strengthen their memory of new words after the point of initial exposure.

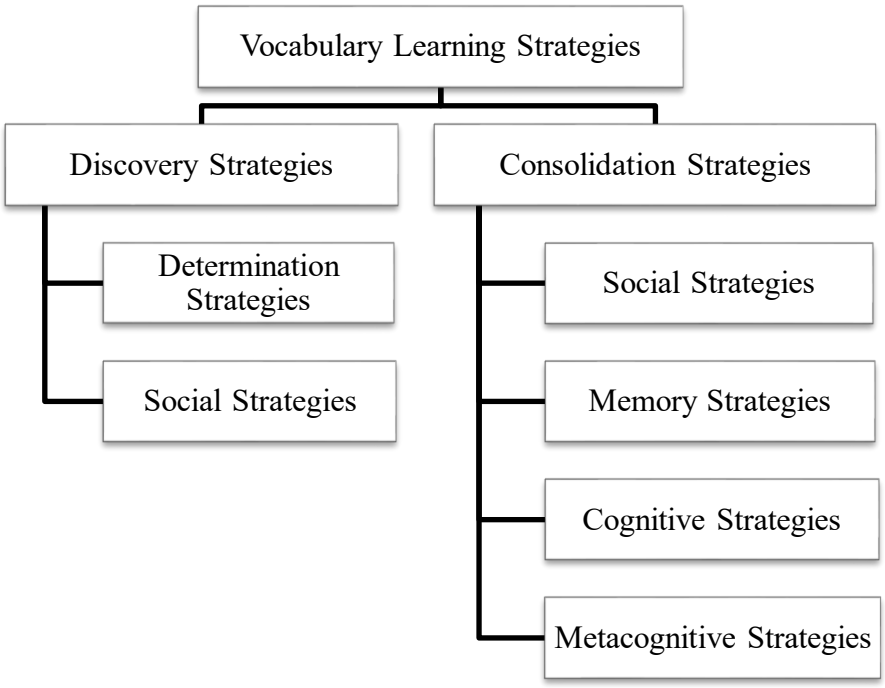

Figure 2: *Schmitt's Taxonomy of Vocabulary Learning Strategies (Adapted from Schmitt, 1997, as cited in Tanyer & Öztürk, 2014, p. 38)*

1.2 Information and Communication Technology (ICT) in Language Learning

1.2.1 From CALL to MALL: A Historical Perspective

With the continuous progress and inclusion of technology in education, language learning has adopted several technological approaches, among them computer-assisted language learning (CALL) and mobile-assisted language learning (MALL). CALL represents one of the first technological innovations in language instruction, which appeared in language education in the twentieth century. Levy (1997) defined computer-assisted language learning as “the search for and study of applications of the computer in language teaching and learning" (p. 1); he also argued that CALL became possible with the evolution and widespread use of computers.

Based on the classification of Warschauer and Healey (1998), CALL is classified into three historical phases: the first phase was the behavioristic CALL, which was developed as a part of computer-assisted instruction. Its foundation was the behaviorist learning theory. Learning was perceived as a process of habit formation developed through repetition, stimulus-response tasks, and reinforcement. Computers supported this process by acting as a mechanical tutor, allowing learners to practice regularly while receiving instant feedback adjusted to their rate of learning.

The second phase was the communicative CALL, which emerged when the behavioristic language teaching started to decline in terms of theory and instructional standpoint, alongside the fact that new personal computers were expanding the possibilities for independent work. This phase was seen as a step forward from the older behavioristic approach that emphasized using language forms, implicit grammar teaching, and student-generated utterances. But it too eventually started facing criticism, claiming that the computer was still being used in a temporary, disconnected way.

The third phase was the integrative CALL, which integrates the four language skills and digital tools throughout the learning process. It focused on authentic language use, skill integration, and ongoing use of technology in learning.

Over the past fifteen years, a new subfield emerged, which is called mobile-assisted language learning. Mobile devices such as laptops, tablets, and smartphones have become an essential part of everyday life. Ozer & Kılıç (2018) stated that mobile devices have become the primary engine of modern life, radically redefining social interaction with others, educational methodologies, and navigating our careers. Alemi et al. (2012) argued that mobile-assisted language learning fosters autonomous learning by supporting self-directed study via phones. The smartphone functions as a personal guide, promoting independence and keeping learners at the core of their own language learning.

According to Kukulska-Hulme & Shield (2008), MALL distinguishes itself from traditional computer-assisted language learning as it gives the freedom to study wherever and whenever the learner wants, using their mobile devices instead of a fixed computer.

1.2.2 Defining ICT-Based Applications

To this day, the term "ICT" does not have a universally accepted definition due to its continuous evolution and advancement. Gillespie (2006) defined ICT as "information and communication technology is a term that covers a range of hardware (machines) and software (applications of the machines)" (p. 03), meaning that ICT has two basic types: hardware, which represents the tangible and physical devices such as computers, tablets, smartphones, interactive whiteboards, and projectors, whereas software refers to the programs and applications used in it, such as language learning apps, online dictionaries, educational websites, learning management systems, and multimedia platforms. Expanding this perspective, another definition was provided by Tamilselvan and Sivakumar (2012), who stated that ICT refers to the technologies that enable access to information through telecommunications systems. It is closely related to IT but places greater attention on communication tools such as mobile devices, wireless connections, online networks, and other communication services. They have also stated that "ICT is concerned with the storage, retrieval, manipulation, transmission, or receipt of digital data" (p. 18); this indicates that ICT deals with saving the information to find and access it later, after that changing or editing that information, then sending it over a network, and finally receiving it. Similarly, Zuppo (2012) highlights that the primary definition of information and communication technologies refers to the tools and systems that allow the exchange of information through digital channels.

1.2.3 The Role of ICT Applications in Vocabulary Learning

Nowadays, ICT has become highly developed, and it is considered in the whole world as a necessity as well as an opportunity. Its rise has led to the growth of digital media and information, which the world is increasingly adopting, and this shift is significantly influencing modern higher education. According to Oliver (2002), ICT acts as the driving force in the field of education, and its integration naturally supports and strengthens autonomous learning amongst students. In this sense, the use of ICT has also reached vocabulary learning, where learners acquire new words using technology-assisted approaches, including digital tools like mobile applications, online platforms, and multimedia resources.

Multimedia resources in particular play a significant role in supporting vocabulary learning by integrating different modes of input, including text, visuals, and audio. Mayer (2005) explains that starting multimedia learning will be more effective if information is conveyed through both verbal and visual channels, allowing learners to construct coherent mental models that enhance

comprehension and retention. Similarly, Haddad and Draxler (2002, p. 177) state that through the participatory design of a bilingual CD-ROM dictionary, incorporating visuals and audio elements facilitates the development of vocabulary and cultural knowledge. In addition, ICT tools help not only vocabulary learning but also promote the learners' motivation and engagement.

1.3 Previous Studies

The connection between vocabulary acquisition in EFL situations and ICT-based applications has been the subject of several research projects. Due to their direct relevance to the topic of this investigation, the studies evaluated below were chosen. The use of technology for vocabulary learning, learners' attitudes toward digital tools, and the particular benefits generated by computer-based or mobile applications in EFL contexts are all covered in one or more of these. When combined, they provide the current study's empirical basis.

1.3.1 Studies on Mobile-Assisted Vocabulary Learning

Digital tools demonstrably help university English students learn vocabulary. When Yeganehpour and Jalilzadeh (2022) tested this directly, they found that undergraduates using interactive software outperformed those in traditional classrooms. The data was clear enough for the researchers to conclude that digital interventions are simply a better strategy for developing lexical competence (Yeganehpour & Jalilzadeh, 2022, p. 446). Smartphones take this accessibility a step further. In their review of mobile-assisted language learning (MALL), Metwally and Morsi (2026) examined how EFL undergraduates actually interact with mobile apps. They highlighted one particularly stark metric: students using these apps retained 15% more vocabulary long-term than peers receiving standard instruction (Iftikhar, 2025, as cited in Metwally & Morsi, 2026, p. 13). But it is not just about the test scores. Metwally and Morsi (2026, p. 14) argue that having the language readily available on a phone naturally encourages students to take control of their own learning and study with much higher motivation.

Both Ağca and Özdemir (2013) and Lu (2008) have examined the effectiveness of mobile device technologies in enhancing EFL students' vocabulary. The two studies used different instructional designs and research focuses. The Ağca and Özdemir study was carried out in Turkey and published in Procedia-Social and Behavioral Sciences. It examined the use of QR “code-supported multimedia materials” with 40 EFL students at Gazi University, demonstrating a practical way of incorporating mobile technology into learning and how it can support the students' vocabulary learning. The study employed an experimental design using a pre- and post-tests format to measure students' vocabulary achievement and motivation while using mobile technologies. The results showed a notable enhancement in students' motivation and improvement in their academic achievement. Lu (2008) was published in the Journal of Computer-Assisted Learning. It examined

30 senior high school students in Taiwan, providing an example of mobile-assisted vocabulary learning in a formal educational setting and investigating the effectiveness of vocabulary learning via SMS messages over two weeks. The results showed that students who used SMS to learn vocabulary outperformed those who used standard word lists on short-term retention tests. Overall, the two studies indicate that mobile-assisted vocabulary learning can improve learners' vocabulary proficiency and facilitate learners' vocabulary acquisition.

1.3.2 Studies on Electronic Dictionaries and CALL Tools

An interesting study titled "What Lexical Information Do L2 Learners Select in a CALL Dictionary and How Does It Affect Word Retention?" was published in *Language Learning and Technology* by Laufer and Hill (2000). The study looked at the kinds of information L2 learners chose to obtain and how they engaged with electronic dictionaries throughout reading assignments. Crucially, the researchers discovered that no one kind of lexical information, like a definition or translation, was consistently better for word retention. The frequency and diversity of look-ups did predict improved retention: students who used more than one search option for the same word demonstrated superior retention results. Laufer and Hill (2000) concluded that electronic dictionaries are superior to paper dictionaries because they can accommodate different learning styles by providing a variety of lexical information at the same time. The use of feature-rich dictionary programs, like Reverso Context and Cambridge Dictionary Online, which provide Algerian EFL students with a variety of information types in a single lookup, is supported by this finding, which is directly related to the current study. It also explains why the tool's richness is just as important as actually looking up words.

The Modern Language Journal published research by Chun and Plass (1996) titled "Effects of Multimedia Annotations on Vocabulary Acquisition." They investigated the effects of various multimedia glosses on foreign language vocabulary learning, specifically comparing text-only, text-plus-picture, and text-plus-video annotations. According to their findings, students who accessed annotations that combined written definitions with visual images recalled a substantially higher number of words than those who utilized glosses that were either text-only or text-plus-video. Chun and Plass (1996) suggested that this advantage occurs because combining verbal and visual information triggers dual coding mechanisms in the brain, which leads to a deeper mental representation of the word. This study supports the use of applications like *YouTube* and picture-based flashcard apps in EFL vocabulary training and offers a cognitive explanation for why multimedia vocabulary applications outperform basic text-based tools.

1.3.3 Studies on Gamified Applications and Vocabulary Motivation

Both studies, Vesselinov and Grego (2012) and Reinders and Wattana (2015), have examined the role of digital and gamified tools in language learning, showing their effectiveness on how these tools enhance learners' engagement and outcomes. The Duolingo study by Vesselinov and Grego (2012) illustrates that learners can cover the content of a first-semester university course within about 34 hours of use rather than a full academic semester due mainly to gamification elements like points, streaks, rewards, and instant corrective feedback. Similarly, Reinders and Wattana (2015) examined the impact of digital game-based learning on learners' willingness to communicate, highlighting that these digital games decrease the feeling of anxiety and increase learners' willingness to communicate due to the creation of a supportive environment devoid of stress. Both studies also stress the importance of learning in a low-pressure setting. Duolingo supports self-paced learning and provides immediate feedback. Likewise, game-based learning reduces stress by creating an enjoyable and supportive atmosphere. In both cases, learners feel more confident using the language. Despite these similarities, the two studies differ in their focus, methodology, and type of outcomes. Vesselinov and Grego adopted a quantitative methodology focused on quantifiable learning outcomes, while Reinders and Wattana adopted a qualitative approach to explore effective elements such as motivation and emotional dimensions of engagement.

In summary, both studies confirm the efficacy of gamified digital tools, despite being examined from different perspectives. Vesselinov and Grego demonstrate the role of gamification in increasing learning efficiency and competence, while Reinders and Wattana focus on its impact on learners' motivation and communicative willingness. Combined, the findings of the two studies provide a better understanding of how gamified applications support vocabulary learning through both measurable progress and positive emotional engagement.

1.3.4 The Role of Out-of-Class Digital Engagement in Vocabulary Development

A study titled "The Effect of Out-of-Class Exposure to English Language Media on Learners' Vocabulary Knowledge" was published in *ITL—International Journal of Applied Linguistics* by Peters (2018). The study examined the link between the vocabulary knowledge of 79 Flemish EFL teenage learners and their exposure to English media outside of the classroom. Participants reported being exposed to a variety of media, such as written material, music, movies, television, and the internet. The results demonstrated a positive correlation with vocabulary knowledge, particularly for written print, internet use, and non-subtitled television shows and movies (Peters, 2018, p. 157). Notably, the study revealed no significant relationship between language knowledge and captioned or subtitled media. According to Peters (2018), the length of

formal instruction did not explain as much of the diversity in vocabulary knowledge as extramural exposure to English-language media (p. 159). This finding emphasizes the significance of what students do outside of the classroom and is pertinent to the current study because it offers empirical proof that vocabulary growth is more influenced by out-of-class digital media engagement than by classroom hours alone. This fact influences how first-year EFL students at Bouira University develop their lexical knowledge.

