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Assistive Learning Technologies for Visually Impaired EFL Students: Implications of CALL and MALL

An Extended Essay Submitted in Partial Fulfillment of the Requirement for a Master's Degree in Didactics and Applied Languages

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Dedications

I dedicate this research project to my beloved parents, who have been my greatest motivators and unwavering supporters throughout my life. Their understanding of my dreams, needs, and aspirations has always been profound, and their patience has been boundless. This dedication is but a small token of appreciation for the sacrifices they have made, especially during the times when I was studying far from home. They constantly worried about my well-being, wondering if I was eating properly or managing well. Their love and concern have driven me to reach this level of academic achievement. I am deeply grateful to them for their enduring support.

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Acknowledgements

Abstract

This paper discusses the contribution of Computer-Assisted Language Learning (CALL) and Mobile-Assisted Language Learning (MALL) to enhancing and facilitating learning strategies for visually impaired EFL students (VIS) and their role in improving student competence. It also discusses the influence of these Assistive Technologies on facilitating teachers' work to meet visually impaired students' needs from the student's perspective. Multimethod qualitative research was conducted with visually impaired EFL students in Algeria. The researcher is a visually impaired EFL student; therefore, the auto-ethnography research method was implemented. In addition, in-depth Semi-Structured Interviews were conducted with five visually impaired EFL students from different Algerian universities. The research highlights key findings regarding the use of assistive technologies in EFL learning for visually impaired students. It emphasises that sufficient time, comprehensive knowledge, and consistent practice are essential for students to learn and utilise these technologies effectively. Additionally, internal motivation is identified as a crucial factor driving students to adopt assistive tools. The study concludes that CALL and MALL significantly enhance visually impaired students' learning strategies and skills. However, while these tools generally aid teachers, they fail to fully address the specific needs of visually impaired EFL students.

Keywords: Assistive technologies, CALL, MALL, Visually impaired EFL Students, English Language, Learning and Teaching.

Abstract in Arabic

يناقش هذا البحث مساهمة تعلم اللغات بمساعدة الحاسوب والهاتف في تطوير استراتيجيات التعلم للطلبة المكفوفين وضعاف البصر المتخصصين في اللغة الانجليزية ودورهم في تحسين كفاءة الطلبة. يعالج هذا البحث أيضا تأثير هذه التقنيات المساعدة على تسهيل عمل الأساتذة لتحقيق احتياجات الطلبة المكفوفين من وجهة نظر الطلبة. لقد تم استعمال البحث الكيفي متعدد الأساليب مع الطلبة المكفوفين وضعاف البصر. المتخصصين في اللغة الانجليزية بالجزائر. بما أن الباحث طالب مكفوف, تم الاعتماد على طريقة البحث الأيثنوغرافي الذاتي. أضافة ألى ذلك, تم عمل مقابلات شبه منظمة مع خمس طلبة مكفوفين متخصصين في هذه اللغة من مختلف الجامعات الجزائرية. يسلط البحث الضوئ على بعض النتائج المفتاحية بخصوص استعمال التقنيات المساعدة في تعلم اللغة الانجليزية للطلبة المكفوفين وضعاف البصر. تؤكد الدراسة أن الوقت الكافي, المعرفة الشاملة والممارسة المستمرة مهمة للطالب في تعلم واستعمال التكنولوجيا بفعالية بالأضافة ألى الدافع الداخلي الذي تم تحديده كعامل حاسم كونه يقود الطالب ألى استعمال الأدوات المساعدة. تستخلص الدراسة أن تعلم اللغات بمساعدة الحاسوب والهاتف يعزز مهارات واستراتيجيات التعلم للطلبة المكفوفين وضعاف البصر بشكل ملحوظ. لكنها تفشل في تسهيل عمل الاستاذ في تحقيق احتياجات الطلبة المكفوفين وضعاف البصر على الرغم من دورها في تسهيل عمل الأستاذ بشك عام.

الكلمات المفتاحية:

التقنيات المساعدة, تعلم اللغات بمساعدة الحاسوب والهاتف, الطلبة المكفوفين وضعاف البصر, اللغة الانجليزية, التعلم والتدريس.

Abstract in French

Cette recherche discute la contribution de l'apprentissage des langues assisté par ordinateur et mobile pour faciliter les stratégies d'apprentissage pour les étudiants mal et non-voyants inscrit en anglais comme une langue étrangère et leurs rôle dans le développement de la compétence d'étudiant . elle discute aussi l'influence de ces technologies d'assistance sur les enseignants pour détecter les nécessités des étudiants mal et non-voyants du côté d'étudiant . une recherche qualitative mulitiméthode a été conduit avec quelques étudiants mal et non-voyants inscrit en langue anglaise en Algérie . le rechercheur est un étudiant non-voyants . alors , une méthode de recherche auto-ethnographique a été employée. En plus , des interviews semi structuré en profondeur ont été conduits avec cinq étudiants non-voyants de différentes universités en Algérie. la recherche surligne quelques résultats concernant l'utilisation des technologies d'assistance dans l'apprentissage d'anglais comme une langue étrangère pour les étudiants mal et non-voyants. Elle confirme que le temps suffisant ; l'information compréhensive et la pratique consistante sont essentielles pour apprendre et utiliser les technologies d'assistance effectivement . en plus, la motivation interne est identifiée comme un facteur principal qui pousse l'étudiant adopter des outils d'assistance . l'étude conclue que l'apprentissage des langues assisté par ordinateur et mobile améliore les compétences et les stratégies d'apprentissages pour les étudiants mal et non-voyants significativement . mais , ces outils échouent à adresser les nécessités des étudiants mal et non-voyants complétement malgré ils généralement aident les enseignants .

Mots clé : Technologies d'assistance , l'apprentissage des langue assisté par ordinateur et mobile, anglais comme une langue étrangère, étudiants mal et non-voyants, apprentissage et enseignement.

List of Acronyms and Abbreviations

AI: (Artificial Intelligence)

ALLP: (Athena Language Learning Project)

App: (Application)

AT: (Assistive Technology)

CALL: (Computer Assisted Language Learning)

EFL: (English as a Foreign Language)

JAWS: (Job Access With Speech)

MALL: (Mobile Assisted Language Learning)

MS: (Microsoft)

NLP: (natural Language Processing)

NVDA: (Non-Visual Desk top Access)

PLATO: (programmed Logic for Automated Teaching operations)

RH: (Research Hypothesis)

RQ: (Research Question)

VIS: (visually Impaired Student)

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When we scrutinise learning strategies, we find that they differ from one student to another. Visually Impaired Students (VIS) are among the learners who have specific learning strategies that facilitate the learning process and the entire understanding of the subject matter. These strategies differ from one VIS to another due to the conditions in which we can set some of them, like classroom environment the type of education where VIS studies inclusively or exclusively. These conditions affect VIS's academic achievement in addition to his competence.

The learning process is witnessing new strategies thanks to the spread of technological innovation. Among the most useful technological devices for learning, computer-assisted language learning (CALL) and mobile-assisted language learning (MALL) are the most useful technologies for the recent generation. They are a set of devices and applications that enhance language learning, including English as a Foreign Language (EFL). They facilitate the learning strategies for VIS, who know the traditional writing strategies, and those who do not. These can be achieved by embracing Assistive Technologies AT. Various devices, applications, and software programs make technological implementation accessible. In the EFL context, they mainly collaborate to enhance reading, writing, and spelling.

The motivation behind this research is intrinsic. There are a set of factors that pushed me to conduct this study. First, the lack of awareness among societies about VIS learning strategies is common. In addition, the lack of knowledge is another point that motivates me to conduct this research. Some people in the academic setting want to assist VIS in their study activities but do not know how to do so. The next point is that I like the field of technology; it is an essential domain that has been commonly used in recent times. So, I want to combine this field with the context of VIS and EFL.

This research aims to explore the various learning strategies employed by visually impaired students (VIS) and how they manage interactions with their teachers and classmates

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through the use of Computer-Assisted Language Learning (CALL) and Mobile-Assisted Language Learning (MALL) technologies. These assistive technologies provide VIS with greater autonomy in their learning and facilitate teachers' instructional efforts. Therefore, the following research questions are raised.

- RQ1. How effective are CALL and MALL in enhancing Visually Impaired students' language learning strategies and skills?

- RQ2. What impact do CALL and MALL as assistive technology materials have on teachers to meet visually impaired students' needs?

In response to these research questions, we hypothesise the following outcomes:

- RH1. CALL and MALL may affect VIS by motivating them to study and providing them with materials like AT programs and multimedia to ease their academic activities.

- RH2. The use of CALL and MALL technologies may reduce the workload of EFL teachers and make it easier for them to support visually impaired students.

This research paper follows a specific methodology. We opted for qualitative research, using auto-ethnography to understand the influence of CALL and MALL on VIS learning strategies and semi-structured in-depth interviews with VIS enrolled in English language departments at various universities in Algeria.

This extended essay is divided into three chapters. Chapter One: Background and Literature Review explores Computer-Assisted Language Learning (CALL), including its history, benefits, and drawbacks. It also discusses Mobile-Assisted Language Learning (MALL) and its applications. It also focuses on visually impaired students (VIS) and integrating CALL and MALL into their learning processes. The challenges teachers and VIS face in inclusive educational settings, including schools and universities, are addressed. Additionally, assistive technologies and their contributions to language learning are explored in relation to

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the use of artificial intelligence and its role in supporting VIS. The research gap is elaborated by the end of the chapter.

Chapter Two: Research Methodology and Data Analysis outlines the exploratory research approach used in this study and explores the primary data analysis. The first section explores the rationale and objectives behind our chosen methodology and discusses the research methods and instruments employed. The second section presents the data obtained from using auto-ethnography as a contemporary research tool and the semi-structured, in-depth interviews.

Chapter three, Discussions and Recommendations, scrutinises the qualitative data collected through the Auto-ethnography and the semi-structured in-depth interviews with visually impaired students. It discusses and examines the findings and their implications for language learning and Assistive technologies. Based on the data discussions, we propose suggestions and recommendations aimed at improving the learning strategies and academic success of visually impaired student.

Chapter One:

Conceptual

Framework

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1.   1. Introduction

Education is one of the main keys to building a society. It is a set of subject matters that the person needs to learn. Foreign languages, especially English, are one of the subjects that many students prefer. It is the global language that is used all over the world. In order to implement this language in education, teaching methodologies, learning strategies, and materials should be available and well-known. CALL and MALL are among the materials that improve teaching methodologies and learning strategies. They are the most common technologies in the recent period. They are used in regular and special education, like visually impaired EFL learners. The idea is that the learning strategies differ. This distinction occurs because of multiple conditions like environment, knowledge And others. This chapter explores CALL and MALL with VIS learning strategies to see their influence.

1. 2. Computer/Mobile Assisted Language Learning

Computer Assisted Language Learning (CALL) and Mobile Assisted Language Learning (MALL) are commonly used in the academic setting. In this section, we will define both concepts and introduce a historical background of CALL and its benefits and drawbacks. Additionally, MALL technology and its features are discussed.

1. 2. 1. Computer Assisted Language Learning (CALL)

Researchers and specialists in the fields of computing, educational technologies, and applied linguistics have defined the term CALL differently. It stands for computer-assisted language learning. It combines computing, educational technologies and applied linguistics. Beaty (2013) says: "Given the breadth of what may go on in Computer-Assisted Language Learning (CALL), a definition of CALL that accommodates its changing nature is any process in which a learner uses a computer and, as a result, improves his or her language." (p. 7): this confirms that using a computer is very important for each foreign language learner to develop his/her linguistic ability, like mastering the four skills, the grammar and lexicon of a language.

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This refers to software like online dictionaries, multimedia like videos and audio, and games. In the same vein, Chun (2011) defines this concept as "an emerging field that studies how technology is used as one (of many) tool(s) for language learning." (p. 681). This term refers to a discipline which deals with everything related to technological tools and how to use them to learn a language, like computers, mobiles, and tablets… which are considered computerised devices, i.e. they work by exploitation systems. They are instruments which motivate and engage students to improve their linguistic abilities. Another point of view of Levy (1997) (P:1), as cited in Chen et al. (2021), considers CALL as "the search for and study of the computer applications in language teaching and learning" (P.1). This definition focuses on the computer programs and their role to help the student learning a language like Microsoft applications which improve the student's performance and writing skills, the world wide web (www) which is concerned with any linguistic element learnt through the internet and the social media. These tools are considered the main software and platforms equipped in computing and technology, and they facilitate language learning. Each application works according to its functions and properties. CALL is an essential approach in applied linguistics that combines language learning with computing and helps improve the learners' linguistic level.

1.   2. 2 CALL as a Diachronic Overview

CALL has passed through some steps in its development. In this part, we scrutinise its history, discussing the three stages: the behaviourist CALL in the 1950s and the 1960s, the communicative CALL in the 1970s and the 1980s and the integrative CALL in the 1990s and the 21st century.

1. 2. 2. 1. CALL in the 1950s and the 1960s

The invention of the computer goes back to the 20th century. With the creation of the electronic numerical integrator and computer (ENIAC) in 1945, UNIVAC and IBM 781 were created in 1951 and 1952. The widespread use started in the 1960s, marking the digital age.

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At the beginning of the second half of the 20th century, precisely during the period between the 1950s and the 1970s, computers were found only at university research facilities, and it was not easy to get a computer. CALL passed through the 1st stage during this period, called the behaviouristic CALL or the structural CALL. It focuses on the behaviourism theory based on reward and reinforcement. Beatty (2013) discussed the idea of assimilation, which deals with the reinforcement to improve language learning motivation. This theory was implemented in some instructional materials and programs created at that time. Ahmed et al. (1985), as cited in Davis and Elder (2004), provide two instructional materials: the first is conducted at Stanford University, which facilitates Slavic language learning. The second important instructional material was conducted at Illinois University in 1959, called PLATO for "Programed Logic for Automated Teaching Operations". It uses one of the language teaching methods to teach the Russian language using English. Grammar checkers equipped with this instructional material could correct spelling errors. Moving to language teaching methods, the most common method at that time was the Grammar Translation Method (GTM), which allows teaching the target language by translating from the source language and the audiolingual method, which is the source of behaviourism. It focuses on the repetition of language aspects. Overall, behaviouristic CALL was dismissed after the criticism of behaviourism and the appearance of other theories, which caused the emergence of other stages concerning CALL.

1. 2. 2.2. CALL in the 1970s and the 1980s

Another CALL stage appeared in the 1970s and 1980s, known as the communicative CALL. The programs innovated at that time differ from the ones created in the previous stage: unlike the instructional CALL materials invented at the beginning of the second half of the 20th century, This kind of program is based on a more constructivist model of CALL. Computers, in general, were divided into a set of kinds: the mainframe computer, which is a room-sized

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machine. A minicomputer is considered a server; the microcomputer is known as the desktop and portable computer, which is the laptop and was less available at that time. These classified types contributed to the improvement of language learning by its multimedia programs. Beatty (2013) lists a set of software programs which facilitate language learning for students. Let us take a look at the first program, which is called Macario. Gale (1989), as mentioned in Beatty (2013), introduced Macario, a video disk used to learn Spanish and equipped with pedagogical characteristics to improve listening skills. Another program is MonteviDisco and Interactive dígame. The idea is that this video disk is provided with a link to choose and the student has to select one. For example, if the student selects going to the airport, he learns the vocabulary with some conversations happening there. Moving to the third program, ALLP, which stands for Athena Language Learning Project, was founded in 1983 and supported by the Massachusetts Institution of Technology MIT. This system is described as two Unix machines connected to each other. These Unix machines stand for university interactive executive or university exchange.

In addition, there was a program called No Recuerdos. The idea behind this program is that it has a main character called Gonzalo, who is not able to recall the location of the biological hazard that will destroy the whole of Latin America. This system is featured by the near-impossible objective. Beaty (2013) describes the near-possible objective as a property that characterises multimedia programs in addition to games. Eliza is one of the language learning software programs which is based on improving communication skills. It is a kind of application that was created using artificial intelligence in 1976 by Weizenbaum. Another system similar to No Recuerdos is À la rencontre de Philippe. The idea is that Philippe has lost his apartment, and the learner is going to help him after discovering the program. The last program Beatty (2013) mentioned in the communicative CALL period is HyperCard. It was created by the invention of the Macintosh as a new kind of computer in 1984 by the Apple computer company.

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This system contains cards, including videos, audio, text, and animations, which help a student manage his language learning skillfully. All in all, the achievements made during this period aimed to improve communicational practices in the linguistic field.

1. 2. 2. 3. CALL in the 1990s and the 21st Century

In the last decades of the 20th century and the beginning of the 21st century, CALL has passed through the third stage, which still exists, and it is called the integrative CALL. In the 1990s, many software programs were created. At the beginning of the 21st century, CDs and flashcards appeared as additional language-learning materials. In 2009, everything concerning language learning was available, including internet features like email, which are among the functions that aim to send messages like Gmail and Hotmail. CALL passed through the third, fourth and fifth generations, witnessing the invention of many tools concerning blagged and online learning. In this period, an area of study appeared due to the smartphone spread called Mobile Assisted Language Learning (MALL).

In addition, Computer-Mediated Communication (CMC) emerged as a new discipline that allows language to be used in authentic communications regarding software programs, websites, and mobile apps. Online dictionaries exist in every foreign language, and there are apps for communication between the student and the teacher, like Meet, Zoom, and Microsoft Teams. Moreover, games have a role in improving language learning. For example, Duolingo is an educational website and a phone app compatible with Android and IOS. Finally, this stage makes CALL influential in language learning

I. 2. 3. CALL Benefits and Drawbacks

CALL has great importance in the field of language and education. It facilitates the students and the teachers' activities. Lee (2000), as cited in Abuseileek and Abu Sa'aleek (2012), has pointed out some of the advantages of computer use. First, it improves experiential learning in which the student enjoys the experience of using technology and knows the skills

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related to it. He learns how to use the educational programs that allow him to achieve his activities. Another reason that discusses the effect of motivation is that the foreign language learner will be motivated to learn all aspects of the target language, like grammar, lexis, culture, and the four skills.

CALL has authentic materials that refer to educational software, which are tools for learning a language, such as writing software, recordings, etc. It promotes the learner's achievements where the activities become more organised, and the skills learned by the student become easily installed in the brain and practised in the real world. CALL develops the students' interaction. Here, online learning comes when the teacher applies the communicative approach by pushing the learners to participate and interact with him in the online meeting. CALL is characterised by individuality, which motivates the student to work alone to accomplish his tasks, leading to learning autonomy. CALL provides the learner with different sources.

In fact, when studying without a computer, the teacher becomes the main source of information. He/she explains, gives examples, gives the tasks and writes the lesson. However, computers have different ways of presenting information to foreign language students. The internet and its multiple websites have infinite sources of information that permit students to research the target language they are learning. In order to really master the target language, CALL technology provides the learner with all mediums to fully understand the idea. For instance, the student repeats the recording to catch a word's meaning or pronunciation. Additionally, Derakhshan, Salehi, and Rahimzadeh (2015) added that providing feedback is a primary benefit of CALL.

CALL is equipped with texts, movements, and sounds that motivate the learners and make them enjoy their studies. Ai (2017) sheds light on corrective feedback that aims to correct and evaluate foreign language students using intelligent CALL. He suggests a web-based

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formative assessment tool called computerised dynamic assessment, in which the evaluation takes place. Another example is Meurers et al. (2010), as cited in Ai (2017), who suggest the WERTI program as a program that concerns EFL learners. Finally, CALL is designed to facilitate students' completion of their learning tasks, and it is helpful for teachers to meet students' needs.

After discussing the pros related to CALL, getting along with its cons is essential. Abuseileek and Abu Sa'aleek (2012) discussed some disadvantages that represent students' and teachers' barriers. First, computers are expensive, leading to low school budgets and low incomes for teachers and students. Students and teachers lack experience using some computer programs, which is considered an issue when the teacher does not master the appropriate application to transmit knowledge to students. The students also have this problem; for example, not all students are accustomed to using PowerPoint or completing an assignment in Google form.

Time may be consumed when the student does not master the computer. Instead of writing, students take time to look for a suitable letter to type. CALL is featured by technical issues when teachers face a problem in the middle of their session while presenting the lesson because the electricity or the program is working slowly. Computers in educational institutions like schools and universities can also have other lacks and issues; students may encounter many software-related problems. For instance, blind and visually impaired language learners may face the problem of assistive technology based on screen readers that help them accomplish their activities, and this problem is highly prevalent in third-world countries. Viruses are programs considered among the barriers that make the computer work slowly, and they may break it.

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1. 3. Mobile Assisted Language Learning (MALL)

MALL is a type of technology that refers to the field of mobile language learning. It stands for Mobile Assisted Language Learning. This technology refers to using a set of wireless devices that contribute to studying a language. Gholami and Azarmi (2012) point out that "MALL is a merging language teaching methodology which can effectively integrate listening, reading and speaking activities. It can also develop academic study, critical thinking and research skills" (p. 1). MALL significantly affects language learning activities; it helps develop some language skills like reading, where it provides applications that contain books, articles, and text on various subject matters. It also enhances listening skills through the equipment of applications with audio like Google Translate and some online dictionaries to show the way of word pronunciation and articulation, or it may detect the accents of a language, such as the American and British accents in English. It develops a foreign language learner's critical thinking by providing educational games containing quizzes with linguistic purposes. It creates successful academic achievement by providing applications that allow the students to do their activities organizationally. All in all, MALL is a technology that facilitates language learning and provides all the tools to meet students' needs.

MALL is a technology which has a set of features that determine its role in language learning. Klopfer and his colleagues, as cited in Miangah and Nezarat (2012), have listed some properties related to mobile learning. First, mobile phones are characterised by portability, allowing learners to study outside the classroom, which can occur anywhere. For instance, the student may suddenly hear a word he has never heard. He can use his online dictionary on his phone to find the explanation of this word. Thus, MALL is independent.

MALL is social and interactive through the use of a phone by the learner to exchange information with his friend or classmate, as he can communicate with people using the target language to reach fluency. Third, MALL is featured by context sensitivity, allowing the foreign

language student to collect and memorise data on his phone. This may happen in many ways, such as taking notes in the classroom, listening to a talk, or reading a piece of writing. In addition, mobile phones are characterised by connectivity; they can be connected to websites and online applications for educational purposes using a wireless network.

Moreover, MALL is personal because it enables students to select learning strategies to reach their goals. Therefore, mobile phones are known for their informality. Furthermore, mobile devices are popular due to their availability in markets, which influences society, which makes them own such devices and implement them in their activities, such as teaching and learning a foreign language like English. Finally, MALL features will be used to determine its influence on foreign language students and introduce its turn in language improvement.

1. 4. Visually Impaired EFL Learners and Assistive Technologies

Inclusive education involves students with disabilities and language minorities studying in the same environment as average students. Tiaiba and Bentouhami (2023) point out that "Inclusive education can be referred to as the process of bringing disabled and non-disabled students together in the same educational environment in order to provide equal educational opportunities" (p. 1). Attaining equal educational opportunities is not easy.

Teachers are required to meet all students' needs. In the case of VIS, teachers may face problems in meeting all their needs as they may not. The role of technology is to ease the teaching-learning process in the case of an inclusive environment. VIS, who do not master traditional writing (braille), depend on their PCs and smartphones to accomplish their activities. Teachers may even use these devices to test VIS by recording the subject or choosing other methods. In inclusive environments, technology is also used to take notes, like recording or writing on the smartphone using Keep Notes or other apps based on this function. Finally, inclusive education effectively cooperates in meeting VIS needs, and technological use allows VIS to reach and understand each point in the subject matter.

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1. 4. 1. Challenges in EFL Learning and Teaching To VIS

Barriers are encountered from both sides of VIS and teachers in terms of learning strategies, teaching methodologies and the lack of materials. The following parts discuss the difficulties of teaching and the obstacles faced by VIS in their learning process.

1. 4. 1. 1. Teaching Challenges

Teachers face many difficulties when dealing with VIS. Many researchers have contributed to this field; Guanoluisa et al. (2022) have conducted a qualitative study of six VIS and their teachers. They found that the negative aspects, which are considered obstacles to teaching English, contain communication problems, which means that the issue is based on the way of explanation, which may include explaining the content of a table, an image, and a graph. Another finding is classroom management, which refers to providing a suitable classroom environment for all students.

Kocyigit and Arta (2015) conducted a qualitative research study using semi-structured, in-depth interviews with VIS and their teachers in prep schools of two foundation universities in Izmir, turkey. It was concluded that teachers lack training, which is very important to meet the VIS needs. In addition, the VIS differ in their way of studying, and this depends on the conditions or the attitude towards the way of study. This makes the teacher confused.

To explain this point more, when the teacher receives a VIS for the first time, he thinks that all VIS have the same learning strategies. Febtiningsih and Wibowo (2021) have conducted qualitative research using semi-structured interviews in some Indonesian high schools. They found that teachers face some challenges with VIS. There is an issue that the curriculum does not suit all students. In addition to the lack of learning technological tools, devices like phones and computers are essential to accomplishing and mastering writing skills using compatible writing software like Microsoft Word.

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Time is another challenge for these teachers; learning writing in each subject matter, especially written expression, needs at least 2 hours per session to meet the needs of average students and VIS. Finally, these problems occur in public schools and universities rather than special needs institutions.