In a study investigating the role of technology in language learning, Fathali and Okada (2018) examined 162 Japanese undergraduate EFL learners' intention to use learning technologies for out-of-class language learning (OCLL). Their research, published in the *Australasian Journal of Educational Technology*, explored the implementation of a web-based e-portfolio system for independent study (Fathali & Okada, 2018, pp. 138, 143). The findings indicated that when learners felt their basic psychological needs, such as competence, autonomy, and relatedness, were met, they perceived the technology as more useful and easier to use. This significantly increased their intention to continue using the system and their actual language learning performance beyond the classroom (Fathali & Okada, 2018, p. 148). Furthermore, this empirical evidence aligns with the theoretical work of Nation (2001, p. 76), who argues that learners must encounter new words multiple times at distributed intervals to successfully move them into long-term memory. By providing constant access to language input, ICT applications create the necessary conditions for the repeated encounters required for permanent vocabulary retention.

In a case study investigating the digital habits of Japanese EFL learners, Fathali, Marandi, and Okada (2020) identified a significant discrepancy between how students utilize technology in their daily lives versus their target language studies. Although more than 85% of the participants engaged with information and communication technology (ICT) daily for general communication and entertainment in their native language, their engagement in English remained remarkably low (p. 157). Specifically, the researchers found that 59% of students relied primarily on online dictionaries or dictionary applications for vocabulary-related tasks, a behavior they attributed to the traditional "yakudoku," or translational reading method, prevalent in the Japanese context (Fathali et al., 2020, p. 164). This suggests that while students possess high levels of technological proficiency for everyday tasks, they often utilize modern digital tools to reinforce traditional, passive learning habits rather than adopting more interactive or collaborative vocabulary-building strategies (p. 164). Furthermore, the study identified that a major obstacle to effective out-of-class language learning (OCLL) is not a lack of access to technology, but rather the students' insufficient knowledge regarding which specific applications are most effective for linguistic development (Fathali et al., 2020, p. 168). These findings are highly relevant to the current investigation at

Bouira University, as they highlight the necessity of moving beyond simple ICT access toward providing students with the digital literacy required to select and utilize applications that foster active vocabulary growth.

1.3.5 Studies in the Algerian and Arab EFL Contexts

A study titled "The Attitudes of Second-Year EFL Students at Dr. Moulay Tahar University towards Learning English Pronunciation through Mobile-Assisted Language Learning" was published in the *Arab World English Journal* by Ghounane (2019). The study looked at how 15 instructors and 95 second-year EFL students at the University of Saida in Algeria felt about using mobile apps to acquire English pronunciation. The researcher gathered data using a students' questionnaire, a teachers' interview, and student pre- and post-tests. The findings demonstrated that both teachers and students had favorable opinions about incorporating mobile technology into pronunciation instruction. After utilizing the mobile applications, students also showed a notable improvement in their phonetic transcription and oral output abilities (Ghounane, 2019). Ghounane (2019) concluded that mobile tools provide a doorway for what is referred to as "free education," enabling learners to move beyond the limitations of the traditional classroom. This study is directly relevant to the current research, even though it concentrated on pronunciation rather than vocabulary, because it offers empirical evidence from the Algerian EFL context that mobile applications produce quantifiable language gains and generate positive attitudes among both students and teachers at Algerian universities, which mirrors the main concerns of the current study.

Among 54 first-year EFL students at Tlemcen University, Benrabah and Kameche (2022, p. 143) examined the issue of vocabulary attrition, or the gradual loss of lexical items over time. According to their research, the main causes of this lexical loss, which mostly affects productive skills like speaking, are a lack of engagement and inadequate exposure to the target language (Benrabah & Kameche, 2022, p. 143). The results indicate that vocabulary attrition in EFL contexts can be overcome with the use of ICTs in the modern day. To strengthen students' linguistic repertoire, it is crucial to maximize the use of technology in language learning (Benrabah & Kameche, 2022, p. 143). The integration of ICT-based applications is a viable pedagogical strategy to mitigate storage and retrieval difficulties in early tertiary education, as this study shows that "Generation Z" students are naturally familiar with technological tools (Benrabah & Kameche, 2022, p. 150). This finding is highly relevant to the present study at Bouira University.

A paper titled "SMS: Tool for L2 Vocabulary Retention and Reading Comprehension Ability" was published in the *Journal of Language Teaching and Research* by Motallebzadeh and Ganjali (2011). Forty Iranian EFL university students were split into two groups for the study.

While the control group acquired the same vocabulary through conventional classroom training, the experimental group received new vocabulary items via SMS messages on their mobile phones. The SMS group performed noticeably better on reading comprehension and vocabulary retention tasks, according to post-test results. These improvements were ascribed by the researchers to the frequency and dispersed character of SMS-based vocabulary exposure. Motallebzadeh and Ganjali (2011, p. 1114) concluded that receiving vocabulary input through mobile messages offers a convenient and effective complement to classroom instruction. Although this study is based in Iran, its conclusions can be applied to the Algerian EFL context due to the same status of English as a foreign language and the similar role of the classroom as the main yet inadequate learning environment.

A review paper by Alqahtani (2015) titled "The Importance of Vocabulary in Language Learning and How to Be Taught" was published in the International Journal of Teaching and Education. This document summarizes current research and pedagogical theory on vocabulary learning and teaching, in contrast to experimental or survey-based investigations. According to Alqahtani (2015), vocabulary is a crucial part of learning a language, and teachers must employ a range of strategies to meet the various requirements and learning preferences of their students (pp. 24, 30-31). The article examines a variety of tried-and-true techniques for teaching vocabulary, such as using mnemonics, working with realia and photos, learning words through context, and checking dictionaries. The author noted that successful vocabulary training relies on carefully integrating strategies because no single approach is effective for all students (Alqahtani, 2015, pp. 30-31). This paper is directly related to the current study because it provides a broad theoretical framework for the discussion of vocabulary instruction and supports the idea that Algerian university instructors should take a more comprehensive approach to teaching vocabulary than just repetition and translation drills. Additionally, the review subtly endorses the usage of various digital tools as extensions of the multi-method philosophy advocated by Alqahtani (2015), such as context-based applications and electronic dictionaries.

Bouderba (2024) conducted a doctoral thesis titled “The Use of ICTs for Enhancing EFL Students’ Reading Skill and Vocabulary Development,” submitted to the Department of English Language and Literature at the University of Mustapha Stambouli, Mascara, Algeria, in fulfillment of the requirements for the degree of Doctorate in Didactics of English Language. The study was carried out over the period 2017 to 2023 and investigated the extent to which EFL teachers at Mascara University integrate ICT tools into their reading comprehension sessions and the impact of ICT on students’ reading skill and vocabulary development. The study involved a large sample of second-year EFL students, new-generation EFL teachers, and older-generation EFL teachers.

Three data collection instruments were used to ensure validity and reliability: a student questionnaire distributed to 162 second-year EFL students, two semi-structured interviews conducted with EFL teachers from different professional generations, and classroom observation sessions. The data were analyzed using both quantitative methods through SPSS software and qualitative methods. The findings confirmed all three of the study's hypotheses. First, teaching reading as a skill receives less attention under the LMD system compared to the classical system. Second, ICT tools have a positive contribution to students' reading skills and vocabulary development: the majority of student participants agreed that digital tools such as the internet, mobile applications, audiovisual resources, and electronic dictionaries help them acquire more vocabulary both inside and outside the classroom. Third, and most significantly for the present study, EFL teachers at Mascara University rarely use ICT inside the classroom to support reading instruction or vocabulary development, despite the availability of these tools and the positive attitudes students hold toward them. Based on these findings, Bouderba (2024) proposed a set of practical recommendations including an online ICT teacher training course and an online reading lesson plan as concrete steps toward greater digital integration in Algerian EFL classrooms. This study is directly relevant to the current investigation because it provides the most recent empirical evidence from an Algerian university English department specifically confirming the gap between ICT availability and actual classroom use, a finding that directly informs the research questions and significance of the present study at Bouira University.

Reading the studies in this section together reveals both shared conclusions and important methodological differences. Ghounane (2019) and Bouderba (2024) both work within Algerian university English departments, making them the most directly comparable to the present study. However, they differ in scope and focus: Ghounane (2019) concentrated on mobile-assisted pronunciation learning with a relatively small sample, while Bouderba (2024) conducted a large-scale mixed-methods doctoral investigation covering reading skill and vocabulary development across multiple teacher generations. Despite their different focus, both arrive at the same finding that is central to the present study: EFL teachers in Algerian universities do not consistently integrate ICT tools into their instruction, even when students hold positive attitudes toward these tools and even when the tools are accessible. Benrabah and Kameche (2022) add a further dimension by showing that this lack of ICT use has measurable negative consequences in the form of vocabulary attrition among first-year students. Motallebzadeh and Ganjali (2011), drawing on the Iranian EFL context, demonstrate that mobile delivery effectively supplements classroom instruction to counteract exactly this kind of vocabulary loss. Alqahtani (2015) provides the theoretical grounding by arguing that a multi-method approach to vocabulary instruction is

necessary. Taken together, these five studies converge on a single implication: Algerian EFL students need structured ICT integration in their vocabulary instruction, and the absence of such integration represents one of the most actionable gaps in current pedagogical practice.

1.3.6 Studies on Learner Attitudes and Perceptions Toward ICT Vocabulary Tools

Ozer and Kılıç (2018) and Stockwell (2012) present two complementary perspectives on ICT in language learning. Ozer and Kılıç (2018) conducted a study with 63 university students enrolled in an A2 level English language preparatory course. Their results showed that the experimental group, which used mobile applications, outperformed the control group in terms of academic performance. Furthermore, Ozer and Kılıç (2018) discovered a clear link between increasing mobile phone integration in the learning process and greater academic gains. The students' positive opinions of mobile learning, which increased their motivation and engagement, were credited with this result (Ozer & Kılıç, 2018). This study shows that technology-enhanced learning can close language performance disparities when students have a favorable attitude toward the instruments utilized, which makes it extremely relevant to the research at Bouira University.

Stockwell (2012) assessed several empirical research studies on student attitudes about CALL and MALL environments. While learners generally have positive attitudes toward technology-assisted language learning, he found that this positivity is conditional: learners respond favorably to digital tools when they offer well-defined, structured learning objectives and fit into their everyday routines. Furthermore, Stockwell (2012) noted that a student's likelihood of sticking with digital vocabulary tools over time cannot be accurately predicted by a good attitude alone. He observed that learners' positive opinions and real sustained use were consistently at odds. According to Stockwell (2012), a variety of factors, including app usability, instructor support, and the availability of an internet connection, moderate learners' regular usage of mobile vocabulary resources. This realization is especially relevant to Algerian universities, where insufficient infrastructure and teacher supervision might occasionally impede students' favorable views toward ICT technologies.

When considered collectively, the studies examined in this section offer substantial empirical backing for the current study's research topic. Together, they demonstrate how ICT-based applications, whether they be electronic dictionaries, gamified platforms, mobile flashcard tools, or multimedia content, create quantifiable vocabulary gains in EFL contexts, boost learner motivation, and induce overall good learner attitudes. Additionally, they highlight a continuous gap that exists across various national settings, including Algeria, between the availability of these tools and their methodical incorporation into formal instruction. By focusing on the unique

situation of first-year EFL students at Bouira University, a local setting that has not yet been the focus of empirical research on ICT and vocabulary acquisition, the current study expands on this body of evidence.

1.4 Research Gap

Although the studies reviewed in this chapter collectively confirm the positive impact of ICT-based applications on EFL vocabulary development, a significant gap remains in the existing literature. The majority of empirical studies on this topic have been conducted in East Asian, Turkish, or Iranian EFL contexts, with only a limited number of investigations focusing on the North African and, specifically, Algerian university settings. Among the studies that address Algeria, Ghounane (2019) examined mobile-assisted pronunciation learning at the University of Saida; Benrabah and Kameche (2022) investigated vocabulary attrition at the University of Tlemcen; and Bouderba (2024) investigated ICT use for reading skill and vocabulary development at the University of Mascara. While Bouderba (2024) is the most comprehensive Algerian study reviewed here, it was conducted at a different institution, focused primarily on reading comprehension rather than vocabulary development, and targeted second-year students rather than first-year learners. No study has yet specifically investigated the impact of ICT-based applications on vocabulary development among first-year EFL students at Bouira University. Furthermore, while the Algerian studies available confirm that EFL teachers rarely integrate ICT into classroom instruction despite positive student attitudes, none of them examines the specific digital applications first-year students use independently for vocabulary purposes, the frequency of that use, or the perceived impact of these tools on their lexical growth. The present study aims to address these gaps directly, contributing locally grounded empirical evidence from a context that remains underrepresented in the research literature.

Conclusion

This chapter has reviewed the principal theoretical and empirical foundations of the present study. The first part established that vocabulary is a core component of language proficiency (Richards & Renandya, 2002, p. 255), covering its definitions, types, dimensions of knowledge, significance for EFL learners, and the main learning strategies used to acquire it. The second part traced the development of technology in language learning from CALL to MALL and defined ICT-based applications as the primary tools of interest in this investigation. The third part reviewed previous studies from a range of national and EFL contexts, comparing their methodologies and findings, identifying points of convergence, and noting where studies differ. The literature consistently shows that ICT-based applications produce vocabulary gains, improve learner motivation, and generate positive attitudes, yet it also reveals a recurring gap between tool

availability and systematic classroom integration. Research in the Algerian university context specifically remains limited, a gap the present study directly addresses.

The following chapter presents the research methodology adopted to investigate the impact of ICT-based applications on vocabulary development among first-year EFL students at Bouira University, explaining the choices of research design, data collection instruments, and analysis procedures that guided the empirical work of this study.

Chapter Two: Research Methodology

Introduction

This chapter presents the methodological framework adopted in the current study. It begins by describing the research design, followed by an explanation of the research method. The population, setting, and sampling technique are then presented. A detailed description of the data collection instruments and the pilot testing procedure comes next. The chapter then explains the data analysis approach, addresses ethical considerations, and closes with the study's scope and limitations.