1. 4. 1. 2. Learning Challenges

After discussing the teaching difficulties, it is essential to shed light on VIS barriers. They face many issues in the EFL context, including testing and learning skills like reading and writing. Tiaiba and Bentouhami (2023) conducted qualitative research on three undergraduate Algerian VIS who were enrolled in the English language department at Setif University. They highlighted two major challenges: the first is a lack of teaching materials. In this case, universities, like other public institutions, are concerned when we talk about inclusive education. It lacks materials like assistive technologies that help VIS improve reading and writing. Second, there are difficulties in tests and exams in the EFL context, which are processes by which the teacher evaluates his/her VIS. At this point, there is no way to include assistive technologies to facilitate the work for teachers and students and avoid being time-consuming.

Matshanisi Kekana and Mogoboya (2022) conducted a qualitative study at the University of Limpopo in South Africa using telephone interviews with six VIS of English and their lecturers in addition to focus group conversations. They concluded that the VIS who use Jaws cannot detect pictorial illustrations, and even the lecturers are not trained to explain them to VIS; Jaws is among the official and famous screen readers for computers. It cannot read pictures and recognise pictorial illustrations. This hinders CALL's effectiveness in improving English and reduces the ability to understand falls. Overall, the pedagogical side has many difficulties, which may decrease the level of learning strategies and the psyche of the VIS.

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1. 4. 2. Language Learning and Assistive Technology

AT is a kind of technology that makes a device, program or function accessible. It is the way to fulfil a disability. King (1999), as cited in Wendt and Lloyd (2011), says: "AT typically concentrates on the special needs of people of all ages who may exhibit a variety of disabilities, limitations, and/or challenges that limit their participation in daily life so that special assistance in sensory, motor, cognitive, and/or linguistic domains becomes necessary" (P. 2): AT replaces the disability which characterises the student and the human in general. In the case of VIS, many devices and software provide suitable functions for them. To clarify what this term is, AT is described as "the applications of science, engineering, and other disciplines that result in processes, methods, or inventions that support people with disabilities" (Bryant & Bryant, 2003, p. 2) as mentioned in, (Wendt and Lloyd, 2011. P.2): this refers to the application created to meet the VIS needs by equipping these programs by functions in order to make learning using the computer and phone accessible like reading. In the same vain, Ghasemazdeh and Kamali (2010) argue that "'Assistive Technology refers to products, devices or equipment that are used to maintain, increase or improve the functional capabilities of people with disabilities" (p.1): in order to develop the capacity of VIS in their learning strategies and to enrich their knowledge about CALL and MALL which make progress in their level, AT plays an important role. It provides some products that can be programmed, like screen readers and text magnifiers or hardware like Braille One and Braille Sense, which facilitate writing and save time. All in all, AT is a kind of technological device and app that is characterised by accessibility to web and non-web resources.

1. 4. 2. 1. Devices, Software And Applications

After discussing what AT is, it is necessary to shed light on the devices and software used by AT for VIS. They facilitate their learning strategies and save time. First, it is important to start with AT devices. According to the UN accessibility centre (2016), there is a set of

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suggested tools for AT to meet VIS needs. Braille Sense is one of the tools described as a tablet containing many software like text editor and e-book reader, and it supports multimedia. It functions as a facilitator for writing by providing braille electronically and makes the learner ignore hard copies. Thus, time consumption decreased.

UN accessibility centre (2016) proposed some devices for text magnifying, like Lifestyle HD 22 and Candy 5 HD II. They are among the AT tools that concern learners with low vision. They make the letters bigger in order to be easily recognised by VIS. In language learning, this facilitates learning reading. Moving to software, there are many of them with various functions. Screen readers are widely used among AT apps. They facilitate navigation on the computer, the internet, and even learning. For computers, there are two well-known screen readers: jaws and NVDA. The first screen reader is Jaws, which comes among the old, formal, and official screen readers created by Freedom Scientific Company (FS). It provides VIS features for writing and reading documents in PDF or docks. The second one is NVDA, among the fastest screen readers, which helps the VIS; it stands for non-visual desk top access.

The Australian company NVDA produced it. It is characterised by the function of translation, which helps VIS learn new words while reading a novel, a story, or a scientific book. For mobiles, it depends on the market; for instance, in Android, there is talkback as a screen reader, which is also called voice assistance. The voice-over for iPhones and these integrated screen readers do not fully meet VIS's needs. They need apps like Voice Aloud Reader, which reads PDF files, as other AT applications facilitate reading like the image to text, which deals with image transcription and Insta-reader, which transforms the written, photocopied documents and images that contain text into audio. For writing, VIS who do not master MS word can use some AT apps and programs like Dragon, naturally speaking for computers and dragon anywhere for mobile phones; this idea means that the VIS speaks whatever he wants, and the program converts the spoken language into a text. All in all, AT

devices and apps are very important and collaborative in improving language learning strategies.

1. 4. 2. 2. English Language and Assistive Technology

Since AT has been defined and its kinds have been discussed, it is essential to deal with its contributions to language learning to VIS. Many researchers have discussed this idea and contributed with fruitful results in this investigation. Hamidi and Setiawan (2022) conducted a qualitative study in south Indonesia by interviewing one VIS. They concluded that AT collaborate in language learning. Since the student uses jaws, it facilitates reading and writing; jaws stand for job access with speech. It is a screen reader, which improves reading and writing. The idea is that the program does not need a copy in English. Even if the computer is installed in another language, a feature detects the language in which the text is written. Thus, reading becomes easy. Concerning writing in English, the VIS can install the English keyboard so the software speaks anything being written in English. This helps him comfortably learn English, makes the VIS more motivated to make an effort, and allows him to master reading and writing.

Saeed Akhtar et al. (2023) have investigated this field in the same vain. They concluded that NVDA is recommendable for the VIS to learn vocabulary, which has many properties that push the VIS to enrich his lexis. NVDA, without extensions and add-ons, is just a simple screen reader that reads the content included on the screen. These add-ons provide a lot of additional functions that facilitate computer management. Concerning CALL, NVDA facilitates learning spelling and how words are written. In addition, it helps the VIS with the intermediate level in English in translating words and expressions by using one of the translation add-ons like Yandex Translate.

After downloading it from an NVDA website like the NVDA francophone website, VIS needs to install this add-on. Then, it sets the source and the target languages. When the VIS reads a text and finds a strange word, he selects it using the ctrl+shift+right arrow. Then, he

presses insert+shift+t in order to hear its translation. It simply has the function of Google Translate. However, it is not recommended to translate a whole text because it only provides word-for-word translation.

Moreover, there is another add-on for intermediate and advanced learners called dictionary. This add-on assembles about 70 dictionaries of different languages, like the Oxford English dictionary. It facilitates the access to online dictionaries. After installing this application, the VIS just presses ctrl+shift+f6 so that the list of dictionaries appears. The VIS needs to select the dictionary he wants after pressing the enter key. The writing space appears in order to write the new word. After clicking ok, the definition of this word appears as it does in dictionaries. VIS can even delete or download a dictionary that he/she wants. Thus, these add-ons aim to facilitate access and to consume time. This leads the VIS to be more motivated to learn vocabulary using AT. Finally, AT collaborates appropriately in language learning.

1. 5. Artificial Intelligence (AI) and Visually Impaired Students

Artificial intelligence (AI) is an important branch of computer science that creates computer programs. It is a discipline which makes the software work with developed functions. There are many definitions by different scholars and researchers in computer science and engineering because of its ambiguity. Grewal (2014) has pointed out that "Artificial Intelligence is the mechanical simulation system of collecting knowledge and information and processing intelligence of universe: (collating and interpreting) and disseminating it to the eligible in the form of actionable intelligence". (P.1): this refers to how to obtain actionable intelligence. It is the way this feature deals with the collected data to reach the goal that the software gives the knowledge effectively.

To clarify more, Cardona, Rodríguez and Ishmael (2023) argue that "AI is not one thing but an umbrella term for a growing set of modelling capabilities" (p.15): this means that AI is not only a function that develops the work of a program, but it is a broad concept that has its

area of study like machine learning and natural language processing. Since this paper discusses language learning, it sheds light on natural language processing. NLP is a branch of AI responsible for the applications of language technology and computational linguistics. Machine translation and computer-assisted translation programs are among the software that have been created using NLP, and they are considered educational applications that enhance the cognitive strategies of learning. All in all, AI is a collaborative feature in CALL and is increasingly helping, progressing and getting spread in all countries.

Discussing AI's contribution to language learning in general and to VIS learning in specific is essential. It is a fundamental idea that has been investigated by scholars and researchers in the fields of computing, education, and linguistics. Yu (2023) has discussed this idea in which he focuses on computer vision as a branch of AI which helps VIS in their learning. He includes the side of learning as a part of activities that computer vision contributes to. In addition, VD and Thenmozi (2023) mentioned a research study that deals with the effectiveness of AI on VIS in improving communication skills. They have found that AI is recommendable for VIS, and many ATs work with AI. Some applications read a hard copy by pointing the smartphone camera at the text. These applications consist of envisioning AI and seeing AI; envision AI reads the text in hard copy as it does with digital documents. AI also has these functions, but it is more developed. In addition, this app is not available in all countries. Finally, AI is collaborative in enhancing VIS academic achievement.

1. 6. Research Contribution

Few researchers have studied the relationship between VIS, CALL and MALL and learning. First, Hennery (2023) has conducted a qualitative study discussing imagination and its influence on blind adult learners. He has relied on research interviews to answer his research questions. He conducted interviews with six females and two males who had lost their vision. Envivo coding has been utilised to analyse data. He concluded that imagination assists the VIS

in improving his learning strategies. In the same vein, AL Maki (2021) conducted research based on narrative inquiry to study the challenges faced by EFL VIS. He concluded that the curriculum does not suit their needs. Shafiullah and Akay (2023) have discussed the challenges faced by VIS using the meta-synthesis method. He concludes that assessment consequences, using technology, and social and educational conditions are among the difficulties encountered by VIS in inclusive environments.

Moving to technology, She (2023) has conducted a qualitative study investigating CALL and MALL to VIS. He has conducted interviews with ten students from around the US. He concluded that online language learning prioritises the use of CALL and MALL. Faculties should support VIS by providing pieces of training in online accessibility materials. Yu (2023) has also conducted interviews with twelve blind people to examine computer vision as a branch of AI and as an AT feature to support VIS. He finds that computer vision is successful in meeting blind people's necessities.

In this research paper, multimethod qualitative research was conducted using in-depth semi-structured interviews with five participants from different universities in Algeria., in addition to an auto-ethnography-based research. This study focuses on CALL and MALL as AT materials in relation to VIS in EFL learning, discussing language learning skills and strategies in addition to teacher-VIS interaction.

1. 7. Conclusion

Technological development has significantly impacted every field in recent years, transforming our ways of thinking and conducting activities. Education, a systematic process encompassing a vast array of subjects and specialisations, is no exception. In this chapter, we explored Computer-Assisted Language Learning (CALL) as a field of study, providing its definition, historical context, and examining its benefits and drawbacks. Additionally, we

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introduced Mobile-Assisted Language Learning (MALL), discussing its characteristics and features.

We then delved deeper into the topic by focusing on the application of CALL and MALL for visually impaired English as a Foreign Language (EFL) students. This section addressed teachers' challenges in instructing visually impaired students in inclusive educational settings. We also examined the specific learning difficulties these students encountered. Furthermore, we introduced assistive technology (AT) as a supportive tool in English language learning, highlighting its role in facilitating educational access. In the final part of this section, we discussed the impact of artificial intelligence (AI) on accelerating the learning strategies of visually impaired students, emphasising its potential to enhance their educational experiences.

Chapter Two: Research Methodology and Data Analysis

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2. 1. Introduction

Research is a systematic process which aims to explore, explain, describe and solve a serious problem. It investigates real-world situations and tries to improve them. It deals with many disciplines like language learning, computer sciences and educational sciences. It also attempts to link the two disciplines, language and technology. This chapter explores the qualitative exploratory research design methodology and delves into Data presentation and analysis of the researcher's auto-ethnography and the semi-structured in-depth interviews.

2. 2. Research Design

Stebin (2001, p.8), as cited in Hunter Mccalum and Howes (2019), has described exploratory research as "a broad-ranging, purposive, systematic, prearranged undertaking designed to maximise the discovery of generalisations leading to description and understanding of an area of social or psychological life. Depending on the standpoint taken, such exploration is a distinctive way of conducting science - a scientific process - a special methodological approach" (p. 2). From a social and psychological point of view, exploratory research is a systematic process based on the organisation of ideas. It focuses on the target of a study. Exploring a new phenomenon or knowledge leads the researcher to give more details about it. For instance, educational psychology and psycho-pedagogy specifically aim to explore the problem that makes students stressed during classroom participation. Another example is educational technology, which aims to find the problem of demotivation in attending online classes. Finally, exploratory research is a research design that facilitates how we discover our world.

The exploratory research has a set of objectives; Swaraj (2019) has introduced five purposes of exploratory research. First, it aims to create new ideas. Second, to improve the researcher's knowledge about the issue, which leads the researcher to know more about the

problem that he studies so that he can describe it. In addition, it targets to give a precise formulation of a problem. Moreover, it aims to assemble data in order to make an idea obvious; this occurs by collecting previous studies about the concept, and then the researcher derives the explicit description of the concept. Furthermore, exploratory research aims to see whether it is possible to accomplish the fieldwork, and this happens to detect the lack of fieldwork that he will conduct, like the absence of the sample. All in all, the objectives of exploring a phenomenon are different according to each research study.

A set of features characterises exploratory research; Question Pro has listed a set of its properties. First, exploratory research design is not structured. i.e., the fieldwork that needs to be conducted is unstructured or semi-structured like interviews. Second, it relies on open-ended questions by analysing data qualitatively rather than quantitatively. Because the open-ended questions are based on the data that require word analysis, they are characterised by a research question that begins with 'What', like the purpose of an element or the problem that leads to a particular phenomenon. The previous studies do not answer the research problem in exploratory research. However, previous research may contain different views towards a specific phenomenon or issue. In addition, exploratory research consumes too much time due to the qualitative analysis and basic research to establish the theoretical part.

Moreover, the problem should be significant by avoiding investigating issues that have no value in society. Since the research is not structured, its rules are broad. Furthermore, to conduct fieldwork, the researcher must have enough knowledge about the case he studies. Overall, exploratory research is the most suitable research to undertake regarding the implication of CALL and MALL within the VIS environment. Multimethod qualitative research was adopted because of the small population sample of EFL VIS. This work applies multimethod qualitative research where Auto-ethnography and interviews are used as research instruments. Auto-ethnography concerns the researcher since he is an EFL VIS at the University

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of Ain Temouchent Belhadj Bouchaib, in addition to a set of semi-structured in-depth Interviews with five EFL VIS from different parts of Algerian universities.

2. 2. 1. The Qualitative Research Method

Mertins (2009)points out that "Qualitative methods are used in research that is designed to provide an in-depth description of a specific program, practice, or setting" (P 251): it aims to reach a deep understanding of a particular phenomenon by going through a detailed description which leads to a robust research conclusion. Heigham and Croker (2009) argue that 'Qualitative research' is an umbrella term used to refer to a complex and evolving research methodology. It has roots in several different disciplines, principally anthropology, sociology, and philosophy, and is now used in almost all fields of social science inquiry, including applied linguistics" (P. 22)

This methodology's complexity refers to how the researcher interprets the data. Researchers may have various interpretations of one idea. This occurs in every social and human sciences field, such as psychology, sociology, and linguistics. The qualitative method contains a set of features that characterise the data collection process. In the study of qualitative description characteristics, Sandelowski (2000) (2010), Neergaard et al. (2009), Vaismoradi et al. (2009) (2013), as cited in Sefcik & Bradway (2017) introduce some features of the qualitative method. First, this research method is phenomenological and naturalistic, in which the researcher investigates a phenomenon in its nature. This phenomenon can be selected through the researcher's observation and attitudes. Second, this method is featured by its particular data collection tools, allowing the researcher to have the choice to conduct this research using a case study or any kind of interview. Third, the qualitative method features various types of analysis: the researcher can select any strategy to analyse his data, such as content analysis (the quantitative description of the collected data) in addition to the thematic analysis. The qualitative method is descriptive, which assists the researcher in reaching the

result by giving details about the ideas. This interpretive method is where the researcher must think critically to analyse the ideas.

2. 2. 2. 1. Sampling in Qualitative Research

Sampling is a technique which relies on choosing participants for a research study. Sampling can be used differently. Abbas set some types of sampling techniques. First, purposive sampling allows the researcher to choose participants, i.e., they have the same characteristics. In this paper, this technique has been implemented. EFL students have been selected based on their special needs, such as being Visually Impaired users of AT. Second, convenient sampling is one of the types which is useful when there is a limited time to submit a research study. The participant has the right to choose whether he collaborates in the research or not. Moreover, snowball sampling is another kind that relies on participants, referring to the idea that the researcher selects a few participants and asks them to refer to others. In this research, this kind of sampling is used in such a way that some participants have been asked to look for others, like participants Three, Four and Five.

2. 2. 3. 2. Multimethod Qualitative Research

In some cases, research studies require using several tools from the same method. The research onion discusses multimethod qualitative research as a method that is slightly different from mixed-method research. This has been clarified by Creswell (2015), as cited in Mek-Meyer (2020), who defines multimethod research as using multiple forms in qualitative methods like interviews and observation or quantitative methods like survey data and experimental data. Multimethod qualitative research is a combination of two research tools which suit data collection in order to answer the research questions. In this paper, the multimethod qualitative research is represented using auto-ethnography and Semi-structured in-depth interviews. Since the researcher is among the participants, the auto-ethnography has

been utilised. In addition, semi-structured in-depth interviews were conducted to assemble data, considering its quality and quantity.

2. 2. 3. 2. 1. Auto-Ethnography

Autoethnography is a research approach in the qualitative inquiry. It is different from other qualitative research tools. Terminologically speaking, the auto ethnography consists of 3 parts: auto, which means self; ethno, which refers to People; and Graphy, Which Represents Writing. According to (Poulos, 2021):

> Autoethnography is an autobiographical genre of academic writing that draws on and analyses or interprets the lived experience of the author and connects researcher insights to self-identity, cultural rules and resources, communication practices, traditions, premises, symbols, rules, shared meanings, emotions, values, and larger social, cultural, and political issues. (p. 6)

This approach resembles a story which is featured by telling it logically and critically. It allows the researcher to share personal experiences in the domain that concerns him with making an interpretation and analysing this experience. (Adam et al., 2015), as cited in (Poulos, 2021), designs a list which helps to understand this approach. He points out that autoethnography is a qualitative tool based on self-reflection and sharing personal experiences. This means that this approach helps to reach self-understanding and share everything the researcher has encountered in his field. This shows what our issues mean, guiding the researcher to understand his lacks in order to fulfil them while using auto-ethnography. It helps the researcher examine himself and others to solve the issues discovered during the auto-ethnographic study. The researcher requires the capacity to describe, evaluate and interpret the reasons behind a particular issue.

Auto-ethnography is written in many ways by researchers. Thus, there are a set of types used in different domains. First, descriptive auto-ethnography describes the researcher's personal experiences without any evaluation. On the other hand, analytic, critical auto-

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ethnography describes the evaluation of personal experiences in a logical manner and is characterised by critical thinking. This category is objectively used in the scientific fields of sociology, anthropology, linguistics, and others. However, the third type, confessional or self-critical autoethnography, analyses data subjectively.

Auto-ethnography is mainly used in three forms. First, it can be written using first-person voice, where the researcher subjectively introduces his experiences using the first-person singular. It is the way in which the reader feels the voice of the researcher as a participant. Second, it can be implemented in a third-person voice using the third-person singular. However, auto-ethnography may be written in the third person voice, implementing the third person plural. For example, (Clark and Gruba, 2010) have researched using social networking sites in foreign language learning. They used autoethnography as a research medium, implementing the third person voice in which they used the third person plural. Finally, there are many structures to be used in auto-ethnographic writing, and the third-person voice is appropriate to omit subjectivity and be explicit.

In this paper, a critical analytical auto-ethnography is adopted. It consists of the narrative, which includes the story of this participant. Then, the data discussion comes after. The data discussion is composed of two parts; the first part discusses the traditional learning strategies and tools. The second part studies Assistive Technologies in language learning, scrutinising the language aspects like the four skills, lexis and grammar. In addition, teacher-learner communication and interaction are part of this subsection.

In this research paper, auto-ethnography is used for two purposes. Some readers may ask why this method should be involved in the field of technology or the field of learning. Adams et al. (2017) set several aims for using auto-ethnography. First, the auto-ethnographer aims to inform the reader about his personal experiences concerning the phenomenon that he investigates. Learning experiences of VIS are the specific phenomena discussed in this research.

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Second, the auto-ethnographer aims to inform the reader about cultural aspects that other researchers might not have experienced before. Using AT is increasingly spreading in all domains. One the researcher is concerned with is the field of education in general and VIS learning specifically. VIS are the people most concerned about using this kind of technology in the academic setting. In general, implementing this research method needs specific purposes to be valid and reliable.

3. 2. 3. 2. 2. Interviews

An interview is a conversation between two people talking about a specific subject. Easwaramoorthy and Zarinpoush (2006) argue that an interview is based on a conversation between two people in order to gather information. This collected information occurs through the conversation between both people. Kvalr (1996), as cited in Alamri (2019) asserts that In the case of research, the data require analysis in order to deeply understand the person's answers. An interview for a research study can be done face-to-face or online. There are many ways to conduct an interview. Either structured in which the questions are fixed, semi-structured, or unstructured, where the questions vary depending on the case of the participant. Finally, the interview is a qualitative instrument that relies on recorded conversations to assemble information about a specific phenomenon.

A semi-structured interview is a conversation based on obtaining information from the participants. Ruslin et al. (2022) have suggested a set of properties that first characterise this kind of interview. Mason (2002), as cited in Ruslin et al. (2022), points out that interviews are a kind of conversations that might take place face-to-face or on social media platforms. Second, semi structured interviews are characterised by the informal style. Where the researcher gets as much information as possible from the participant regarding the research topic. This kind of interview is also called a structured, in-depth interview. Third, a semi-structured interview is a

topic-centred interview in which the researcher selects themes that need exploration and discussion with the participants.

In this research paper, online interviews have been conducted using the Telegram platform. This platform contains the recording function. A group named (interview) has been created where participants have been interviewed. The recorded section is not saved in this group but in a secured private file to protect each participant's data. These interviews are in-depth interviews in which data is deeply discussed. Osborn & Grant-Smith (2021) state: "The goal of interviewing is not usually to produce knowledge that is generalisable. In-depth interviewing allows researchers to explore in detail people's subjective experiences, biography, and assumptions" (p. 2). In order to scrutinise all this information, meetings have been prepared with each participant. The duration of these sessions varies from one participant to another. These sessions might last from 1-2 hours and 30 minutes.

The interview questions discuss the effect of CALL and MALL on | the VIS learning process in the EFL context. It consists of six parts. The first part requires the participant to provide a background of himself in terms of the type of visual impairment, motivation towards learning English, and learning exclusion and inclusion. The second part discusses the implementation of AT in EFL learning, in which familiarity, the time spent using AT, and learning the four skills are evaluated. The third part explores teacher-learner communication using AT. The fourth part investigates the use of artificial intelligence (AI) as a function in AT. The fifth deals with assessment and feedback using AT. It discovers whether teachers and VIS are acquainted with using these materials in test conduction. The last part ends the interview by asking participants to give suggestions and recommendations on the use of AT, CALL, and MALL.

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2. 2. 3. Data Analysis Procedures

In this paper, thematic analysis has been selected to treat the collected data. Thematic analysis is a kind of data analysis that is based on dividing gathered data into themes. This process is utilised with auto-ethnography and semi-structured in-depth interviews.

For the Auto-ethnography, the narrative analysis is composed of three stages. First, it deals with the traditional way of learning of the researcher. The second part concerns the shift in which the researcher starts learning the use of technology in his high school. The third part discusses the use of AT in EFL learning and how it helped him in his studies.

In this part, we have divided data analysis into two themes. The first theme, which discusses traditional English language learning strategies and skills, investigates old teaching methodologies and learning strategies in Braille implementation. The second theme that discusses technological implementation is divided into two other subthemes. The first subtheme discusses aspects of learning language, including oral communication, reading and writing, grammar, and vocabulary. The second subtheme investigates the use of AT in the interaction between teachers and VIS.

For the semi-structured in-depth interviews, data are divided into six themes: learning background, AT in EFL learning, AT in EFL teaching, AI and language learning, assessment, and improvements. The learning background discusses the participant's learning experience evaluating the motivation in his EFL learning. AT in EFL learning attempts to analyse the participant's attitudes towards AT and its use in learning the four skills. AT in EFL teaching aims to see how CALL and MALL successfully communicate between instructors and VIS. Additionally, it evaluates the participant's point of view regarding AT use in face-to-face or online learning. AI in language learning evaluates the participant's knowledge about AI features in language learning. The part of the assessment targets to discuss how technology needs to be

inserted in inclusive environments in terms of tests and exams for VIS. The last part of improvements introduces and assembles the participants' visions concerning AT development.