Methodology is the core element of any research study. The quality, dependability, and applicability of the results are shaped by the choice of methodology and tools. According to Cohen, Manion, and Morrison (2018), scientific investigation is distinguished from ordinary observation by its precise attempt to control and take into consideration outside factors that could affect outcomes. The need to provide results that authentically reflect the experiences and perceptions of first-year EFL students and their teachers at Bouira University informed the major methodological decision made in this study, from the research design to the selection of instruments.

2.1 Research Design

"A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure" (Kothari, 2004, p. 31). It is considered the blueprint for conducting a study and analyzing data. effectively and efficiently.

This study adopts a case study design as its primary research strategy. To the best of our knowledge, no previous study has explicitly examined the impact of ICT-based applications on vocabulary development among first-year EFL students at Bouira University. The case study was selected because it is the most appropriate strategy for investigating a contemporary phenomenon in depth within its real-life educational context, as Yin (2009, p. 18) argues. Unlike experimental or survey-based approaches, the case study does not strip the phenomenon under investigation from its setting. Instead, it examines how ICT-based vocabulary learning operates within the full complexity of the institutional, pedagogical, and socio-cultural conditions specific to this department. This makes it particularly well suited to a study concerned with the actual impact of digital tools on students' vocabulary learning, as experienced and perceived by the participants themselves.

In terms of its time frame, the study is cross-sectional. Creswell (2012, p. 340) notes that cross-sectional studies "collect data at one point in time" and are suitable when the objective is to describe a situation or identify relationships among variables at a given moment. For this investigation, a cross-sectional approach provides a clear picture of students' current ICT practices

and perceptions during the academic year 2025/2026. This time frame is appropriate because the study aims to produce a situated, descriptive account of the impact of ICT tools on vocabulary development at a specific and well-defined moment in this student cohort's academic journey.

2.2 Research Method

To meet the objectives of this study, a mixed-methods approach was adopted, combining the characteristics of both qualitative and quantitative methods. The qualitative method focuses on gathering information and describing experiences through words and images to uncover deeper meaning, while the quantitative method focuses on measuring and analyzing information using numerical data (Gelo, Braakmann, & Benetka, 2008). Together, these approaches form the basis of a mixed-methods design that provides deeper comprehension of the research problem.

According to Creswell and Plano Clark (2011, p. 5), mixed-methods research involves

> collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches, in combination, provides a better understanding of research problems than either approach alone.

Tashakkori and Creswell (2007) similarly define mixed methods as a research approach in which researchers integrate both qualitative and quantitative data in a single study to ensure that findings are supported by both statistical evidence and personal experience. Understanding mixed methods as an approach explains its widespread use in educational research. According to Dawadi, Shrestha, and Giri (2021), combining two methods can be superior to a single approach, as it provides rich insights into the research phenomena that cannot be fully understood by using only qualitative or quantitative methods.

This method was selected because it allows the researchers to take advantage of the complementary strengths of both strands: the quantitative component yields measurable, statistically interpretable findings, while the qualitative component adds depth and nuance to the numbers. Mixed-methods designs are especially appropriate for educational research, as Dörnyei (2007, p. 45) argues, because language learning is a multifaceted human process that cannot be fully understood through numerical data alone.

Specifically, this study follows a convergent parallel design, one of the most widely used mixed-methods frameworks. Creswell and Plano Clark (2011, p. 77) describe the convergent parallel design as a process in which the researcher collects both quantitative and qualitative data simultaneously, analyzes them independently, and then merges the two sets of results during the final interpretation. In this study, quantitative data from the students' questionnaire provides

measurable information about ICT use frequency, application preferences, and perceived vocabulary impact, while qualitative data from the teachers' interview adds pedagogical depth. Merging these two sources allows the researchers to cross-check findings and identify convergence or divergence, which strengthens the overall validity of the conclusions.

2.2.1 Case Study

For the purposes of this study, the case is defined as the first-year EFL student cohort enrolled at the University of Akli Mouhand Oulhadj, Bouira, during the academic year 2025/2026. This definition situates the case within a specific institutional and temporal context: a single public Algerian university department, at a precise moment in the students' academic trajectory. Defining the case in this way is consistent with Creswell's (2007, p. 73) requirement that case study research focus on a clearly bounded system, and it ensures that the findings are grounded in the concrete conditions of this particular educational setting rather than in abstract generalizations.

The study is carried out as a case study. A case study is defined by Creswell (2009, p. 13) as "a strategy of inquiry in which the researcher explores in depth a program, event, activity, process, or one or more individuals." A more precise description is provided by Yin (2009, p. 18), who describes a case study as "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context [...]." This approach was chosen for the current study because it enables us to examine ICT-based vocabulary learning within its natural educational context while accounting for the unique institutional, cultural, and linguistic conditions of Bouira University.

One defining feature of the case study approach is its focus on a bounded system, that is, a specific entity with clear boundaries in terms of time, location, and participant group (Creswell, 2007, p. 73). In this study, the bounded system is the first-year EFL student cohort at Bouira University during the academic year 2025/2026. This boundary is meaningful because first-year students represent a critical transitional stage in the Algerian EFL learning trajectory, having just moved from secondary school to university, where vocabulary demands increase significantly.

Stake (1995, p. 3) distinguishes between intrinsic case studies, carried out because the case itself is of interest, and instrumental case studies, where the case is examined to understand something broader. The present study is best described as instrumental: the first-year students at Bouira University are studied not simply for their own sake, but because understanding their ICT practices and vocabulary learning provides insights that can inform EFL instruction at comparable Algerian university departments. As Yin (2009, p. 4) argues, the case study method "allows investigators to retain the holistic and meaningful characteristics of real-life events [...]," a quality

that is essential for this study given the situated and context-dependent nature of ICT use in language learning.

2.3 The Population and Setting

The population of this study consists of all first-year EFL students enrolled at the Faculty of Letters and Foreign Languages, University of Akli Mouhand Oulhadj, Bouira, during the academic year 2025/2026. The total population comprises approximately seventy-four (74) first-year students. First-year EFL teachers who instruct this student cohort in vocabulary-related modules such as Written Expression, Oral Expression, and linguistics are also included in the study. There are eight (8) first-year EFL teachers in the department.

McMillan and Schumacher (2014, p. 143) define a population as "a group of elements or cases, whether individuals, objects, or events, that conform to specific criteria and to which we intend to generalize the results of the research." In the present study, the population is clearly defined: it is limited to first-year students registered in the English Department during the specified academic year and to the teachers responsible for delivering first-year language modules. This definition ensures that all participants share a common academic context, which is essential for the internal consistency of the study's findings.

The setting is the Department of English at the University of Akli Mouhand Oulhadj, Bouira, located in the Bouira province of north-central Algeria. This institution was selected for several reasons. First, we are affiliated with this department, which facilitated direct access to participants and guaranteed detailed familiarity with the local pedagogical context. Second, no prior study specifically on ICT and vocabulary development has been conducted in this department, making it a significant and original research site. Third, the student population at Bouira University shares the demographic and educational characteristics typical of first-year EFL students at other Algerian public universities, which means that findings from this setting can be transferred, with appropriate caution, to similar institutional contexts across the country.

The English Department at Bouira University offers a three-year license degree program, followed by a two-year master's degree program. First-year license students take a full load of language skills modules, including Written Expression, Oral Expression, Listening Comprehension, and Linguistics. These modules require substantial vocabulary knowledge, and the gap between the vocabulary level that students arrive with from secondary school and the level expected at university is one of the most pressing challenges that teachers in this department face on a daily basis. The context renders the investigation of ICT-based vocabulary tools both timely and particularly relevant.

2.4 The Sample

Given the size of the total population, a sampling procedure was necessary. This study used convenience sampling, a non-probability sampling technique in which participants are selected based on their availability and willingness to participate. Dörnyei (2007, pp. 98-99) acknowledges that convenience sampling is common in educational research because it is practical and efficient, though he cautions that findings should not be generalized beyond the sampled population without care.

Cohen, Manion, and Morrison (2018, pp. 217-218) describe non-probability sampling as appropriate when the goal is not statistical representation but in-depth understanding of a particular group within a specific context. Since the present study is a case study, the aim is not to produce findings that are statistically representative of all Algerian EFL students, but rather to generate detailed, contextualized insights about first-year students in the English department at Bouira University. Convenience sampling is therefore a defensible and appropriate choice for this research design.

2.4.1 The Student Sample

The student sample consists of thirty (30) first-year EFL students at Bouira University. The sample includes twenty-seven (27) female students and three (3) male students, which reflects the predominantly female demographic consistently found in EFL and language departments at Algerian public universities. Participants' ages range from eighteen (18) to thirty-four (34). The case study corresponds to the standard age range for first-year undergraduate students in Algeria. The sample was drawn from different first-year groups within the department to ensure that the data represents the full cohort rather than a single class.

A balance between practicality and data quality is reflected in the selection of thirty participants. At the master's research level, thirty participants is a typical and recognized minimum for mixed-methods case studies because it is both large enough to yield significant quantitative frequencies and percentages and small enough for in-depth qualitative analysis of open-ended responses (Dörnyei, 2007). The quantitative foundation of the study's conclusions in Chapter Three is derived from the data gathered from these thirty students.

2.4.2 The Teacher Sample

The teacher sample consists of six (6) EFL instructors who teach first-year modules in the English Department. Their teaching experience ranges from one (1) to twenty-two (22) years, which ensures that the data reflects perspectives from both early-career and experienced faculty members. Their specializations include linguistics, applied linguistics, didactics and applied languages, literature and civilization, and American literature. This diversity of academic

backgrounds guarantees that the qualitative data from the teachers' interview captures a range of pedagogical viewpoints on ICT use, vocabulary instruction, and the challenges specific to first-year EFL teaching at Bouira University.

Although six teachers is a small number, it is important to note that this figure represents a substantial proportion of the eight first-year EFL teachers in the department. Merriam (1998) emphasizes that in qualitative case study research, the sample size is determined by the specific purpose of the inquiry and the need for informational depth rather than statistical breadth. Each teacher participant brings a distinct set of teaching experiences and professional perspectives, providing a well-rounded picture of how ICT is perceived and used at the departmental level.

2.5 Data Collection Instruments

Both instruments used in this study were self-prepared by us. They were not adapted from pre-existing standardized tests but were designed specifically for this investigation, based on the study's research questions and objectives and on a review of relevant literature on ICT in language learning and vocabulary development. Relevant works consulted during instrument design include Dörnyei (2003) on questionnaire construction and empirical studies on CALL and MALL such as Ghounane (2019), Benrabah and Kameche (2022), and Bouderba (2024), which informed the selection of themes and the formulation of individual items.

Two instruments were used to collect data for this study: a questionnaire administered to first-year EFL students and a semi-structured interview administered to first-year EFL teachers. The choice to use two different instruments, one for each participant group, reflects the mixed-methods design of the study. Quantitative data from the questionnaire captures the breadth of student ICT practices and perceptions across the full sample, while qualitative data from the interview captures the depth of teacher perspectives that numbers alone cannot convey.

According to Dörnyei (2003, pp. 1-8), the questionnaire is one of the most commonly used data collection instruments in second language research and can capture a wide range of information, including self-reported behaviors, attitudes, beliefs, and factual data. The questionnaire is particularly suited to this study because it allows data to be collected efficiently from all thirty student participants simultaneously and provides a standardized format that makes comparison across respondents straightforward. Its anonymous nature also encourages participants to respond honestly, without the social pressure that face-to-face interaction can produce.

2.5.1 Validity and Reliability

Before administering the instruments to the full sample, we took deliberate steps to establish their validity and reliability. "Validity" refers to whether a research instrument actually measures what it claims to measure (Creswell, 2012, p. 159), while "reliability" refers to the

consistency of results when the instrument is used under similar conditions (Cohen, Manion, and Morrison, 2018, p. 268).

To ensure content validity, the questionnaire items were designed to directly reflect the study's three research questions: the frequency and types of ICT application use, students' perceptions of ICT's impact on vocabulary development, and the most commonly used applications for vocabulary purposes. Each section of the questionnaire maps onto one or more of these research questions, ensuring that the instrument covers the full scope of the study's objectives.

Face validity was also established through expert review. The questionnaire and interview guide were reviewed by a senior faculty member in applied linguistics at the English department before the pilot test was conducted. Feedback from this review led to the rewording of three items that were judged to be ambiguous and to the addition of one item that addressed a dimension of ICT use the original draft had overlooked. Reliability was supported through the pilot testing procedure described in Section 2.6, which confirmed that participants understood all items as intended and that the instrument produced consistent, interpretable responses.

2.5.2 The Students' Questionnaire

Taherdoost (2021) describes a questionnaire as a fundamental research instrument consisting of a series of questions designed to gather information from respondents regarding their knowledge, attitudes, and behaviors. In this study, the students' questionnaire was developed to collect quantitative data on ICT use and vocabulary learning among first-year EFL students at Bouira University.

The questionnaire is organized into four sections. The first section is a consent statement that informs participants of the study's purpose, their right to withdraw at any time, and the confidentiality of their responses. This section ensures that participation is fully informed and voluntary. The second section collects demographic information, including age, gender, and participants' self-reported confidence in their current English vocabulary level. It also asks how frequently they encounter unfamiliar words in class, which provides a baseline indicator of vocabulary challenge.

The third section is the most extensive and forms the quantitative core of the instrument. It asks students to report which ICT applications they use for vocabulary purposes, how frequently they use them, and for what specific purposes (such as looking up word meanings, checking pronunciation, practicing through games, or building vocabulary through media). It then uses a five-point Likert scale to measure students' perceptions of the impact of ICT applications on their vocabulary development. The Likert format, which ranges from "Strongly Agree" to "Strongly

Disagree," was chosen because it allows for graduated responses that capture varying degrees of agreement rather than forcing a simple yes/no choice. Dörnyei (2003, pp. 36–37) specifically recommends the five-point Likert scale for attitude and perception research in language learning contexts because it balances sensitivity with simplicity.

The fourth section consists of two open-ended questions. The first asks students to identify the ICT applications they find most useful for vocabulary development and to explain why. The second asks them to describe the challenges they face when using ICT tools for vocabulary learning. These open-ended items were included to capture individual voices and specific experiences that cannot be anticipated in advance and therefore cannot be addressed by closed-ended items alone. The qualitative data produced by these questions enriches and contextualizes the numerical data from the Likert-scale section.

The questionnaire was distributed to students via Google Forms, a choice that aligned with participants' familiarity with digital platforms and allowed for automatic tabulation of quantitative responses. The distribution period ran from February to March 2026, covering approximately two weeks. All thirty student participants completed and submitted the questionnaire within this period. In total, the questionnaire consists of fifteen (15) items distributed across the four sections. The second section contains four closed-ended items covering age, gender, self-reported vocabulary confidence level, and frequency of encountering unknown words in class. The third section contains seven items: one yes/no item asking whether the student uses ICT applications for vocabulary learning, two multiple-choice items asking which applications are used and for what purposes, and four five-point Likert scale items measuring students' perceptions of ICT's impact on their vocabulary learning (specifically on learning volume, retention, motivation, and confidence). The fourth section contains two open-ended items, one asking students to name and justify the applications they find most useful and one asking them to describe the challenges they face when using ICT tools for vocabulary purposes. This structure ensures that the instrument captures both quantifiable patterns and individual learner perspectives.

2.5.3 The Teachers' Interview

In order to collect qualitative data on teachers' perspectives, a semi-structured interview was administered to first-year EFL teachers. Cohen, Manion, and Morrison (2018) describe the semi-structured interview as a flexible approach in which the researcher follows a pre-determined set of themes or questions while allowing the participants the freedom to expand on their answers. This format was chosen because it provides enough structure to ensure that all relevant themes are covered while allowing teachers the flexibility to elaborate on their experiences and express viewpoints that a fully structured questionnaire would not capture.

The interview guide is organized into four sections. The first section collects demographic information, including gender, years of teaching experience, and academic specialty. The second section asks teachers to assess the vocabulary difficulties they observe among first-year students and to explain what they believe causes these difficulties. This section also asks whether teachers consider ICT applications to be an effective support for vocabulary development. The third section investigates whether and how teachers currently integrate ICT tools into their vocabulary teaching. The fourth section invites teachers to propose strategies for more effective ICT integration in vocabulary instruction at the department level.

The teachers' interview was also delivered via Google Forms, using a combination of multiple-choice and open-ended response formats. This approach was chosen for practical reasons: it allowed teachers to complete the instrument in their own time without the need to schedule in-person meetings, which is particularly important given the limited availability of university teaching staff during the academic term. Follow-up contact was made with all six participating teachers to ensure full completion of the instrument. All teacher responses were collected within the same two-week period as the student questionnaire.

It is important to clarify a terminological point regarding this instrument. Although it is referred to throughout this study as a "semi-structured interview," it was not conducted face-to-face or via audio recording. Instead, it was administered remotely through Google Forms, using a combination of open-ended and multiple-choice response formats. This approach was adopted for practical reasons related to time constraints and teacher availability. We acknowledge that this format differs from a conventional interview in that it does not allow for immediate follow-up questions or real-time probing of responses. This limitation is addressed in Section 2.10 of this chapter.

2.6 Pilot Testing

Before the instruments were distributed to the full sample, a pilot test was conducted. Creswell (2012, p. 390) defines a pilot test as "a procedure in which a researcher makes changes in an instrument based on feedback from a small number of individuals who complete and evaluate the instrument." The purpose of piloting is to identify ambiguous or unclear questions, inappropriate response options, and structural problems before the instrument is used with the main sample when revisions are no longer possible.

The pilot test was conducted with five (5) first-year EFL students and two (2) EFL teachers who were not part of the main sample. Participants were asked to complete the instrument and then provide written feedback on the clarity of each question, the appropriateness of the response

options, the adequacy of the instructions, and the overall length and structure of the questionnaire. Their feedback was collected through a short follow-up form attached to the end of the instrument.

The pilot testing process resulted in many revisions. First, three questionnaire items were reworded because pilot participants found the original phrasing ambiguous. For example, one item originally asked students to rate how "technology affects your vocabulary," which pilot participants found too vague. It was revised to ask specifically how "ICT-based applications help you learn more vocabulary words." Second, two items that addressed overlapping content were merged into a single question to reduce redundancy and shorten the completion time. Third, the order of sections was adjusted so that the demographic section came before the ICT use section, which pilots confirmed felt more natural and logical. These revisions strengthened the instrument's clarity and ensured that all participants interpreted the questions as intended.

According to van Teijlingen and Hundley (2001), a pilot study is an essential phase in research because it can uncover flaws in the design of a proposed procedure or experiment. This makes it an indispensable step in the development of research instruments. The changes made as a result of the pilot test in the present study improved the overall quality of the data subsequently collected from the main sample, and they are reflected in the final version of the instruments presented in the appendices.

2.7 Data Analysis Procedures

Data from the two instruments were analyzed using a combination of quantitative and qualitative methods, in keeping with the convergent parallel mixed-methods design of the study.

2.7.1 Quantitative Analysis

The quantitative data obtained from the closed-ended items of the students' questionnaire were analyzed using descriptive statistics. Google Forms automatically generated frequency counts and percentage distributions for each response option. These results are presented in Chapter Three in the form of tables and figures, with each table accompanied by a written interpretation that links the numerical findings to the study's research questions.

Descriptive statistics were considered appropriate for this study because the goal is to describe and summarize patterns in the data rather than to test hypotheses or establish causal relationships. Cohen, Manion, and Morrison (2018, p. 727) note that descriptive statistics are essential tools when a researcher aims to describe and present data through summary frequencies and percentages. Frequency tables and percentage calculations serve this purpose efficiently and transparently, and they are the standard form of quantitative data presentation in master's-level mixed-methods research in EFL contexts.

2.7.2 Qualitative Analysis

The qualitative data from the open-ended questions in the students' questionnaire and from the teachers' interview were analyzed using thematic analysis. Braun and Clarke (2006, p. 79) define thematic analysis as "a method for identifying, analyzing, and reporting patterns (themes) within data." It is one of the most widely used qualitative analysis methods in applied linguistics and educational research because it is flexible, accessible, and applicable to data collected through a variety of instruments.

The thematic analysis in this study followed the six-phase process described by Braun and Clarke (2006, pp. 87-93): familiarizing with the data by reading all responses multiple times; generating initial codes by systematically labeling features of the data relevant to the research questions; searching for themes by grouping related codes; reviewing themes to ensure they are coherent and distinct; defining and naming themes to capture their essence; and producing the written analysis that reports the themes with supporting data extracts. This process was applied to the open-ended responses from the student questionnaire and to all qualitative responses from the teacher interview.

To ensure trustworthiness in the qualitative strand of analysis, we adopted the strategy of member checking. Creswell (2007) describes this process as a validation technique in which the researcher involves participants in checking the accuracy of the findings and interpretations. In this study, a summary of key themes identified from the interview data was shared with two of the teacher participants, who confirmed that the thematic interpretations accurately reflected their intended meanings. This step strengthens the credibility of the qualitative findings.

Coding was conducted manually. No specialized qualitative data analysis software such as NVivo, ATLAS.ti, or MAXQDA was used. We read through all open-ended responses from the student questionnaire and all written responses from the teacher interview instrument, assigned initial codes to recurring ideas and phrases, and then grouped these codes into broader themes. This process was carried out independently by each of us and then compared to ensure consistency. Disagreements over coding were resolved through discussion until consensus was reached. Manual coding was chosen because the data volume was manageable given the sample size and because it allowed us to maintain close familiarity with the data throughout the analytical process.

2.8 Variables and Their Measurement

Although this study does not test hypotheses in the experimental sense, it is built around clearly defined key concepts that function as measurable variables. Identifying these variables and specifying how they are measured is essential for ensuring transparency in the research design and for establishing a direct link between the instruments and the research questions.

The independent variable in this study is ICT use. It is defined as the frequency and type of ICT-based application use that students engage in for vocabulary learning purposes, outside of or in addition to formal classroom instruction. ICT use is measured through three questionnaire items: a yes/no item confirming whether the student uses ICT applications for vocabulary purposes, a multiple-choice item identifying which specific applications are used, and a frequency scale item measuring how often these tools are used. Together, these items provide a descriptive profile of each student's digital vocabulary learning habits.

The dependent variable is vocabulary development. In this study, vocabulary development is not measured through an objective vocabulary test but through students' self-reported perceptions of how ICT applications affect their vocabulary learning. It is operationalized through four five-point Likert scale items that measure students' perceived gains in vocabulary volume (learning more words), vocabulary retention (retaining words for longer), engagement (finding learning more interesting), and productive confidence (feeling more confident using new words). We acknowledge that self-reported perception is not a direct measure of vocabulary growth and that the relationship between perceived gain and actual gain requires future validation through objective testing. This limitation is addressed in Section 2.10.

A third key concept is students' perceptions of ICT tools. This is treated as both a dependent variable and a contextual factor. It is measured by the same four Likert scale items described above, as well as by the two open-ended items in Section Four of the questionnaire, which allow students to evaluate specific applications in their own words and to describe the barriers they encounter. Together, these items capture both the degree and the nature of students' attitudes toward digital vocabulary learning. On the teacher side, the interview data provides a qualitative measure of pedagogical perceptions: whether teachers view ICT as an effective support for vocabulary development and to what extent they currently integrate these tools into their instruction. The direct link between these variables and the study's three research questions is as follows: Research Question 1 (extent of impact) is addressed by the vocabulary development variable; Research Question 2 (perceptions) is addressed by the perceptions variable; and Research Question 3 (most commonly used applications) is addressed by the ICT use variable.

2.9 Ethical Considerations

Research ethics refers to the set of principles that guide how researchers conduct their studies with human participants, with the aim of protecting participants from harm and ensuring the integrity of the research process (Cohen, Manion, & Morrison, 2018). The present study adhered to all relevant ethical principles throughout the data collection and analysis phases. This

involved ensuring that the first-year EFL students and teachers at Bouira University were fully informed of the study's purpose and that their participation remained voluntary and confidential.

Informed consent was obtained from all participants before data collection began. Both students and teachers received a clear written explanation of the study's purpose, the procedures involved, the nature of the data being collected, and their right to withdraw at any time without any negative consequences for their academic or professional standing. Participation was entirely voluntary. No student or teacher was pressured or motivated to participate.

Confidentiality and anonymity were maintained throughout the study. The questionnaire and interview instrument did not require participants to provide their names or any identifying information beyond basic demographic data (age, gender, and years of experience). The data collected is stored securely and accessed only by us. It will not be shared with third parties, will not be used for any purpose other than this study, and will be deleted after the research is complete. Participants were informed of all these measures in the consent statement at the beginning of the instrument.

Since this study involved university students, we also took care to ensure that the questionnaire content was appropriate, respectful, and free from any potentially sensitive or distressing material. The questions focused exclusively on participants' use of educational technology and their perceptions of vocabulary learning, topics that carry no significant risk of psychological harm. No deception was involved at any stage of the study, and participants were given the opportunity to ask questions before completing the instrument.

2.10 Scope and Limitations

Every research study has a defined scope and a set of limitations that affect how its findings should be interpreted. Acknowledging these limitations honestly is itself a marker of rigorous scholarship, as it allows readers to evaluate the extent to which the results are transferable to other contexts.

The present study is scoped to first-year EFL students and teachers at Bouira University during the academic year 2025/2026. It does not examine second- or third-year students, students at other faculties of the same university, or EFL learners at other Algerian universities. Findings, therefore, reflect the specific conditions of this student population at this particular point in their academic journey and should not be extended uncritically to other years or institutions.

The most significant limitation of this study is the small sample size. With thirty student participants and six teacher participants, the study cannot produce statistically representative data. The results reflect the experiences and perceptions of this specific group and are intended to generate insights for future research rather than to establish universal conclusions. Dörnyei (2007,

pp. 99-100) acknowledges that while small samples are appropriate for case study research in applied linguistics, the findings from such studies are not intended for broad generalization to the wider population.

A second limitation is the reliance on self-reported data. Both the questionnaire and the interview ask participants to report on their own ICT use, perceptions, and vocabulary practices. Self-reported data is inherently subject to social desirability bias, as participants may respond in ways they believe are expected rather than in ways that accurately reflect their actual behavior. Creswell (2012) noted that self-report measures involve collecting data based on individuals' own perceptions, which may not always correspond directly to their observable actions. Future studies could complement these perceptions with direct observation of ICT use or with objective vocabulary tests to measure actual gains.

A third limitation relates to the cross-sectional design. Because data was collected at a single point in time, this study cannot track changes in vocabulary development over the course of a full academic year or examine whether the perceived benefits of ICT use are sustained over time. A longitudinal study that follows the same group of students across multiple semesters would provide a richer picture of the long-term impact of ICT applications on vocabulary learning.

A fourth limitation is the potential for researcher bias. We are affiliated with the same institution as the participants, which facilitated access but may have influenced how participants responded, since they know us personally. This familiarity may have led some participants to respond more favorably than they would have with an external researcher. The anonymous design of the instruments was intended to mitigate this risk, but it cannot eliminate it entirely.