2. 4. Auto-Ethnography: A Narrative Analysis

English has been among my preferred languages since middle school. I started studying English in a special needs school in 2012. I began to build a strong relationship with this language. Since I am a VIS, I studied this language using the traditional way of learning. It relies on hard copies of traditional Braille materials. During this period, our teachers used old teaching methodologies like GTM. Since we were less acquainted with this language, our teachers had implemented translation from l1. In addition, dictation was another way to learn how words are written. In the first and second years, our teacher used audio-visual aids that improved listening and pronunciation. He used to introduce songs and recordings to us. I remember he gave us hard copies with Braille writing so we could follow while listening. Despite learning computing, I was not familiar with computers and phones. This was not enough because of lack of materials and lack of training. In the last two years, I started asking for information about technology. When I got a computer, I began to practice writing in MS Word. In this period, the computing teacher brought the keyboard to teach us how letter keys are organised and how controlling keys are shaped. In general, I had never used AT in EFL learning during this period.

In 2016, I moved to study in high school. High school for VIS may be challenging due to the differences in learning strategies and teaching methodologies. I did not face many challenges. Since I lacked books in Braille, I sometimes relied on the internet to get information about our study lessons. I have never used this device in a classroom. Although I started learning smartphone management, I had ignored its use in class. Consequently, I could not get access to dictionaries, unlike my classmates. I have been studying English for those three years using my traditional way. However, I depended on the computer to improve my listening skills. I relied

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on the BBC and some YouTube channels that offer English conversations. Using this strategy, I started recognising various English accents like the RP and American English. In addition, I tried to chat with native speakers and English-speaking people using different social media platforms, such as Facebook, since I specialised in foreign languages. The lack of accessible reading programs prevented me from using online content in English and answering subjects related to the Baccalaureate exam. In this period, technology was slightly involved in my EFL learning process.

In 2019, I selected English as a speciality at university. When I started studying there, I had the chance to choose my learning strategies freely as a university student. I have been involved in technology in this field. As EFL students, we were supposed to read books and articles in many fields, such as literature, civilisation, and language sciences. As a VIS, I did my best to get English voices and software that play a fundamental role in reading. The idea is that these voices read for VIS the content of written material. I remember one day when one of the EFL teachers asked us to read a novel. It was my first time to discover what a PDF file is. I started using AT in learning language aspects like reading and writing through doing assignments and learning communication. Technology was highly adopted in oral expression. One of the EFL teachers was focusing on listening and speaking. She used to provide recordings from multiple English-speaking people so that we could learn lexis on different topics. The way to communicate with different people and detect varied English accents.

In the middle of the first year, online learning was established by the Algerian Ministry of Higher Education and Scientific Research. It provided me with the benefit of technology in communicating with my EFL teachers. I easily learnt about the diverse educational platforms the government supports. Phonetic transcription is the only challenge that could not be solved even with AT. This international phonetic alphabet IPA is not available in the Braille system. I tried a lot of solutions on my PC, but I had no success. I started using apps to improve my

English fluency and proficiency during this period. I have used English games like vocabulary builder, grammar tests, and quizzes…. After two years, reading apps were developed, which made me use MALL to read lectures, books, and other written materials. I started to be acquainted with research methodology in the English language. I learnt the way to create forms. I also started learning MS Office PowerPoint to make presentations. When I was enrolled in my master's, I did some presentations using this program. I remember one of my teachers telling me about her curiosity about how to work with AT and what materials were provided for VIS. Concerning tests, I used AT in online learning, implementing Google Forms, E-mails, and Google Classroom. However, it has never been used in the classroom.

2. 5. Interviews Analysis

This research conducted a semi-structured, in-depth interview with five participants, such as VIS, from various universities in Algeria. In these analyses, the learning experiences of each VIS are presented.

2. 5. 1. Participant One

Participant One is the first participant to conduct an in-depth interview; technically, he is considered a pilot interview.

2. 5. 1. 1. Learning Background

English is the language of choice for the first participant because he grew up watching movies. From a young age, he started watching films with subtitles, significantly contributing to his English learning even before he experienced an eye injury. Generally, people who watch movies in English without formal language certification often still achieve a reasonable level of proficiency, suggesting that movies can be an effective tool for learning the language. The participant's family played a crucial motivational role, encouraging him to pursue his studies in English despite his visual impairment. This familial support acts as a psychological catalyst,

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pushing him to achieve many things, including mastering English. His early exposure to English through movies and his family's encouragement has fostered a desire to become fluent and create content in English.

In addition to family support, the participant's motivation also stemmed from his passion for improving his reading and writing skills, as he had already developed listening and speaking skills through movies. This indicates that motivation for learning English encompasses the family's support and the learner's personal attitude towards the language. When asked about the challenges he faces in learning English, the participant identified difficulties with English transcription, particularly in phonetics. Phonetics, the scientific study of human speech sounds, involves the production, perception, and transmission of these sounds and their transcription. For visually impaired students, transcribing language is challenging, even for those proficient in Braille. Another barrier involves using images, graphs, and tables, commonly used in phonetics, to describe the human vocal cords. The reliance on visual aids in this context makes learning difficult for VIS students.

Regarding lectures, the participant relies on listening and speaking rather than writing, as he is not proficient in Braille. He uses digital tools to review his lectures, which are vital for his studies, particularly in learning English. For homework, he requests that assignments be sent via email, allowing him to complete them in Microsoft Word. He engages in socio-collaborative learning strategies in group assignments and classwork, which enhance his English skills.

The participant also utilises technology, including his phone and computer, which are crucial for his English learning and are part of CALL and MALL strategies introduced in earlier chapters. He primarily uses screen readers for assistance, which are effective for reading documents in PDF format through applications like Voice Aloud Reader. The appropriateness of these tools varies by language; for instance, screen readers tend to have better English

pronunciation than Arabic. Thus, the suitability of a language learning application often depends on the language it supports. Consequently, language is the main criterion for deciding whether the application is appropriate.

2. 5. 1. 2. Reading and Writing Skills

Reading and writing skills are crucial elements that learners need to consider. In CALL, the participant uses several programs and apps for writing. On his computer, he primarily uses Dragon NaturallySpeaking, a voice typing software that facilitates writing. He also uses Windows Dictation in Windows 10 and Notepad as his main writing tools. On his mobile device, he uses a simplified Notepad app. As a result, he does not face significant difficulties in choosing a writing strategy.

However, the participant encountered problems with screen reader compatibility while learning these programs. Not all software is fully accessible with screen readers. This necessitates additional assistance since he does not use a mouse, leading to technical challenges that can hinder the completion of academic tasks. Regarding AI applications, the participant expressed an interest in AI. He uses OpenAI tools to help with brainstorming and written expression. This has both positive and negative effects: on one hand, it saves time; on the other, it provides too much assistance, potentially diminishing his critical thinking skills.

For reading, if the document is on his phone, he uses Voice Aloud Reader. He uses Notepad to access text documents on his PC. His reading strategy depends on the document type, whether a short text or a novel. Writing presents additional challenges, such as correcting words and controlling text size, which can impact his writing performance. Although his phone is helpful for writing tasks, it has limitations. The participant often uses his phone for classwork, especially during written expression sessions where he sometimes works alone. Writing on the phone is time-consuming due to difficulty navigating the keyboard, even with voice typing,

which may not function well in a noisy classroom environment. Consequently, his progress is slow, requiring considerable time to complete tasks.

2. 5. 1. 3. Grammar, Vocabulary and Culture

These linguistic aspects, grammar, vocabulary, and culture, are very important. Regarding grammar, the participant learned this aspect through movies, acquiring grammatical structures automatically without complicated methods. This process aligns with language acquisition, which involves learning a language subconsciously. The participant does not favour using games for language learning, highlighting individual differences among learners. Regarding the influence of movies, the participant gave an example: when you listen to the expression "I will go tomorrow" many times. Then a person comes and says, "I will go yesterday", it will be confusing for you. Therefore, you understand that this expression is false. Thus, this is among the real examples of second language acquisition.

Concerning lexis, the participant argues that social media platforms are effective for learning, especially when interacting with native speakers, which enriches one's vocabulary. Instead of games, the participant uses apps to develop vocabulary, though this approach lacks practical application. The best method is to practice what is learned to reinforce it. Some games suitable for screen readers, like English quizzes and vocabulary builders, can aid this process. The participant primarily uses Google Assistant for dictionary needs, as it is speech-based and time-efficient, and he also uses Merriam-Webster for checking vocabulary. Thus, theoretical knowledge alone cannot achieve vocabulary learning without practical application.

Regarding culture, videos are valuable for cultural development. The participant watches tutorials related to computer sciences, though many tutorials do not use screen readers, complicating the learning process. Technology is a significant cultural element influencing people's lifestyles. The participant finds social media platforms like Facebook useful for cultural learning, particularly when screen readers describe images and read text within

pictures. From a visually impaired perspective, he also views YouTube as superior to Facebook in terms of navigation and cultural development.

2. 5. 1. 4. Listening and Speaking Skills

Listening is the strongest sense for visually impaired students (VIS). The participant believes that listening is very effective for language learning, especially when listening to stories, as it helps familiarise learners with particular accents and expands their knowledge. Listening can be linked to memory retention. The participant finds audiobooks to be the most beneficial for improving listening skills due to their clear voice and language. Additionally, he enjoys listening to interviews, which helps improve conversational skills and communication. Listening allows EFL learners to explore new words and expressions, often repeating them during learning. The participant used to practice repetition but has since stopped, believing his pronunciation has improved, indicating that repetition aids in developing pronunciation and fluency.

Communication is a vital skill for any English student. CALL and MALL provide various communication tools like software, apps, and social media platforms. The participant views social media as essential for learning communication skills, particularly platforms facilitating random communication and making new friends from countries like Azar. This goal motivates learners to improve their communication skills. The type of people the English learner interacts with is crucial in determining the level of communication skills. The participant prefers conversing with everyday people, which helps develop communication skills and other linguistic aspects. Previously, he spent up to six hours talking to one person, though this has reduced over time, depending on the enjoyment of the conversation. Enjoyable activities enhance learning efficiency, and conversations facilitate improved communication skills. The participant finds talking to native speakers beneficial for learning pronunciation, accents, and

even dialects. Native speakers often make extra effort to ensure learners understand, aiding in language learning.

Text-based apps are also useful communication tools, though group chats can be challenging for visually impaired users. The participant finds it cumbersome to read all messages from group members, often leading to neglecting such applications.

2. 5. 1. 5. Testing and Assessment

Tests are essential for assessing student knowledge and significantly impact the development of English proficiency. The participant manages testing situations with the help of teachers who read the questions aloud, and he dictates the answers. This process is time-consuming due to dictation, and the type of subject also plays a role. Subjects based on texts pose challenges as visually impaired students may struggle more than their sighted peers. The classroom environment is also important, and the participant notes that noisy classmates can affect his performance during exams. As an alternative, the participant suggests integrating technology, like Braille, for testing, though he acknowledges the importance of using technology equipped with AI, such as Envision AI, despite its limitations, such as the inability to detect italicised words or those in brackets. Such tools can assist visually impaired students in tasks requiring textual analysis, thereby easing the workload for both teachers and students in passing exams and tests.

2. 5. 2. Participant two

2. 5. 2. 1. Learning Experience

Participant Two describes his condition as partial visual impairment, which severely restricts his ability to read printed text and write using conventional methods. Consequently, he adopts the common learning strategies that VIS uses. Participant Two is proficient in Braille, a traditional writing system based on tactile signs. His mastery of this technique, acquired at a special needs school, has been crucial in enhancing his vocabulary and spelling skills.

CHAPTER TWO: RESEARCH MEHODOLOGY AND DATA ANALYSIS

Participant Two's learning journey highlights the challenges and triumphs of acquiring English as a foreign language. He recalls studying at the Special Needs School of Al Achor in Algiers, where he began learning English in middle school. Initially, he faced significant obstacles in mastering vocabulary, grammar, and pronunciation. Over time, these challenges were mitigated through persistent practice, including repetitive pronunciation drills and the use of newly learned words in sentences, alongside a focus on enhancing his writing skills. Marulanda Angel and Martines García (2017) emphasise that improving academic writing plays a crucial role in enhancing various language aspects, such as syntax and vocabulary. In the context of vocabulary acquisition, writing practice is vital for EFL students to become familiar with word spellings. For VIS, English language instructors at special needs schools provide essential support, such as spelling out terms while dictating lessons or information.

Participant Two attributes his positive attitude towards learning English to intrinsic motivation, which is a key psychological factor that drives a person to pursue a task. Aminah and Nugraha (2021) state that intrinsic motivation can significantly enhance English language skills when accompanied by appropriate teaching methods. For this participant, the supportive classroom environment and the guidance of an EFL teacher proficient in traditional writing techniques, such as Braille, were instrumental. Additionally, external motivation from his parents further fuelled his determination to improve his English proficiency. A combination of intrinsic motivation and consistent practice has contributed to his language development.

Having attended a special needs school, Participant Two has experienced both inclusive and exclusive educational environments. He notes that the varying approaches to teaching and learning in these settings can be confusing for VIS. Differences in materials, teaching strategies, and teacher types between special needs and inclusive schools can lead to a lack of necessary resources in inclusive settings, such as Braille and assistive technology (AT) devices. The lack

of materials and suitable teaching methods, like dictation, hinders the progress of VIS in subjects like English.