A fifth and final limitation concerns the data collection instrument used for the teacher participants. Due to teachers' unavailability and time constraints during the data collection period, it was not possible to conduct face-to-face interviews. As a result, we used Google Forms as an alternative, delivering the interview guide as an asynchronous written instrument. Although this is referred to as a semi-structured interview throughout the study, we acknowledge that it differs from a conventional face-to-face interview in several important respects. It does not allow for immediate follow-up questions, real-time probing of ambiguous responses, or the use of non-verbal cues to guide the interaction. As a result, the depth of qualitative data obtained from teachers is more limited than a live interview would typically produce. Future research in this context should consider conducting oral interviews when teacher availability permits to allow for richer and more responsive data. Despite this limitation, the Google Forms instrument was sufficient to capture the main pedagogical perspectives needed to address the research questions of this study, and its findings are interpreted with this constraint in mind.

Conclusion

This chapter described the complete methodological framework of the present study. It explained the choice of a case study design with a cross-sectional time frame, justified the adoption of a convergent parallel mixed-methods approach, and described the population, setting, and sampling technique. It presented the two data collection instruments in detail, addressed their validity and reliability, and explained the pilot testing procedure that preceded their use. The quantitative and qualitative data analysis procedures were outlined, ethical considerations were addressed, and the study's scope and limitations were honestly identified.

Every methodological decision made in this study, from the choice of convenience sampling to the use of thematic analysis, was made with the goal of producing findings that are as accurate, nuanced, and locally meaningful as possible within the constraints of a master's-level research project. The following chapter presents and discusses the findings produced by these procedures, drawing on data from both the students' questionnaire and the teachers' interview to address the three research questions of this study.

Chapter Three: Data Analysis and Discussion

Introduction

This chapter presents and interprets the data collected through the two instruments described in Chapter Two: a questionnaire administered to thirty (30) first-year EFL students and an interview instrument administered to six (6) EFL teachers out of a total population of eight (8) first-year teachers at the Department of English, University of Akli Mouhand Oulhadj, Bouira. The chapter is organized into three main sections. Section 3.1 presents the results of the students' questionnaire, proceeding section by section. Section 3.2 presents the results of the teachers' interview. Section 3.3 provides a cross-reading of the two data sets, discussing similarities, differences, and the overall picture they produce in relation to the three research questions of this study. Each result is followed by an interpretation that explains what the data indicates rather than simply describing the numbers.

3.1 Results of the Students' Questionnaire

3.1.1 Section One: Demographic Information

Question 1: *Gender*

Gender	Number of Participants	Percentage
Female	27	90%
Male	3	10%
Total	30	100%

Table 1: *Distribution of Participants by Gender*

As Table 1 shows, twenty-seven (27) of the thirty participants are female, representing 90% of the sample, while three (3) are male, accounting for 10%. This distribution may reflect the commonly reported predominance of female students in English departments. This demographic reality is consistent with what has been observed nationally and does not represent a sampling bias specific to Bouira University.

Question 2*: Age*

Age	Number of Participants	Percentage
18	14	46.7%
19	11	36.7%
20	3	10%
Above 20	2	6.6%
Total	30	100%

Table 2: *Distribution of Participants by Age*

Table 2 shows that the large majority of participants are between eighteen (18) and nineteen (19) years old. Fourteen students (46.7%) are eighteen, and eleven (36.7%) are nineteen. Three students (10%) are twenty, and two (6.6%) are above twenty, with the oldest participant being thirty-four. This age distribution confirms that the sample is largely composed of standard-entry first-year students, which is the primary population of interest for this study.

Question 3: *Self-Reported Vocabulary Confidence*

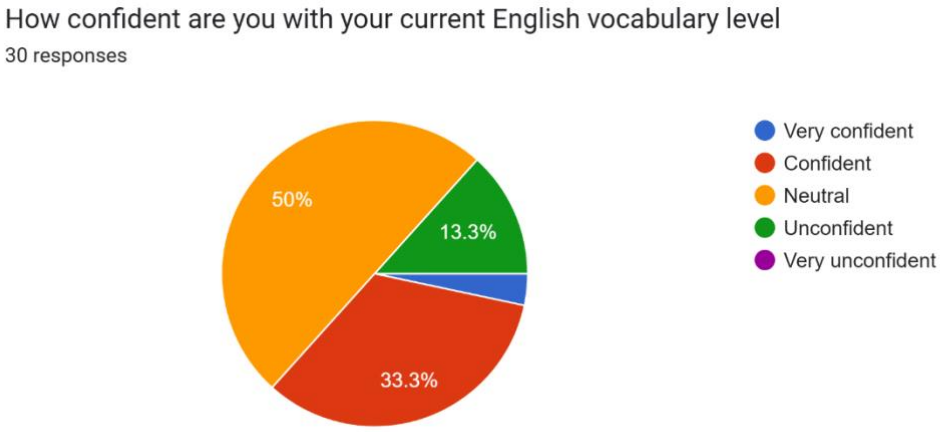

Figure 3: *Students' Self-Reported Vocabulary Confidence Level*

Figure 3 reveals that half of the participants (50%) describe their vocabulary confidence as neutral, meaning they neither feel secure nor particularly lacking in their lexical knowledge. Thirty-three percent (33.3%) consider themselves confident, and one student (3.3%) reports being very confident. In contrast, four students (13.3%) describe themselves as unconfident. The dominant neutral position, combined with the 13.3% who feel unconfident, indicates that a significant proportion of first-year students arrive at the university level with a degree of uncertainty about their vocabulary competence. This finding directly supports the rationale underlying the study: This may suggest that students could turn to supplementary resources, and ICT applications represent one of the most accessible options available to them. Nation (2022) argues that the transition from receptive recognition to confident productive use represents one of the most challenging stages of lexical development; a student who cannot confidently deploy a word in context has not yet completed the learning process, regardless of whether they can recognize it. The widespread neutral self-positioning observed here suggests that most participants occupy precisely this intermediate zone: they possess a partial lexical repertoire that is insufficient for confident academic production, a finding that directly motivates their reported reliance on ICT tools as supplementary support.

Question 4: *Frequency of Encountering Unknown Words in Class*

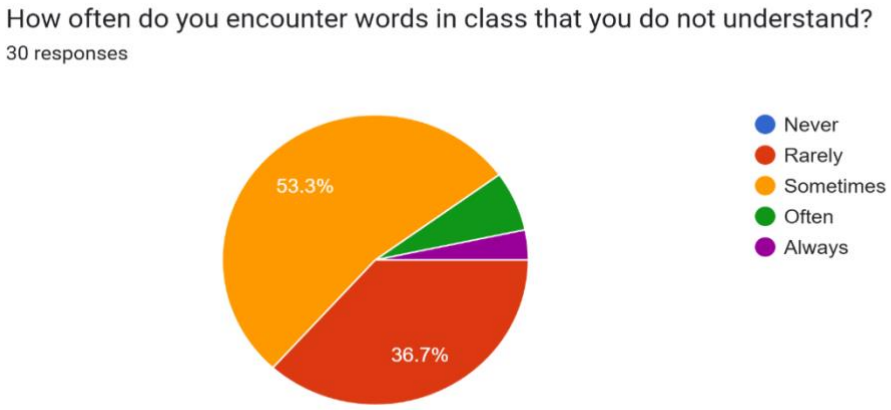

Figure 4: *Frequency of Encountering Unknown Words in Class*

More than half of the participants (53.3%) report encountering unknown words in class sometimes, and 6.7% report this happening often or always. Taken together, 63.3% of students encounter unfamiliar vocabulary in class at least sometimes. While 36.7% say this happens rarely, the overall picture confirms that vocabulary challenges are a persistent, if not constant, feature of first-year EFL instruction at Bouira University. This establishes the practical relevance of ICT vocabulary tools as a support resource outside of class hours.

3.1.2 Section Two: ICT Use for Vocabulary Learning

Question 5: *Do you use ICT-based applications to help you learn English vocabulary?*

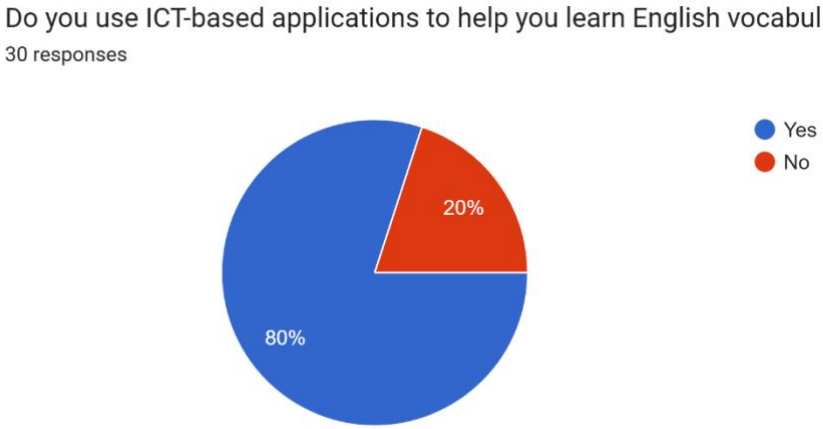

Figure 5: *Use of ICT Applications for Vocabulary Learning*

As Figure 5 shows, eighty percent (80%) of student participants report using ICT-based applications to support their vocabulary learning. Only six students (20%) indicate that they do not use digital tools for this purpose. This high adoption rate confirms that the use of ICT applications for vocabulary development is already a widespread practice among first-year

students at Bouira University, regardless of whether it is encouraged or guided by their teachers. The finding justifies the central focus of this study on digital tools as a genuine feature of students' vocabulary learning behavior.

Question 6: *Which ICT-based applications do you use for vocabulary learning?*

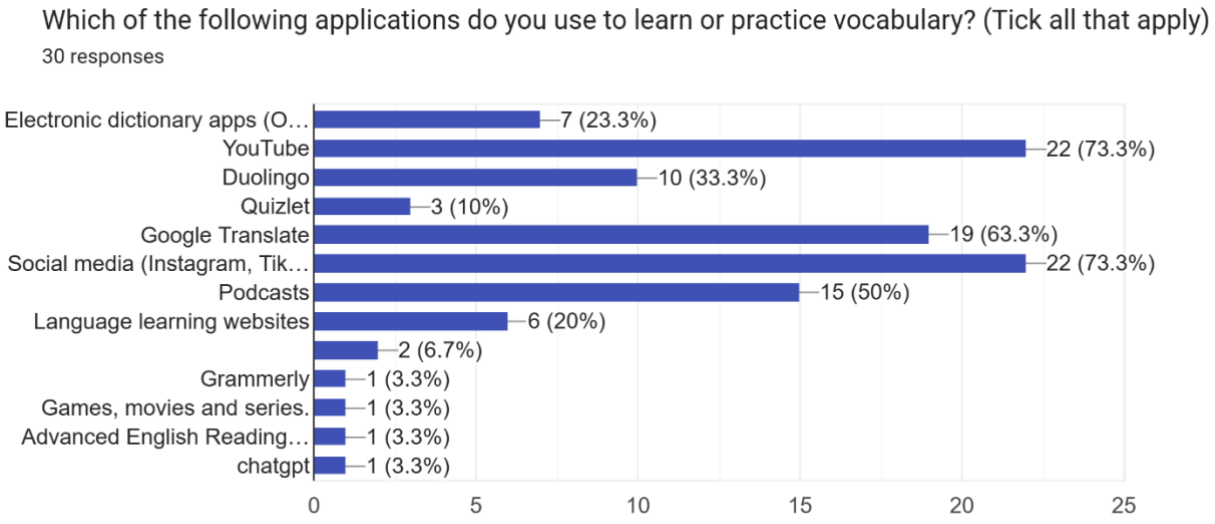

Figure 6: *ICT Applications Used for Vocabulary Learning*

Figure 6 reveals the specific digital tools students use. YouTube and social media platforms such as Instagram and TikTok are the most widely used, each reported by twenty-two students (73.3%), followed by Google Translate (63.3%) and podcasts (50%). These four tools share a common characteristic: they are primarily content consumption platforms rather than dedicated vocabulary instruction tools. Students use them to encounter English in authentic, informal contexts, which suggests that incidental vocabulary learning through real-world digital content is the dominant mode of ICT-supported vocabulary acquisition at the student level.

Dedicated language learning applications appear less frequently. Duolingo is used by ten students (33.3%), electronic dictionary applications by seven (23.3%), language learning websites by six (20%), and Quizlet by only three students (10%). A small number of students also mentioned AI tools such as ChatGPT. This distribution indicates that while structured vocabulary learning applications exist and are used by some students, the majority of digital vocabulary engagement happens through general-purpose platforms. This gap between incidental and deliberate digital vocabulary practice is an important finding to carry into the discussion section.

Question 7: *How often do you use ICT applications for vocabulary learning?*

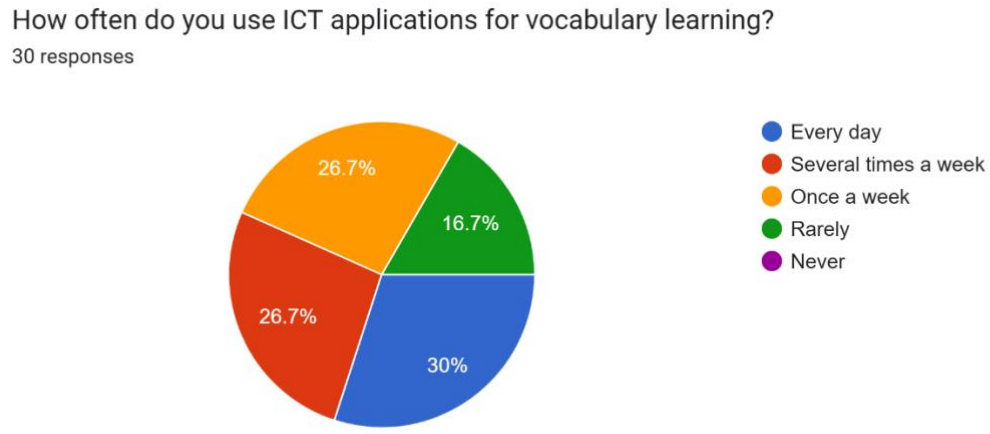

Figure 7: *Frequency of ICT Application Use for Vocabulary Learning*

Figure 7 shows that nine students (30%) use ICT applications for vocabulary purposes every day, and eight (26.7%) do so several times a week. Combining these two categories, over half of the sample (56.7%) engages with digital vocabulary tools on a near-daily basis. A further eight students (26.7%) use them once a week, and five (16.7%) do so rarely. No student reports never using these tools, which is consistent with the 80% adoption rate found in question 5. The frequency data suggests that for most students who use ICT tools, this engagement is fairly regular rather than occasional, which increases the potential for these tools to have a meaningful cumulative effect on vocabulary development.

Question 8: *For what purposes do you mainly use ICT applications for vocabulary?*

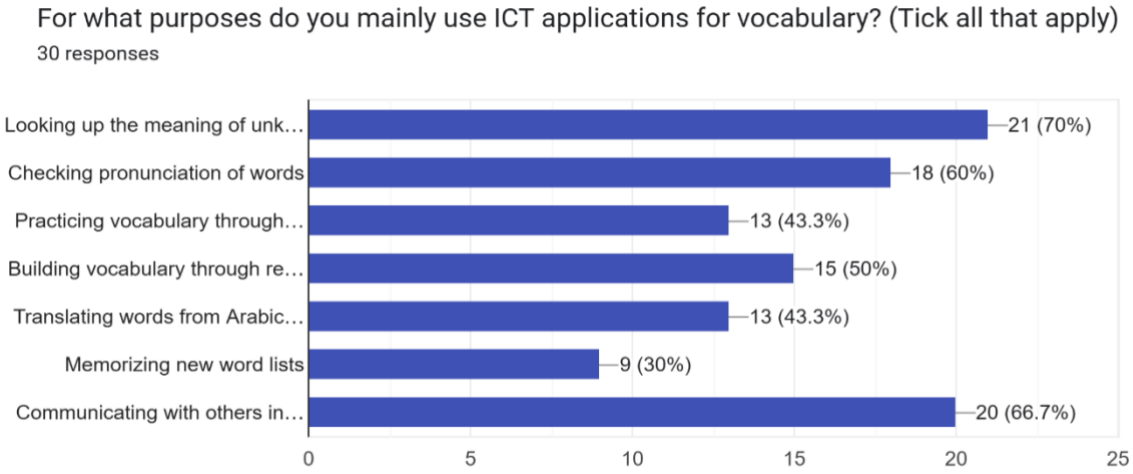

Figure 8: *Purposes of ICT Application Use Related to Vocabulary*

Figure 8 shows that the most common purpose for which students use ICT tools is looking up word meanings (70%), followed by communicating with others in English (66.7%) and checking pronunciation (60%). These are largely receptive activities: students are primarily using digital tools to decode and understand language rather than to produce it. This indicates a predominance of receptive vocabulary processing, which may limit the development of productive lexical competence, a key issue highlighted in communicative language teaching, rather than producing it. Building vocabulary through content (50%) and practicing through games or exercises (43.3%) come next. Translation from Arabic or French is reported by 43.3% of students, indicating that a substantial minority still rely on their first language as a primary mediation strategy. Memorizing word lists is the least common purpose (30%).

The overall pattern suggests that ICT use for vocabulary purposes is heavily oriented toward receptive knowledge and immediate comprehension needs. Students turn to these tools most frequently when they encounter an unknown word and need to understand it, rather than when they want to systematically expand their vocabulary. This reactive, need-driven pattern of use has implications for the depth of vocabulary knowledge that students are likely to develop and is discussed further in Section 3.3.

3.1.3 Section Three: Perceptions of ICT's Impact on Vocabulary Development

Questions 9 to 12 used a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree," with the additional item in Question 13 measuring perceptions of teacher encouragement.

Question 9: *ICT applications help students learn more vocabulary.*

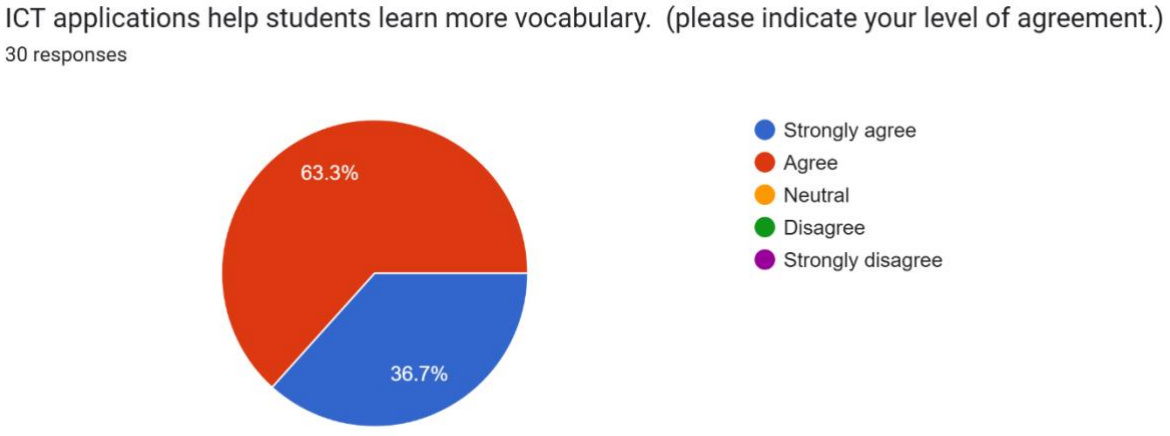

Figure 9: *ICT Applications Help Students Learn More Vocabulary*

The results for this item are unambiguous: all thirty participants (100%) agree or strongly agree that ICT applications help them learn more vocabulary. Not a single student is neutral or disagrees. Eleven students (36.7%) strongly agree, and nineteen (63.3%) agree. While this unanimous agreement appears significant, it may also reflect the limited sample size or response bias in the entire student dataset and provides clear affirmative evidence in response to the first research question. Students perceive ICT-based applications as having a direct positive effect on their vocabulary acquisition.

Question 10: *ICT applications help students retain vocabulary for a longer time.*

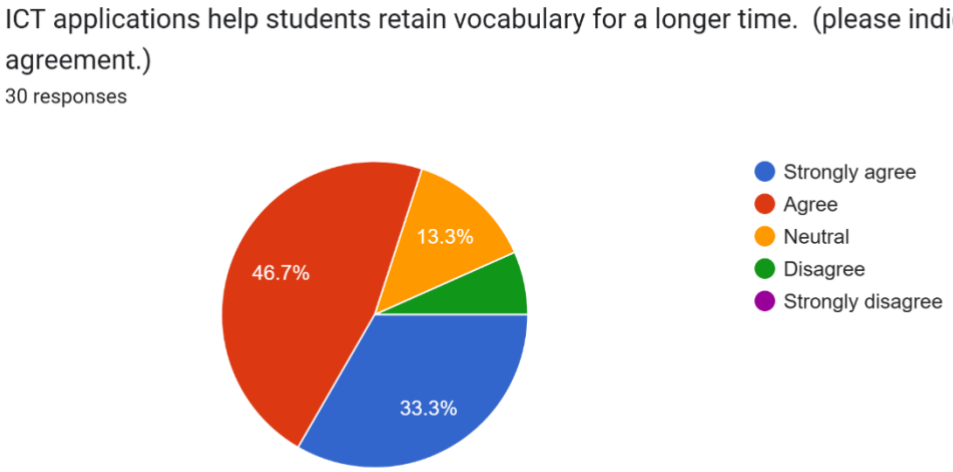

Figure 10: *ICT Applications Help Students Retain Vocabulary for Longer*

Eighty percent of students (80%) agree or strongly agree that ICT applications help them retain vocabulary for a longer time. Four students (13.3%) are neutral, and two (6.7%) disagree. No student strongly disagrees. While the result remains predominantly positive, the four neutral and two disagreeing responses suggest that retention benefits are not consistently perceived. This is consistent with open-ended responses discussed in Section 3.1.4, where some students report forgetting new words quickly even when using digital tools. The gap between acquisition and long-term retention is a recognized challenge in vocabulary learning that ICT tools address to varying degrees depending on the specific application and the frequency of use.

Question 11: *ICT applications make vocabulary learning more interesting.*

Response	Frequency	Percentage
Strongly Agree	10	33.3%
Agree	15	50%
Neutral	5	16.7%

Disagree	0	0%
Strongly Disagree	0	0%
Total	30	100%

Table 3: *ICT Applications Make Vocabulary Learning More Interesting*

Eighty-three percent (83.3%) of students agree or strongly agree that ICT tools make vocabulary learning more interesting, with ten strongly agreeing (33.3%) and fifteen agreeing (50%). Five students (16.7%) are neutral, and no one disagrees. The motivational dimension of ICT use for vocabulary is therefore strongly endorsed by the sample. This is particularly significant in the Algerian EFL context, where vocabulary learning through traditional drills and repetition has long been associated with low engagement. The fact that digital tools increase the perceived interest in vocabulary work suggests that they address one of the key barriers to consistent vocabulary practice.

Question 12: *I feel more confident using new vocabulary after practicing through ICT applications.*

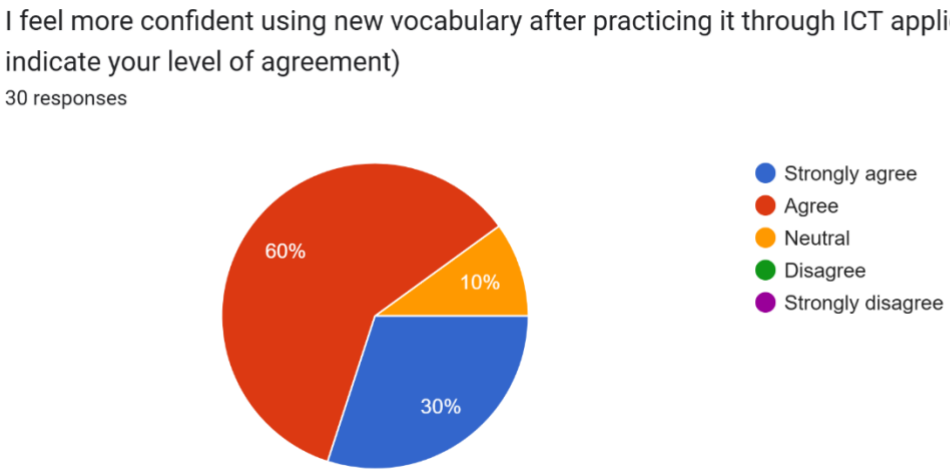

Figure 11: *Increased Confidence in Using Vocabulary after ICT Practice*

Ninety percent of students (90%) agree or strongly agree that they feel more confident using new vocabulary after practicing it through ICT applications. Three students (10%) are neutral, and no student disagrees or strongly disagrees. Confidence in vocabulary use is closely associated with the transition from receptive to productive knowledge: a student who feels confident is more likely to attempt to use new words in speaking and writing rather than relying on circumlocution or avoidance. The very high agreement rate on this item indicates that ICT tools are perceived as contributing not only to vocabulary learning in the abstract but also to the student's ability to actively deploy new vocabulary.

Question 13: *My teachers encourage the use of ICT applications for vocabulary learning.*

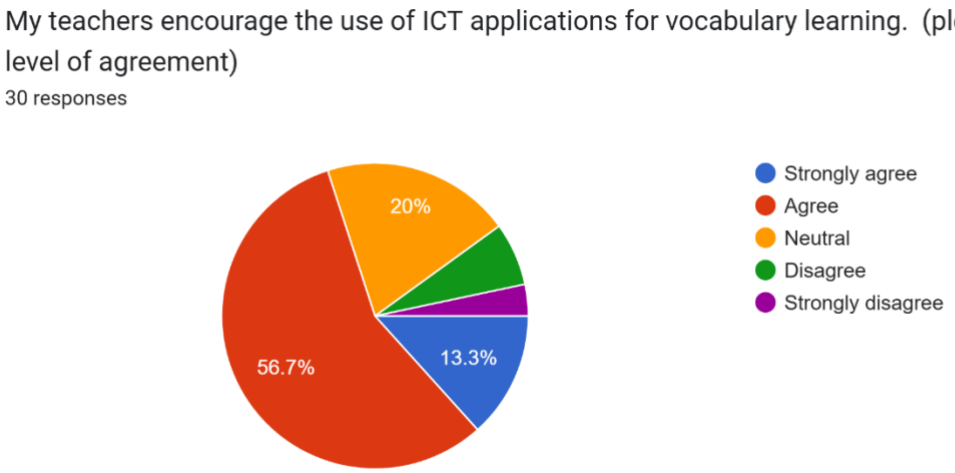

Figure 12: *Teacher Encouragement of ICT Use for Vocabulary Learning*

Figure 12 shows a less unanimous picture than the previous Likert items. Seventy percent (70%) of students agree or strongly agree that their teachers encourage the use of ICT applications, while 20% are neutral and 10% disagree or strongly disagree. Although the majority endorses teacher encouragement, the level of agreement is noticeably lower than on all other perception items, where at least 80% agreed. The 20% neutral and 10% disagreeing suggest that a substantial minority of students do not perceive their teachers as actively promoting digital vocabulary tools. This finding is directly relevant to the third research question and will be examined in relation to teacher responses in Section 3.3.

3.1.4 Section Four: Open-ended Questions

Question 14: *Most useful ICT applications for vocabulary development and reasons*

Participants were asked to name the applications they find most useful for vocabulary development and to explain their choice. A thematic analysis of student responses to this question, conducted following the six-phase process described by Braun and Clarke (2006), produced three distinct themes that correspond to qualitatively different modes of ICT-based vocabulary engagement. These themes are labeled and analyzed below.

The first and most frequently mentioned category is gamified language learning applications. Duolingo is the most cited tool across all responses, praised repeatedly for its use of repetition and spaced practice. Multiple students also mention Quizlet, valued for its digital flashcards, self-testing features, and games. Students consistently link these tools to the benefit of encountering words multiple times and the motivating effect of game mechanics. Representative

student comments indicate that these tools help them retain words because the app repeats words until they are memorized.