2. 5. 2. 2. Assistive Technology in EFL Learning

Participant Two is well-acquainted with the concept of assistive technology (AT) and uses various AT devices and apps to facilitate his EFL learning. He feels comfortable using his smartphone, which supports reading apps like Jieshuo and Smart Voice, enhancing his study capabilities. Metruk (2021) advocates for the use of smartphones in EFL contexts, highlighting their benefits in improving language skills, including communication, vocabulary, grammar, and syntax. Familiarity with AT is essential for VIS to succeed in academic tasks and learning strategies in EFL.

One significant challenge for Participant Two is the difficulty of reading printed text, as inclusive schools often lack strategies to provide Braille handouts. To overcome this, he uses various technological apps, such as Tech Freedom, which accelerates reading techniques and offers more effective functions than other apps like Envision AI, making reading more accessible for VIS.

Participant Two has been using AT for four years. While this duration has allowed him to become familiar with various devices and software, he has yet to achieve complete mastery. This may be attributed to his attitude towards learning about technology and the lack of necessary materials. Hesitation in learning to manage a PC, including file management and software like MS Office, has posed additional challenges.

Technology has significantly enhanced Participant Two's language proficiency, particularly by providing audio resources that improve communication and listening skills. He highlights the advantages of AT, such as creating websites and platforms that facilitate learning for VIS who are not proficient in Braille. These technologies enable VIS to read, write, and perform various activities, filling gaps in traditional learning methods.

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2. 5. 2. 3. The Usage of Assistive Technology in Learning the Four Skills

Participant Two uses various mediums, such as interviews, podcasts, and audiobooks, to improve his listening skills. These resources help him learn new words and expressions, particularly through interactive YouTube channels. He engages in listening tasks through repetition, which helps reinforce new expressions in context. This engagement leads to excitement, a psychological factor that enhances learning enjoyment. Mathew and Alidmat (2013) suggest that audio-visual aids, like conversations and dialogues, motivate learners to study English.

The primary challenge for Participant Two is a lack of vocabulary. Technology aids him in understanding difficult words or expressions through repetition, thereby improving his language proficiency. Kaur (2012) emphasises that repetition in listening and speaking enhances clarity and understanding of new aspects. He prefers listening to dialogues, which are beneficial for learning English. Dialogues teach conversational skills, vocabulary, pronunciation, the distinction between formal and informal language, and various accents like British and American.

Regarding Speaking skills, participant Two practices speaking through repetition and by participating in discussions. Feedback is provided by group members rather than through technology, helping correct expressions and pronunciation. He uses social media platforms, such as Hello Talk, to interact with native speakers, which helps him learn different accents and enrich his vocabulary. This interaction motivates him to participate more actively in discussions. He frequently uses voice features in Google Translate and Google Assistant for pronunciation practice. This approach helps him adjust to difficult words and is an effective learning strategy for VIS.

Reading is essential for language competence. Participant Two uses screen readers like TalkBack, Jieshuo, and Smart Voice, as well as apps like Tech Freedom, to read digital

documents. However, these tools are not compatible with photocopied documents or poor handwriting, indicating a need for improved reading techniques. While Participant Two does not find any specific reading materials enjoyable, his interest in various fields like policy, economy, and technology drives him to read more and expand his vocabulary. He uses Tech Freedom to navigate texts by sharing documents with the app. However, he faces difficulties navigating MS Word documents with his phone screen reader, indicating a need for better mastery of writing software. He encounters challenges with photocopied text and handwriting due to a lack of knowledge. While apps like Insta Reader can read photocopied documents, his reading strategies remain limited.

In terms of writing, Braille has been a helpful tool and has not hindered his learning. However, he lacks knowledge about technological writing tools and is still learning to use computing and writing software, which may improve his learning strategies.

2. 5. 2. 4. The Use of Assistive Technology in EFL Teaching

Technology plays a crucial role in facilitating teacher-student communication. Participant Two uses various tools to interact with his instructors, including phone calls, Gmail for assignments, and platforms like Google Forms and Google Classroom for tests and exams. However, his reliance on others to write assignments due to a lack of proficiency in MS Office reduces his learning autonomy.

Providing feedback is crucial for identifying and correcting mistakes. Participant Two's teachers use technology to send messages or mark errors in his work, demonstrating that technology is compatible with feedback delivery. Technology is commonly used in classrooms and is preferred by many teachers. Participant Two mentions that his teachers occasionally use audio recordings to explain language concepts, which helps improve his listening skills.

Online classes facilitate interaction between EFL teachers and students. However, Participant Two rarely engages in discussions with his teachers and classmates due to fear of

making mistakes, which can hinder his learning progress. Participant Two does not use technology in the classroom, which does not negatively affect his cognitive learning strategies. He acknowledges that while technology can be beneficial for accessing lecture materials and information, it can also be misused outside academic contexts. However, participant Two uses his mobile device for individualised learning plans, such as listening to English programs. Technology provides the necessary tools for planning and personalising his learning experience.

2. 5. 2. 5. Artificial Intelligence and Language Learning Strategies

Participant Two is somewhat familiar with artificial intelligence (AI), citing ChatGPT as a tool he uses. Tech Freedom, an app with AI-generated voices from Eleven Labs, also supports his learning, indicating a limited understanding of AI capabilities. For Participant Two, AI simplifies research methodologies. However, he believes that over-reliance on tools like ChatGPT can diminish creativity and academic work's originality, as Khanzode and Sarode (2020) noted. AI can reduce the human touch necessary for personal understanding and interpretation of research.

Participant Two does not utilise AI applications to enhance language proficiency due to his limited familiarity with AI tools. He acknowledges the benefits of AI in facilitating learning strategies but also recognises its potential drawbacks, such as enabling cheating in online exams. His limited knowledge of AI restricts his ability to provide a comprehensive evaluation. Assessment and Feedback

Sending files via email, Google Classroom, and Google Meet are the primary platforms used by EFL teachers for continuous assessment. Participant Two finds these methods accessible for completing exams and for teachers to collect and correct data. Self-evaluation allows students to identify and correct mistakes. Participant Two notes that technology, including AI platforms like ChatGPT, helps students improve their work, enhancing fluency

and competence. Participant Two has not advocated for specific assessment methods, indicating that he finds online assessments accessible despite his limited proficiency with MS Office programs. These programs can assist in exams or tests submitted via email.

Participant Two expresses a desire for more language learning apps, which he believes are essential for improving language competence, fluency, and proficiency. He prefers communication apps to enhance his speaking skills and vocabulary. Participant Two views technology as a facilitator for learning, providing additional tools for various academic tasks. He perceives technology positively, recognising its potential to enhance educational experiences.

2. 5. 3. Participant Three

2. 5. 3. 1. Learning Experience

The participant is completely visually impaired, which means he engages with various learning strategies, both traditional and modern. This participant attended the Special Needs School of El Achor in Algiers, where he mastered Braille during his educational journey. He argues that special needs schools are superior because they have trained teachers proficient in teaching methodologies, such as using dictation with spelling and mastering writing with the Braille system.

This participant is unique among the sample members for specialising in translation. He began learning English two years ago. Two key factors motivated him to learn the language. Firstly, his interest in translation necessitated learning English to facilitate translation from English to other languages. This indicates that he is externally motivated and driven by the requirement to achieve a specific goal. External motivation, a psychological factor, propels individuals to pursue certain aims. Secondly, the universal status of English further reinforces his external motivation. He acknowledges that English is pivotal across various fields, such as

policy, education, and the economy. These external factors prompted him to prioritise learning English.

2. 5. 3. 2. Assistive Technologies in EFL Learning

The participant is familiar with several assistive technologies, including mobile phones and computers. He feels more proficient with mobile phones than with computers. Using a mobile phone for English language learning is comfortable for him as it provides strategies and tools for communication. The ability to interact with people via smartphone positively impacts his English competence. Additionally, specific tools, such as YouTube channels, podcasts, and communication apps like "Goodnight" and "Speaky," enhance his communication skills by allowing him to connect with native speakers.

Participant Three has been using technology for five years. Initially, he used it to study French and later applied this experience to learning English. This demonstrates that language learning through CALL and MALL can be similar despite the diversity of tools available. The participant believes that technology is highly beneficial for VIS. Since they rely heavily on listening, technology offers multimedia and social media platforms that influence language learning and usage. He asserts that ATs are more effective than traditional learning strategies due to their wide range of resources and materials that aid in studying various aspects of the English language.

2. 5. 3. 3. Usage of AT in Learning the Four Skills

The participant generally uses MALL technology to practice listening. He prefers channels, podcasts, and radio apps, which are effective audio materials for enhancing listening skills. These strategies improve his English fluency and proficiency. YouTube plays a significant role in learning and improving listening skills. Balay and Keles (2017) found that YouTube positively affects English language learners by providing materials such as movies that help students understand native speakers and various English accents. Listening to podcasts

is another effective strategy, enhancing vocabulary and metacognitive awareness, as noted by Azmee (2022). Podcasts cover various fields, allowing students to learn specialised vocabulary. Listening to spoken material requires interaction for complete understanding. The participant employs two strategies for engaging with audio material. Firstly, recording is a significant method for practising listening, especially for learning the pronunciation of new words. Secondly, he looks up new terms in a dictionary. Learning new words and expressions poses a challenge in listening, but ATs like MALL provide online dictionaries that facilitate learning.

As far as speaking, ATs offer materials that allow students to practice speaking. The participant prefers apps like "Goodnight" and "Speaky" for this purpose. Mouna (2018) confirms that "Speaky" is a valuable app for English learning, improving speaking skills by connecting with various English speakers. He corrects his pronunciation by chatting with these individuals, including a friend from Mexico who is an English teacher, helping him improve his American accent.

Communication is key for any foreign language learner to enhance proficiency. According to the participant, meeting native speakers is the most effective strategy for improving spoken English, as it helps understand various English accents and enrich knowledge about English-speaking countries' cultures.

Speech recognition is a feature available on mobile phones, such as Google Translate or text-to-speech applications like TalkBack and Jieshuo. The participant does not use this feature because, as a translation student, he needs to focus on comprehension. He believes that these functions do not significantly contribute to speaking or translation. For instance, Jieshuo offers translation options but primarily supports literal or word-by-word translation.

Reading is a receptive skill essential for all students. For VIS, specific tools assist in reading. The participant uses the Jieshuo screen reader, which helps him navigate online content, dictionaries, books, and documents. Additionally, he uses document-reading apps like

Envision AI, which can read photocopied and handwritten documents. He states that VIS generally rely on listening, and these functions are helpful for recognising content on screens.

Writing is a productive skill that VIS may face with challenges. The participant typically uses MALL technology, relying on voice assistance for dictation to write texts and long paragraphs. He does not use MS Word for English learning, citing a lack of English voices on his PC. He uses a screen reader to edit, proofread, and correct spelling errors, navigating letter by letter or word by word, unlike with Microsoft Word. If he used MS Word, he believes he would have a different opinion. Overall, the participant has not fully benefited from writing software.

3. 5. 3. 4. The Use of AT in English Language Teaching

Teacher-student interaction is crucial in the teaching-learning process, and technology significantly enhances communication between teachers and students. The participant uses Google Meet and Google Classroom for online sessions, which are particularly useful for interacting with teachers. Feedback is also provided through Google Classroom, so there are no challenges in online learning that could impede language learning strategies.

AT also supports collaboration and participation in group activities. The participant does not face difficulties participating in group discussions, whether online or in person. Psychologically, he feels comfortable in online classes, where he can discuss lessons with his teacher and classmates effectively and without stress.

The participant has no experience using AT in the classroom. The subject matter does not require AT, and teachers are not trained to facilitate learning for VIS using technology. As a result, he has not benefited significantly from classroom sessions.

Individualised plans are essential for any student to create a structured learning approach. As a VIS, the participant uses AT to convert homework into text using Envision AI, enabling him to read the text. Therefore, individualised plans mainly focus on completing

homework. A significant challenge is the lack of training for teachers in technology to meet the needs of VIS, despite the successful interaction between the participant and his teachers.

Artificial Intelligence and Language Learning Strategies

Artificial intelligence (AI) is an advanced technological feature that plays a role in language learning. However, the participant does not utilise AI in his learning strategies, limiting his ability to benefit from its functions that enhance language learning. Dodigovic (2007) finds that AI facilitates error correction and improves written materials. For example, Grammarly, an AI software, detects grammatical errors and guides users in better preparing their texts or paragraphs. Similarly, Rusmiyanto et al. (2023) conclude that AI increases communication through apps and features like speech recognition and chatbots.

The participant lacks knowledge about AI features, including the fact that some screen-reading software is equipped with AI. For instance, Envision AI includes an "Ask Envision" option that provides additional information about the content being read. Instant text recognition is another feature that aids in reading hard copies. Overall, the participant finds AI currently useless in his language learning.

2. 5. 3. 5. Assessment and Feedback

Language learning technologies aid in conducting tests and exams. However, the participant does not rely on these features, preferring traditional methods. Although online exams are available via Google Forms and Google Classroom, he does not use technology for self-assessment or evaluation. Based on his experiences, he proposes training teachers in AT and suggests that academic institutions should create special classrooms equipped with computers to make VIS more independent and facilitate teachers' work. Despite a preference among VIS for using AT for exams, there are currently no conditions to facilitate this process. The future of AT is promising, with ongoing developments in CALL and MALL. The participant believes that an important feature to improve is the integration of multiple languages

in smart voice technology, allowing the recognition of French, Arabic, and English, which is beneficial for a translation student like him. He anticipates that future advancements in AI will further enhance language proficiency. He recommends training teachers in AT use and improving the learning process for VIS by providing technological tools that meet their needs.

2. 5. 4. Participant Four

2. 5. 4. 1. Background and Learning Experience

Participant Four, a graduate of Elhadj Lakhdar University in Batna, completed a master's degree in English in 2019. He began learning English in middle school and chose it as his speciality due to his passion for the language and its global significance in various scientific fields. His motivation for learning English is primarily intrinsic, driven by a personal love for the language rather than external factors. Internal motivation stems from psychological influences like personal interest and passion, which are more powerful than external motivation. Being totally visually impaired (VIS), he attended the Special Needs School of Taha Hsin in Biskra. He observed significant differences between special needs schools and inclusive schools. In special needs schools, teachers are well-versed in Braille and use teaching methodologies tailored to visually impaired students, such as combining dictation with spelling exercises to enhance pronunciation, spelling, and meaning comprehension. In contrast, inclusive schools often lack trained staff and appropriate teaching methods for VIS, posing additional challenges that need to be addressed.

2. 5. 4. 2. Assistive Technologies in EFL Learning

The participant is somewhat familiar with assistive technologies (AT) and feels comfortable using them. He utilises both a smartphone and a computer. The smartphone helps him read books and articles, while the computer is mainly used for writing, providing access to Microsoft Office programs. He has been using these technologies for 12 years, significantly improving his ability to recognise different English accents. He employs various methods to

enhance his listening skills, such as listening to audio recordings and watching videos. He particularly finds TED Talks beneficial for distinguishing between English accents, as they feature diverse speakers worldwide.

Despite the benefits, the participant faces challenges in learning vocabulary. He relies more on YouTube channels than dictionaries to expand his lexicon, allowing him to learn new expressions and their pronunciations. Research suggests that mobile phones are practical tools for vocabulary acquisition, providing easy access to resources like audio, videos, and dictionaries. The participant views AT as an invaluable resource for reading, offering access to unlimited books and articles and broadening his knowledge across various domains. He also highlights the role of screen readers like NVDA in improving spelling by providing audio feedback on the spelling of new words.

2. 5. 4. 3. Usage of AT in Learning the Four Skills

Listening is crucial for comprehending content in English. The participant primarily uses YouTube channels to practice listening, focusing on the BBC Learning English channel. He employs several techniques to engage with audio material, including repetition, mimicking what he hears to get accustomed to new terms or expressions, and writing, where he notes down difficult words to learn their spelling and meaning. This process, though complex, helps him tackle the main challenge of learning specific vocabulary related to different topics.

Speaking is essential for effective communication. The participant practices speaking by imitating what he hears and correcting his pronunciation during the process. Despite acknowledging that technology can boost self-confidence, he does not rely on social media platforms to practice speaking. This presents a question of why he does not use these platforms, which can help learners gain confidence by interacting with native speakers. Additionally, the participant does not make use of speech recognition features to aid his speaking practice.

Reading is a fundamental skill that enhances language proficiency. The participant uses smartphone screen-reading applications like InstaReader and Envision AI to access written materials, including pictorial illustrations. These tools provide artificial voices that read out texts, making them accessible for visually impaired users. He uses book reader software for PDF files and DXV applications for Braille materials on his computer. InstaReader is his primary choice for reading, and he reports no significant challenges in this area.

Writing helps cement spelling and language use in the brain. The participant considers AT an effective tool for writing. During his master's studies, he used his laptop to take notes during lectures quickly. Screen readers like NVDA and JAWS assist him in proofreading and correcting his work by alerting him to spelling and grammatical errors through auditory signals, which helps eliminate misunderstandings in written materials.

2. 5. 4. 4. Assistive Technologies in EFL Teaching

Teacher-student communication is crucial for learning and understanding the subject matter. The participant believes that this area requires improvement. Due to time constraints and the lack of online learning opportunities before 2019 in Algeria, he has limited experience interacting with teachers through AT. Consequently, he has not received much feedback via technology, and teachers in his classes typically do not use AT due to a lack of training and familiarity with these tools. This lack of experience has also hindered the implementation of socio-collaborative learning strategies using AT. The participant suggests that the absence of individualised learning plans is due to most activities being conducted in traditional classroom settings.

2. 5. 4. 5. Artificial Intelligence in Language Learning Strategies

AI is a recent technological development that has become significant in the 2020s. The participant is somewhat familiar with AI and uses it occasionally for academic tasks such as learning grammar, summarising, research, and translation. He uses the website Smodin, which

is equipped with AI for tasks like summarising texts and translating. While AI can save time and facilitate learning, the participant warns that over-reliance on AI can reduce effort and critical thinking. He prefers traditional learning methods, such as reading books, which he believes provide more comprehensive information.

2. 5. 4. 6. Assessment and Feedback

Assessment is challenging for VIS, as it determines their proficiency and involves testing and evaluation. The participant has had limited opportunities to use AT in exams, resorting to Google Forms and Gmail on rare occasions. He finds that AT does not contribute significantly to self-assessment or reflection. He has requested permission from the administration to use his computer for exams, but they refused, forcing him to rely on traditional methods and assistance from others. This can be time-consuming and inconvenient. He recommends that teachers provide electronic versions of exam materials and that administrations allow the use of devices like PCs to make the exam process more efficient and foster autonomy for VIS.

The participant believes that the future of AT, including CALL and MALL, will involve the addition of more advanced features. He suggests that improvements should include the ability to recognise and vocalise multiple languages, such as French, Arabic, and English, which would be particularly useful for translation students. He also advocates for the training of teachers in the use of AT to support the learning needs of VIS better and to provide technological tools that meet their specific requirements.

2. 5. 5. Participant Five

2. 5. 5. 1. Learning Background

This participant completed his PhD at Ouargla University, having obtained a bachelor's degree in English in 2008 and a master's degree in 2014. He reports that he chose to study English based on a recommendation from his cousin, indicating an element of external

motivation. External motivation can stem from various sources, such as family, friends, or career opportunities. As a completely visually impaired student, he attended Taha Hussein Special Needs School in Biskra. He noted that this school's teaching methodologies and learning strategies were specifically tailored to suit visually impaired students, fostering self-confidence and independence. This foundational support enabled him to adapt to inclusive environments in high school and university, emphasising the crucial role of special needs education in equipping visually impaired students with the skills necessary for broader educational settings.

2. 5. 5. 2. Assistive Technologies in EFL Learning

Assistive Technology (AT) is essential for enhancing learning across various subjects. The participant is familiar with AT and uses both a laptop and a smartphone for his studies. However, he experiences challenges with reading scanned documents, which limits his access to information. The computer is his preferred device for writing, as it offers various features that facilitate the writing process, such as screen readers compatible with text formats like PDF and DOCX. He started using these technologies during his master's degree in 2014, significantly improving his language learning strategies by providing better access to resources and enabling more independent learning. Before adopting AT, he relied on others to help him read materials, but technology has since allowed him to become more self-sufficient. In his view, AT not only facilitates access to books and enhances writing skills by correcting spelling errors but also offers the freedom to improve various language skills, such as listening, speaking, reading, and writing, along with expanding vocabulary.

2. 5. 5. 3. The Usage of AT in Learning the Four Skills

Listening is a fundamental skill that enables language comprehension. The participant uses AT to enhance his listening skills, particularly through audio materials such as BBC channels, which help improve his British accent and expand his vocabulary. Despite positive

attitudes toward these resources, as Khasan and Abusileek (2023) noted, there is a lack of interactive engagement with the audio materials. This passive approach may result in missed opportunities for practising pronunciation and vocabulary. He also faces challenges in distinguishing between different English accents and prefers Received Pronunciation (RP) due to its academic usage in Algeria. Therefore, while he uses AT for listening, there is a need for more interactive methods to benefit from these resources fully.

Speaking is a productive skill that fosters social interaction. Despite the potential of AT to enhance speaking skills, the participant does not engage with technology for this purpose, resulting in a lack of feedback, interaction, and practice. This absence of interaction with English speakers hinders his ability to practice different accents and cultural aspects of the language. He acknowledges that AT could significantly improve speaking skills and suggests that more interaction with technology could help learners practice and refine their pronunciation.

Reading is essential for acquiring information and completing academic tasks. The participant primarily uses the JAWS screen reader to access written materials, which assists in vocabulary acquisition and file management. He organises his files by topic and uses reading software to access and detect scanned documents. However, the screen reader on his phone is incompatible with various dictionaries, limiting his ability to learn new vocabulary. This lack of access to dictionaries is a significant challenge, as they are valuable resources for language learning.

Writing is crucial for expressing ideas and completing tasks. The participant uses a laptop with MS Word for writing, which he finds accessible and useful for academic purposes. MS Word offers editing features that help correct spelling errors, and he is learning to use these tools independently. While he previously relied on others for feedback, he is now able to correct

his work himself, though he still faces challenges with formatting and other aspects of written content. Overall, AT has proven to be an effective tool for improving his writing skills.

2. 5. 5. 4. The Use of AT in EFL Teaching

AT can facilitate effective communication between students and teachers, mainly through online learning. However, the participant has limited experience with online learning and primarily interacts with teachers via email, resulting in a lack of feedback and interaction using AT. In the classroom, teachers typically use data projectors for presentations, which do not cater to the needs of visually impaired students. The participant believes that technology in the classroom can enhance research and vocabulary acquisition but notes that more exposure and training are needed for both teachers and students to utilise these tools fully. He emphasises the importance of individualised learning plans and the role of AT in promoting autonomy in learning.

2. 5. 5. 5. Artificial Intelligence and Language Learning Strategies

AI has become increasingly prevalent in education, providing tools supporting various learning aspects. However, the participant is unfamiliar with AI, possibly due to the rapid pace of technological advancements and the relatively recent introduction of AI in Algeria. He recognises the potential benefits of AI, such as assisting with writing and learning new terms, but also highlights the risks of plagiarism if misused. Despite his limited experience with AI, he acknowledges its potential to enhance learning while cautioning against over-reliance on technology, which could undermine the originality of academic work.

2. 5. 5. 6. Assessment and Feedback

Assessment is a critical process for evaluating student performance. The participant has limited experience with AT in assessments, both as a student and as a teacher. He believes that current assessment methods do not adequately address all language aspects, particularly in written expression, where technology can correct spelling errors but may not fully evaluate

writing style and structure. He also notes that self-evaluation using AT can be achieved by comparing written work with reference materials on a laptop. The lack of familiarity with AT among educators may limit its use in assessments, and the participant suggests that more training and awareness are needed to ensure that visually impaired students can benefit from these technologies.

The participant believes more research is needed to improve AT for language learners, particularly visually impaired students. He recommends that universities conduct studies on the effectiveness of AT in language learning and that authorities provide assistive materials to support inclusive education. By enhancing access to AT, visually impaired students can become more autonomous learners and better equipped to succeed in their studies.

2. 6. Conclusion

Scientific research demands a blend of exploration, creativity, and objectivity to investigate a specific topic effectively. Critical thinking is central to achieving these aims, which forms the cornerstone of deriving meaningful conclusions. This chapter is divided into two parts: the first covers Research Design and Methodology, and the second focuses on Data Analysis through auto-ethnography and interviews conducted with five participants. The subsequent chapter will analyse the findings derived from these methodologies and propose recommendations based on the outcomes.

Chapter Three:
Discussions and Recommendations

CHAPTER THREE : DISCUSSIONS AND RECOMMENDATIONS

3. 1. Introduction

The use of materials in language learning is essential. They facilitate the learning process and improve students' linguistic capacity. AT is one of the recent materials that might help VIS to learn and do their academic tasks. It fills gaps and solves issues where the VIS cannot interact with his studies. Several devices and apps may have a fundamental role in the learning process. This chapter discusses the findings of the researcher's auto-ethnography and semi-structured, in-depth interviews.

3. 2. Discussion of the Findings

This section delves into the discussion of the finding from both the Autoethnographic narrative of the researcher and the five semi-structured indepth interviews with VIS.