The second category is content and multimedia platforms. YouTube appears frequently, with students explaining that it presents vocabulary in real-life contexts, combines visual and audio input, and keeps them engaged through authentic and varied content. Social media platforms, particularly TikTok and Instagram, are mentioned by a substantial number of students who explain that constant exposure to English content in short, dynamic formats makes vocabulary learning faster and more enjoyable.

The third emerging category is AI-based tools. A smaller but notable group of students mention ChatGPT and DeepSeek as useful tools, explaining that these allow them to ask for word explanations, example sentences, synonyms, and contextual usage in an interactive, conversational format. This pattern reflects the growing integration of AI tools into students' independent learning strategies, even at the first-year level.

Question 15: *Challenges encountered when using ICT applications for vocabulary learning*

Responses to this question converge around four recurring challenges that cut across the entire sample.

Distraction is the most frequently cited challenge. A large number of students describe how the smartphone environment itself works against focused vocabulary learning: notifications from social media applications interrupt study sessions, and it is easy to move from a vocabulary exercise to an unrelated activity. Several students describe using phones for vocabulary practice on Duolingo or Quizlet but being pulled away by incoming messages or social media feeds. This challenge is inherent to the multi-purpose nature of the device’s students use and represents a significant practical obstacle.

Internet connectivity and technical limitations are the second most commonly reported challenge. Students mention slow internet connections, limited mobile data, and in some cases restricted access to certain platforms. These infrastructure constraints are particularly relevant in the Algerian university context, where reliable high-speed internet access is not universally available.

Vocabulary retention is the third challenge. Several students report that they learn new words through apps but forget them quickly, particularly if they are not used in actual communication. This problem points to the difference between recognition in a game-like context and genuine long-term retention and suggests that ICT tools are more effective at initial exposure than at consolidation.

A fourth, less frequently mentioned but analytically important challenge is the quality of information provided by some digital tools. A small number of students note that some applications or websites provide unreliable translations or context-free definitions that do not adequately explain how words should be used. Overdependence on translation tools such as Google Translate is also identified by some students as a challenge, with one student acknowledging the risk of depending too much on translation rather than trying to understand the word from context.

3.2 Results of the Teachers' Interview

Six (6) first-year EFL teachers from the Department of English at Bouira University participated in this study, representing a response rate of 75% from the total first-year teacher population of eight (8). All six participants are female. Their teaching experience ranges widely, from one (1) year to twenty-two (22) years, providing a range of early-career and experienced professional perspectives. Their academic specializations include linguistics (2 teachers), applied linguistics (1), didactics and applied languages (1), American literature (1), and literature and civilization (1).

3.2.1 Teachers' Views on the Vocabulary Gap

Question 1: *How significant is the vocabulary gap among first-year EFL students at Bouira University?*

Response	Number of Teachers	Percentage
Significant	5	83.3%
Moderately significant	1	16.7%
Total	6	100%

Table 4: *Teachers' Assessment of the Vocabulary Gap*

All six participating teachers acknowledge the existence of a vocabulary gap among first-year students. Five (83.3%) describe it as significant, and one (16.7%) as moderately significant. No teacher considers the gap minor or non-existent. This unanimity among teachers who collectively cover a wide range of experience and specialization lends credibility to the assessment: the vocabulary gap is not a perception confined to one disciplinary perspective or career stage. It is a classroom reality reported by teachers regardless of whether they teach writing, literature, linguistics, or language skills.

Question 2: *What are the main vocabulary difficulties you observe?*

Teachers' open-ended responses to this question reveal a consistent set of difficulties across all six participants. Limited vocabulary size is the most universally reported problem: all six teachers note that students simply do not know enough words to operate effectively at the

university level. Several teachers observe that students arrive with a passive vocabulary that is too small even for comprehending basic academic texts.

Over-reliance on translation from the first language is the second most prominent difficulty. Teachers across different specializations report that students default to Arabic or French when processing unknown vocabulary, a behavior that slows comprehension and undermines the development of direct lexical associations in English. One teacher specifically uses the term "L1 interference," while others describe it as students translating from their mother tongue rather than attempting to interpret meaning from context.

Vocabulary retention difficulties are highlighted by several teachers. Students may learn words in class but struggle to recall them shortly afterwards, particularly during speaking or writing tasks. A teacher with a linguistics background describes this as difficulty recalling words when speaking or writing, noting that students can often recognize words in reading but fail to retrieve them productively. This gap between receptive and productive vocabulary is a central diagnostic observation across the teacher responses.

Additional vocabulary difficulties mentioned include spelling and pronunciation errors, collocation mistakes, wrong word use in context, poor understanding of idiomatic expressions, and a weak grasp of word meaning nuances, particularly for abstract terms. One teacher from a specialized content module noted that students struggle with discipline-specific terminology because their secondary school exposure was limited and lacked variety. Together, these teacher observations provide a detailed portrait of the vocabulary deficits that motivate the investigation of ICT as a supplementary learning tool.

3.2.2 Teachers' Views on ICT and Vocabulary Development

Question 3: *Do you believe ICT-based applications can effectively support vocabulary development?*

Response	Number of Teachers	Percentage
Yes, definitely.	4	66.7%
Yes, to some extent.	2	33.3%
No	0	0%
Total	6	100%

Table 5: *Teachers' Beliefs Regarding ICT's Potential for Vocabulary Support*

All six teachers hold a positive view of ICT's potential to support vocabulary development. Four (66.7%) believe ICT-based applications can definitely support vocabulary learning, and two (33.3%) hold this view to some extent. No teacher expresses doubt or a negative assessment. However, the distinction between 'definitely' and 'to some extent' is analytically significant. The

two teachers who qualify their endorsement suggest an awareness that ICT effectiveness is conditional: one noted that improvement is limited if students do not use vocabulary in real communication, and another emphasized that the benefit is realized only when tools are well used. These qualified responses indicate that the experienced teachers in this sample understand ICT as a tool whose value depends on how it is integrated, not as an automatic solution.

Question 4: *From your experience, have ICT-based applications improved students' vocabulary acquisition?*

All six teachers provide affirmative answers to this question. Their explanations center on three shared arguments. First, ICT tools capture students' attention: teachers note that the current generation of learners responds more readily to visual, interactive, and audio-rich content than to traditional text-based instruction and that this heightened attention translates into better word acquisition. Second, ICT provides variety and flexibility: multiple teachers note that digital platforms can present the same vocabulary through different formats and exercises in a short amount of time, addressing different learning styles and keeping learners engaged. Third, ICT enables learning outside the classroom: several teachers highlight that digital tools extend vocabulary practice beyond the two or three hours of formal instruction per week, which is the primary channel through which ICT genuinely supplements classroom teaching.

One important nuance in the teacher responses is the condition attached to effectiveness. Two teachers explicitly note that ICT-based improvement is contingent on purposeful use. Students who passively scroll through content or use tools only for quick translation are unlikely to benefit as much as those who engage interactively and apply new vocabulary in communication tasks. This perspective from practicing teachers aligns with what the student data reveals about the predominantly receptive and reactive nature of most students' ICT vocabulary practices.

Question 5: *Which ICT-based applications do you consider most appropriate for first-year vocabulary development?*

Duolingo is the application most consistently recommended by teachers, mentioned by four of the six participants. Teachers describe it as practical and motivating, particularly for beginners, because it uses games, short lessons, and repetition to build basic vocabulary. One teacher noted that her students consider it practical and motivating, which reflects the alignment between teacher recommendations and student usage patterns found earlier.

YouTube is recommended by one teacher specifically for its combination of visual and contextual input. Another teacher endorses Quizlet as a flashcard and self-testing platform. One teacher with a focus on didactics and applied languages moves beyond conventional vocabulary apps and recommends AI-based tools such as ChatGPT, Gemini, and Perplexity, arguing that their

conversational interface allows students to explore word meanings, request corrections, and practice vocabulary in a dialogic format. One teacher emphasizes MALL applications generally, arguing that their portability makes them more practical than fixed computer-based tools for the student population.

Notably, one teacher acknowledges limited familiarity with specific ICT vocabulary tools, indicating that not all teachers possess equal digital literacy when it comes to language learning applications. This observation has direct implications for teacher training priorities at the departmental level.

3.2.3 Teachers' Current Integration of ICT Tools

Question 6: *Do you currently integrate ICT-based vocabulary tools into your teaching?*

Response	Number of Teachers	Percentage
Yes, occasionally.	4	66.7%
Rarely	1	16.7%
No	1	16.7%
Total	6	100%

Table 6: *Teachers' Current Integration of ICT Tools in Vocabulary Teaching*

Table 6 reveals that while all six teachers hold positive views of ICT for vocabulary learning, their actual integration of these tools varies considerably. Four teachers (66.7%) integrate ICT tools occasionally, one (16.7%) does so rarely, and one (16.7%) does not use them at all. No teacher reports regular or systematic integration. This gap between belief and practice is one of the most significant findings in the teacher data. Despite unanimous confidence in the value of ICT, not a single teacher describes its use as a regular, structured feature of their vocabulary instruction. The reasons for this gap are explored in the next question.

Question 7: *What obstacles prevent fuller integration of ICT applications?*

Teachers' responses to this question identify a consistent set of structural and contextual obstacles that collectively explain the gap between positive attitudes and limited practice.

Time constraints appear in the majority of responses. Teachers describe both the limited contact hours available for each module and the time required to prepare ICT-based materials as significant barriers. One teacher noted that preparing digital vocabulary resources such as flashcards and quizzes is time-consuming, while another identifies that having too many lectures to conduct within a semester leaves little room for ICT integration.

Technical and infrastructural limitations are the second major obstacle category. Multiple teachers cite slow or unreliable internet connectivity, students' limited access to personal devices,

and the absence of language laboratories as barriers to implementing ICT-based activities in class. These are not individual teacher failings but institutional resource constraints.

Lack of teacher training is mentioned by two teachers, who indicate that professional development in the use of digital vocabulary tools has been insufficient. One teacher explicitly noted a lack of training as a barrier alongside limited device access.

Students' lack of motivation and the heterogeneity of vocabulary ability within a single class are also cited. One teacher describes the challenge of addressing a class where vocabulary levels are highly uneven: some students have rich vocabulary, others not, creating a situation where any single ICT strategy may not serve the full group effectively.

One teacher provides a notably different response, stating that vocabulary can be taught explicitly without necessarily incorporating ICT and that she recommends tools to students rather than using them in class herself. This response reflects a deliberate pedagogical position rather than a technical or structural barrier and points to the role of teacher conviction in shaping ICT integration alongside the practical obstacles described above.

Question 8: *What strategies do you suggest for more effective ICT integration?*

Teachers' recommendations converge around several practical and institutional strategies. The most frequently suggested approach is blended learning: combining face-to-face classroom vocabulary instruction with ICT-based tasks assigned for home practice. Two teachers explicitly describe this model, with one recommending that students complete small online vocabulary tasks at home that reinforce what was introduced in class.

Teacher training is the second most prominent recommendation. Multiple teachers suggest that faculty need professional development in how to select, evaluate, and implement ICT vocabulary tools before integration can be meaningful. One teacher noted that teachers should assess the quality of different tools before implementing them.

Other recommendations include level-based differentiation of groups to allow more targeted ICT instruction, the creation by each teacher of discipline-specific digital vocabulary content such as flashcards and short video explanations aligned with course modules, encouraging students to use new words actively in speaking and writing rather than passively consuming word lists, and using vocabulary competitions and games to motivate students. One teacher specifically recommends mind-mapping activities that combine ICT with collaborative vocabulary work.

Infrastructure improvement is recommended by one teacher, who argues that better internet access and adequate equipment are prerequisites for effective ICT integration. This recommendation points to institutional responsibility rather than individual teacher practice.

3.3 Discussion of Findings

This section brings together the student and teacher data to produce an integrated interpretation of the findings in relation to the study's three research questions.

3.3.1 Research Question 1: To What Extent Do ICT-Based Applications Impact First-Year EFL Students' Vocabulary Development?

The student data provides strong evidence that ICT-based applications are perceived as having a positive impact on vocabulary development. The most striking finding is that all thirty students (100%) agree that ICT tools help them learn more vocabulary, making this the only question in the dataset to achieve unanimous agreement. Ninety percent agree that they feel more confident using new vocabulary after ICT practice, and 83.3% find ICT learning more interesting. Eighty percent report benefits for retention, though the modest number of neutral and disagreeing responses on this item indicates that retention benefits are not universally experienced.

The teacher data reinforces this picture from a pedagogical perspective. All six teachers confirm that ICT tools have in their experience contributed to vocabulary improvement, and all endorse the potential of these tools. The two teachers who qualify their endorsement do so in terms of conditions rather than doubt: they observe that benefits are realized when tools are used purposefully and when new vocabulary is applied in real communication, not merely encountered in a game or exercise. This qualified professional perspective is important because it points beyond simple positive attitudes toward a more nuanced account of when and how ICT tools produce vocabulary gains.

Together, both data sets indicate that ICT-based applications have a meaningful positive impact on vocabulary development as perceived by both learners and their teachers. The impact is strongest on motivation and initial acquisition and somewhat more variable on long-term retention. This pattern is consistent with the nature of most ICT vocabulary tools, which excel at providing engaging, low-stakes exposure to new words but require complementary real communication practice to move words from short-term recognition into long-term productive use.

3.3.2 Research Question 2: What Are Students' and Teachers' Perceptions Toward ICT-Based Applications for Vocabulary Learning?

Student perceptions are uniformly and strongly positive. Across all five Likert-scale items, agreement levels range from 70% (teacher encouragement) to 100% (learning more vocabulary). No student strongly disagrees on any item. The positive perceptions extend across all dimensions measured: learning volume, retention, motivation, and confidence. Open-ended responses further confirm this pattern, with students consistently identifying specific tools by name and articulating

why they find them effective, suggesting a reflective and reasoned engagement with digital vocabulary learning rather than a superficial enthusiasm.

Teacher perceptions are also positive across all six participants, but with a greater degree of nuance and conditionality. Teachers are aware of the limitations of ICT tools and link their effectiveness to the quality of integration and the degree to which students use vocabulary actively rather than passively. This contrast between students' enthusiastic positive perceptions and teachers' qualified endorsement reflects different positions relative to the learning process: students experience the motivational and immediate acquisition benefits directly, while teachers observe the full learning arc, including the retention challenges and the passive use tendencies that the student open-ended data also reveals.

An important convergence between the two groups is the alignment on Duolingo as the most recognized and valued vocabulary application. Teachers recommend it, and students use it. YouTube and social media are the most used tools by students but receive less specific discussion from teachers, perhaps because teachers are less familiar with how students use these platforms for vocabulary purposes. This partial gap in shared vocabulary between what teachers recommend and what students actually use is a productive area for further pedagogical dialogue.

3.3.3 Research Question 3: What Are the Most Commonly Used ICT Applications for Vocabulary Purposes?

The student data shows clearly that YouTube (73.3%) and social media platforms such as Instagram and TikTok (73.3%) are the most widely used tools, followed by Google Translate (63.3%) and podcasts (50%). These are all general-purpose digital environments rather than dedicated vocabulary learning applications. The most commonly used purpose is looking up word meanings (70%), followed by communication in English (66.7%) and pronunciation checking (60%).

This pattern reveals an important characteristic of student ICT vocabulary practices: the majority of digital vocabulary engagement is incidental and consumption-oriented. Students encounter English vocabulary naturally as part of their everyday digital media use, and they use translation and dictionary tools reactively when they encounter an unknown word. This is fundamentally different from the intentional, structured vocabulary practice that applications like Duolingo and Quizlet are designed to provide, which are used by only 33.3% and 10% of students, respectively.

From a teacher perspective, Duolingo is the most explicitly recommended application, and several teachers additionally mention Quizlet and YouTube. The alignment between teacher recommendations and at least part of student use is present but incomplete. Teachers have limited

visibility into how students use social media and content platforms for vocabulary, and this gap in awareness may partly explain why teacher integration of ICT into vocabulary instruction remains occasional rather than systematic.

3.3.4 The Gap Between ICT Use and Classroom Integration

Perhaps the most consistent and analytically important finding across both data sets is the gap between ICT use and classroom integration. Students report high rates of independent digital vocabulary tool use (80% use ICT for vocabulary, and over 56% do so daily or several times a week), yet teachers report only occasional or rare integration of these tools into their formal vocabulary instruction. Furthermore, only 70% of students perceive their teachers as actively encouraging ICT use, the lowest agreement score on any student perception item.

This gap is not the result of negative attitudes: both students and teachers hold positive views of ICT for vocabulary learning. The teacher data points instead point to structural and contextual explanations: limited class time, inadequate infrastructure, insufficient training, and the time cost of preparing digital materials. These are institutional challenges that individual teacher goodwill cannot resolve on its own.

The implication is that the positive impact of ICT on vocabulary development at Bouira University is currently being realized largely through student initiative rather than through pedagogically structured integration. Students are using digital tools independently and reporting significant benefits, but without teacher guidance on which tools to use and how to use them most effectively. As the open-ended challenge data shows, students also encounter real problems with distraction, inconsistency, and passive engagement when left to manage their digital vocabulary practices without structured support. Addressing this gap is therefore the most actionable recommendation emerging from the combined findings.

Conclusion

This chapter has presented and interpreted the data collected from the thirty student participants and six teacher participants at Bouira University. The student questionnaire data reveals that ICT-based applications are widely used by first-year EFL students, with highly positive perceptions of their impact on vocabulary learning, motivation, and confidence. YouTube, social media platforms, and Google Translate are the most commonly used tools, reflecting a predominantly incidental and receptive pattern of digital vocabulary engagement. The teacher data confirms both the reality of significant vocabulary challenges among first-year students and the potential of ICT tools to address them, while also revealing that formal classroom integration remains limited despite positive teacher attitudes. The most important finding to emerge from the cross-reading of both data sets is the gap between students' independent digital vocabulary

practices and the structured pedagogical guidance that would maximize their effectiveness. The implications of this finding for vocabulary instruction at Bouira University are addressed in the general conclusion of this study.

General Conclusion

General Conclusion

This study set out to investigate the impact of ICT-based applications on vocabulary development among first-year EFL students at the University of Akli Mouhand Oulhadj, Bouira. Guided by three research questions, it examined the extent of ICT's perceived impact on vocabulary learning, the attitudes of students and teachers toward digital vocabulary tools, and the specific applications most commonly used for vocabulary purposes. The findings, drawn from thirty students and six teachers through a questionnaire and a semi-structured interview instrument, provide a rich and locally grounded account of digital vocabulary practices at Bouira University.

The first research question asked about the extent to which ICT applications impact students' vocabulary development. The findings provide clear evidence of a strong positive perceived impact. All thirty student participants agreed that ICT applications help them learn more vocabulary, making this the only questionnaire item to achieve unanimous agreement. Ninety percent reported increased confidence in using new vocabulary after digital practice, and eighty percent perceived benefits for vocabulary retention. Teacher data corroborates this picture: all six teachers confirmed that ICT tools contribute to vocabulary improvement, attributing the benefit to increased student attention, variety of input formats, and the extension of learning beyond classroom hours. The first hypothesis is therefore fully confirmed.

The second research question examined the attitudes and perceptions of both groups toward ICT tools. Student perceptions were uniformly and strongly positive across all dimensions measured: motivation, confidence, learning volume, and retention. Teacher attitudes were also positive without exception, though teachers expressed a more conditional endorsement, linking effectiveness to purposeful use and to students' willingness to practice vocabulary actively in communication. The second hypothesis is confirmed, with the important nuance that teachers' positive views come with awareness of the conditions under which ICT benefits are realized.

The third research question asked which applications students use most frequently. The data shows that YouTube and social media platforms such as Instagram and TikTok (each used by 73.3% of students) and Google Translate (63.3%) dominate, followed by podcasts (50%). These are general-purpose content platforms rather than dedicated vocabulary learning tools. Duolingo is used by 33.3% of students, and Quizlet by only 10%. The third hypothesis, that general-purpose platforms would dominate over dedicated language learning applications, is therefore confirmed. Most student digital vocabulary engagement is incidental and receptive: vocabulary is encountered as part of everyday digital media consumption rather than through deliberate lexical study.

The most analytically significant finding across both data sets is the gap between students' widespread independent ICT use and the limited structured integration of digital tools into formal

vocabulary instruction. Eighty percent of students use ICT tools for vocabulary, and over half do so daily or several times a week. Yet teachers report only occasional integration, and only seventy percent of students perceive their teachers as actively encouraging digital vocabulary practices, the lowest agreement score on any student perception item.

This gap is not explained by negative attitudes, since both groups endorse ICT tools. It is explained by structural and institutional factors: limited class time, inadequate infrastructure, insufficient teacher training in digital pedagogy, and the time cost of preparing digital vocabulary materials. The positive impact of ICT on vocabulary development in the English department at Bouira University is therefore currently being realized almost entirely through student initiative, without the pedagogical structure that would enable students to move beyond incidental and reactive engagement toward systematic vocabulary development.

Pedagogical Recommendations

On the basis of the findings, the following recommendations are offered for the English Department at Bouira University.

Teachers should capitalize on students' existing digital habits by providing structured guidance on which applications to use and how to use them purposefully. Assigning specific ICT-based vocabulary tasks as homework, rather than relying on self-directed engagement alone, would bridge the gap between independent use and pedagogically supported learning. A blended learning approach, combining classroom vocabulary instruction with guided out-of-class ICT practice, offers the most practical pathway to systematic integration given the current infrastructure constraints.

Department administrators should invest in ICT-focused teacher professional development, providing faculty with the training needed to evaluate, select, and implement digital vocabulary tools effectively. The observation that one participating teacher openly acknowledged limited familiarity with ICT vocabulary applications indicates that professional development needs in this area are real and immediate. Infrastructure improvements, including more reliable internet connectivity in university spaces and access to digital learning platforms, are a prerequisite for systematic classroom integration.

Directions for Future Research

The reliance on self-reported data, rather than objective vocabulary testing, means that the relationship between perceived ICT impact and actual vocabulary gains remains to be established empirically. A follow-up study combining questionnaire data with pre- and post-vocabulary tests would provide a stronger evidential basis for the conclusions reached here.

The small sample size and case study design limit generalizability. A larger-scale comparative study involving multiple Algerian university English departments would allow broader conclusions. A longitudinal design tracking the same cohort across a full academic year would examine whether the perceived benefits of ICT use are sustained over time.

The emergence of AI-based tools such as ChatGPT in student responses, cited by a small but notable number of participants as useful vocabulary resources, represents a new dimension of ICT-based vocabulary learning that warrants dedicated investigation in the Algerian EFL context.

In sum, this study has documented that ICT-based applications are already a significant and positively perceived feature of first-year EFL students' vocabulary learning at Bouira University. The principal challenge is not one of learner motivation or digital access but of pedagogical structure. Students are willing, capable, and actively engaged with digital vocabulary tools. What they need is systematic teacher guidance that connects their existing digital practices to the deep, contextualized, and productive vocabulary knowledge that academic success in English requires.

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List of Appendices

Appendix A: Students' Questionnaire

Dear participant,

Thank you for agreeing to take part in this questionnaire. The questions below are part of a research study on the impact of ICT-based applications on vocabulary development among first-year EFL students at Bouira University. All responses will remain strictly confidential and will be used solely for academic research purposes. Your participation is entirely voluntary.

By proceeding, you confirm that you have read and understood the above information and consent to participate.

Section One: Demographic Information

1. What is your age? ……

2. What is your gender? Female ☐ Male ☐

3. How confident are you with your current English vocabulary level?

Very confident ☐ Confident ☐ Neutral ☐ Unconfident ☐ Very unconfident ☐

4. How often do you encounter words in class that you do not understand?

Always ☐ Often ☐ Sometimes ☐ Rarely ☐

Section Two: ICT Use for Vocabulary Learning

5. Do you use ICT-based applications to help you learn English vocabulary? Yes ☐ No ☐

6. Which of the following applications do you use to learn or practice vocabulary? (Tick all that apply)

- Electronic dictionary apps (Oxford, Cambridge, Reverso, etc.) ☐
- YouTube ☐
- Duolingo ☐
- Quizlet ☐
- Google Translate ☐

- Social media (Instagram, TikTok, etc.) ☐
- Podcasts ☐
- Language learning websites ☐
- Other (please specify): ……

7. How often do you use ICT applications for vocabulary learning?

Every day ☐ Several times a week ☐ Once a week ☐ Rarely ☐

8. For what purposes do you mainly use ICT applications for vocabulary? (Tick all that apply)

- Looking up the meaning of unknown words ☐
- Checking pronunciation of words ☐
- Practicing vocabulary through exercises or games ☐
- Building vocabulary through reading or watching content ☐
- Translating words from Arabic or French ☐
- Memorizing new word lists ☐
- Communicating with others in English ☐

Section Three: Perceptions of ICT's Impact on Vocabulary Development

For questions 9 to 13, please indicate your level of agreement:

SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

9. ICT applications help me learn more vocabulary. SA ☐ A ☐ N ☐ D ☐ SD ☐

10. ICT applications help me retain vocabulary for a longer time. SA ☐ A ☐ N ☐ D ☐ SD ☐

11. ICT applications make vocabulary learning more interesting. SA ☐ A ☐ N ☐ D ☐ SD ☐

12. I feel more confident using new vocabulary after practicing through ICT apps. SA ☐ A ☐ N ☐ D ☐ SD ☐

13. My teachers encourage the use of ICT applications for vocabulary learning. SA ☐ A ☐ N ☐ D ☐ SD ☐

Section Four: Open-ended Questions

14. What ICT-based applications do you find most useful for vocabulary development? Why?

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……...

……..

15. What challenges do you face when using ICT applications for vocabulary learning?

……..

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……..

Thank you for your participation.

Appendix B: Teachers' Interview

Dear Teachers,

Thank you for agreeing to participate in this interview. The questions below form part of a master's research study on the impact of ICT-based applications on vocabulary development among first-year EFL students at Bouira University. Your responses will remain strictly confidential and will be used solely for academic research purposes. Participation is entirely voluntary.

Section One: Demographic Information

1. What is your gender? Female ☐ Male ☐

2. How many years of experience do you have teaching EFL at the university level? ……..

3. What is your academic specialty? ……..

Section Two: Vocabulary Difficulties

4. In your view, how significant is the vocabulary gap among first-year EFL students at Bouira University?

Very significant ☐ Significant ☐ Moderately significant ☐ Not significant ☐

5. What are the main vocabulary difficulties you observe among first-year EFL students?

……..

……..

……...

……..

Section Three: ICT and Vocabulary Development

6. Do you believe ICT-based applications can effectively support first-year students' vocabulary development?

Yes, definitely ☐ Yes, to some extent ☐ No ☐

7. From your experience, have ICT-based applications improved students' vocabulary acquisition? Please explain.

……..

……..

……..

8. Which ICT-based applications or tools do you consider most appropriate for vocabulary development at the first-year level?

……..

……..

……..

Section Four: Current Integration and Recommendations

9. Do you currently integrate ICT-based vocabulary tools into your teaching?

Yes, regularly ☐ Yes, occasionally ☐ Rarely ☐ No ☐

10. What obstacles prevent you from integrating ICT applications more fully into vocabulary instruction?

……..

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……..

11. What strategies would you suggest for a more effective integration of ICT applications into vocabulary teaching at Bouira University?

……..

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……..

Thank you for your time and cooperation.