3. 2. 1. Auto-ethnography

This part discusses the findings of the auto-ethnography as a research method. First, traditional language learning strategies and tools are investigated. Then, the use of AT in language learning regarding language aspects and EFL teaching is discussed.

3. 2. 1. 1. Traditional English Language Learning Strategies and Tools

English language learning is approached in various ways. The participant in this study was exposed to traditional learning strategies, where teachers predominantly employed the Grammar Translation Method (GTM). This method focuses on translating language components between the target and native languages, thereby enhancing writing skills. Additionally, dictation was employed as another strategy by the participant's teachers to improve spelling. As stated by the participant, "dictation was another way to learn how words are written" which can significantly enhance EFL students' writing competence (Kamal & Basith, 2023). Furthermore, dictation also contributes to improving listening skills, as supported

by Marzban & Abdollahi (2013) and Jia & Hew (2022), who emphasise its effectiveness, whether through traditional means or mobile instant messaging apps.

The participant witnessed the traditional way in which he got the pronunciation from his teacher. Traditional learning tools vary in their inclusivity, particularly for visually impaired students (VIS). Braille, for instance, is a critical tool that enables VIS to engage in academic tasks by providing tactile representations of text, such as textbooks and handouts. Mastery of Braille is essential for effective use of assistive technology (AT) devices tailored for VIS before transitioning to more advanced tools.

3. 2. 1. 2. Assistive Technologies and Language Learning

Oral communication skills, essential in language acquisition, are supported by AT. The participant began using Computer-Assisted Language Learning (CALL) in middle school, which involved audio-visual aids to improve listening and pronunciation skills. He states: "In the first and the second year, our teachers were using audio-visual aids that improve listening and pronunciation. He used to introduce songs and recordings to us. I remember that he was giving us hard copies, so we followed while listening". Songs and recordings were frequently used, as studies by Rhbar and Khodabakhsh (2013) and Afriyunda and Oktaviani (2021) confirm their efficacy in vocabulary acquisition and pronunciation.

Recordings also have a similar effect. They allow the student to learn vocabulary in various domains. For instance, the participant has been using BBC channels and the BBC Learning English app during his learning period. Speaking is another factor that AT backs up. It provides many tools and programs where speaking is among the goals required to be attained. The participant has witnessed the experience of learning to speak using AT, saying: "I was trying to chat with native speakers and English-speaking people using different social media platforms like Facebook". Chatting with native speakers using these platforms might increase

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three linguistic aspects: vocabulary, pronunciation and culture. Culture varies from country to country; the variation might be in how language is used and other cultural components. Pronunciation is another aspect that aims to improve these social media platforms, such as Facebook. The way English pronunciation differs from one English-speaking country to another. The user of these platforms might increase his awareness of detecting RP, American or Australian English. Lexis is the third aspect where the student might find different kinds of terms used by multiple English dialects speaking people. Speaking skills were honed through social media platforms like Facebook, where interactions with native speakers exposed the participant to diverse linguistic nuances and cultural variations. Platforms like these are instrumental in developing vocabulary, pronunciation, and cultural awareness across different English dialects.

The participant has relied on presentations to improve his English fluency. He argues that he usually does presentations during his learning period. Lately, he has started to benefit from AT when doing presentations. Facilitated by tools such as PowerPoint, presentations were also pivotal in enhancing the participant's speaking and presentation skills (Angkarini, 2022). AT has significantly contributed to improving the participant's English communication abilities.

3. 2. 1. 3. Reading and Writing

Reading and writing pose significant challenges for VIS in their language learning journey. Among the challenges that might go hand in hand with the VIS learning process are reading and writing, which are considered to be the skills of language use in learning activities and getting information. The participant has introduced his experience in reading and writing. In reading, he states: "As a VIS, I made my effort to get English voices and software which play a fundamental role in reading".

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The participant utilised English voices with NVDA screen readers to access textual content effectively. NVDA add-ons like Vocaliser and Acapela, available from platforms such as Blind Help, facilitate vocabulary expansion, correct pronunciation, and enhance spelling skills.

Unlike CALL, which primarily relies on desktop platforms, mobile apps like InstaReader enable seamless access to written materials, thereby enhancing reading efficiency. For writing tasks, Microsoft Word emerged as the preferred software for the participant, aiding in assignments, research projects, and lesson preparations. MuArofah (2021) highlights MS Word's role in improving writing skills through its language features and spelling correction capabilities. It assists the reader in understanding what the writer is conveying. In addition, MS Word might correct the student, specifically the VIS, in word spelling by providing signals involved in the screen reader. This may solve some language-related problems like the lack of knowledge about language, words' spelling, and the management of this program, in addition to facilitating learning tasks and saving time. AT, including CALL and MALL, may be reliable for each VIS in reading and writing.

3. 2. 1. 4. Grammar and Vocabulary

Various apps and games support grammar and vocabulary development. Vocabulary Builder apps, tailored for exams like TOEFL and IELTS, provided structured exercises that facilitated language learning. English Fast Dictionary, compatible with screen readers, enabled VIS to navigate through its contents effectively.

Games like English quizzes offered engaging platforms to practice grammar and vocabulary skills, supplementing formal learning methods. The participant found these tools integral to his language-learning journey. The participant states that he has used apps and games. Apps are successful material for improving Lexis and grammar in the language. There

are various kinds of these tools, including vocabulary builders. This app comprises sections involving the English section for TOEFL and the International English Language Testing System (IELTS). Each section consists of levels. The level is a set of multiple questions where the word is given, and the learner needs to select the suitable definition.

Dictionaries are other important learning mediums. However, they do not suit mobile phone screen readers. English Fast Dictionary is a suitable one for VIS. They might be able to navigate through this app. Games are another successful technique used in mobile phones. For example, an English quiz is a game containing sections to practice tenses, grammar and vocabulary. The NVDA screen reader also provides a dictionary add-on that might assist the VIS in language learning. In general, CALL and MALL might be helpful in learning these aspects.

3. 2. 1. 5. EFL Teacher and VIS Communication

Effective communication between EFL teachers and VIS is crucial for learning outcomes. AT, including CALL and MALL, plays a pivotal role in facilitating this interaction. The participant noted significant experiences with online platforms like Gmail, Google Classroom, Zoom, Google Meet, and Microsoft Teams, which enabled seamless communication and access to educational resources.

These platforms fostered self-confidence in speaking, facilitated assignment submissions and exam preparations, and catered to individual learning needs through personalised interactions with teachers. The compatibility of these tools with screen readers ensured accessibility for all students, including those with visual impairments. This gives VIPs unlimited opportunities to study. AT might be successful in the interaction between students and teachers.

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3. 2. 2. Discussion of Interviews' Findings

Assistive Technology (AT) significantly impacts various aspects of language learning by enhancing learning strategies and teaching methodologies. It enables visually impaired students (VIS) to develop linguistic skills, address learning challenges, and acquire vocabulary through diverse, accessible materials. Furthermore, AT serves as a communication bridge between students and teachers. The development and integration of AT in language learning are ongoing and evolving. To explore this phenomenon, a series of interviews were conducted with VIS studying English as a specialization or as a subject matter in translation at different Algerian universities from 2023 to 2024. The findings from these interviews are discussed in the following sections.

3. 2. 2. 1. Attitudes towards EFL Learning

The global significance of English makes it an area of interest for students. All interviewees specialised in English, except for one who studied translation. The study of English as a subject matter, focusing mainly on translation, differs from studying it as a speciality, which involves exploring language aspects, history, and linguistic sciences. Technology aids both English as a Foreign Language (EFL) and translation students, albeit through different learning strategies. For instance, translation students primarily focus on translating written or spoken materials, often utilizing technology effectively, especially for VIS. On the other hand, EFL students employ diverse strategies such as translating to learn vocabulary, using dictionaries, and integrating media and books to acquire information and understand language aspects.

Motivation plays a crucial role in determining a student's level of engagement and success. It helps to identify whether the student is driven by personal interest or external factors. Three participants exhibited internal motivation, while external factors drove two. Internal motivation, a psychological factor, stems from a personal desire to achieve something. For

example, one participant had been exposed to English through movies since childhood, a practice that continued even after losing his sight. Watching movies can significantly improve English fluency and proficiency, showcasing how technology contributes to Second Language Acquisition (SLA). Another participant chose English due to a personal preference and the language's universal status, supported by accessible learning methods. Research by Aminah and Nugraha (2021) highlights that internal motivation can significantly enhance English language proficiency when suitable methods, including technology, are provided.

In contrast, external motivation is influenced by external factors, such as the requirements of a study field or recommendations from others. For instance, one participant studied English because it was necessary for his field of study, while another was motivated by a cousin's recommendation to pursue EFL learning. Generally, internally motivated individuals are more successful in studying English, as this motivation drives them to utilise any resources, including AT, that can aid their learning.

The type of visual impairment determines the use of AT and the specific tools employed. Visually impaired students may use text magnifiers, while completely blind students typically rely on screen readers. All participants in this study were completely blind, resulting in similar learning strategies, though the use of materials varied among them. These materials were evaluated based on their benefits and limitations.

3. 2. 2. 2. Assistive Technology in EFL Learning

Language learning is increasingly incorporating AT due to its accessibility and effectiveness. The collected data reveal that all participants are familiar with AT, with two using MALL and three employing both CALL and MALL in their studies.

MALL users provided reasons for its effectiveness in EFL learning. One participant highlighted reading apps like Jieshuo and Smart Voice, which help manage learning. Another noted that mobile phones facilitate communication and provide strategies for interaction, using

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tools like YouTube channels, podcasts, and communicational apps such as Goodnight and Speaky. These resources enhance English fluency and proficiency. Metruk (2021) supports the use of English language learning apps to improve communication skills, vocabulary, grammar, and syntax. CALL users found it more accessible for reading and writing. Preferences varied among participants; some found reading easier on mobile phones, while others preferred computers. Preferences play a key psychological role, reflecting internal motivation for using technology.

Using AT positively influences VIS in many ways. Participants reported that it provides unlimited resources, reduces dependence on Braille by offering screen reading programs, and enhances communication skills, particularly through MALL, which facilitates learning vocabulary.

Time is another factor influencing the use of AT. The duration of AT use varies among participants, affecting their familiarity and proficiency with these tools. The following table summarises the use of AT and its impact on participants' learning experiences:

Participant	Time of using AT	Findings
Participant one	Since childhood	This may make the participant to easily adopt these AT in EFL learning.
Participant two	Four years before	Disability to reach mastering AT devices and softwares like MS office programs.
Participant three	Five years	language learning using CALL and MALL is similar despite the diversity of the useful tools.

Participant four	12 years	This might give him enough information about its implementation.
Participant five	Ten years	The ability to access educational materials like books.

Table 3. 1: The use of AT and its influence on participants' learning experience.

The time spent using AT is related to its influence. Using technology influences VIS in many ways. Participants argue that it positively influences the VIS in language learning. First, it provides unlimited resources. Before, dictionaries and books written in Braille were not accessible. Nowadays, the existence of screen reading programs decreases the dependence of VIS on Braille. Second, AT provides the ability to increase communication skills, as stated by participants. When we talk about communication, the four skills come to mind. MALL is the most successful function of AT that enhances this linguistic component. In addition to having easy access to vocabulary learning,

3. 2. 2. 3. The Usage of Assistive Technology in Learning the Four Skills

3. 2. 2. 3. a. Listening

Listening is a fundamental skill that enables learners to acquire a new language. It is a crucial strategy upon which learners must rely. Many learners utilise resources like YouTube channels and podcasts to improve their listening skills. According to Balay and Keles (2017), YouTube positively influences English language learners by providing a variety of materials, such as movies, that enhance listening abilities. Watching and listening to movies helps learners understand native speakers and different English accents. Additionally, listening to podcasts is an effective learning strategy. Azmee (2022) found that listening to podcasts enhances vocabulary and metacognitive awareness. These tools are particularly beneficial for students

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with lower proficiency who struggle with limited vocabulary. Multiple podcasts expose learners to vocabulary across different fields.

Participant Three, for instance, relies on radio apps to improve intensive listening. These apps offer a wide range of radio channels, including English and American ones, which can enrich the student's vocabulary on various topics. Participants Four and Five utilise BBC channels for listening practice. Khasan and Abuseileek (2023) confirm that there are positive attitudes towards using these channels. These participants reported significant benefits from YouTube channels. Additionally, an app has been developed featuring various channels and sections, each focusing on different linguistic components such as grammar, stories, and vocabulary in diverse topics. This app can help EFL students become familiar with Received Pronunciation (RP) and explore various domains of the English language while interacting with the recordings. Engaging with spoken materials using Assistive Technology (AT) facilitates the learning process.

All participants use repetition as part of their interaction with these tools. However, Participant Five did not engage in any form of interaction while learning to listen. Repetition is an effective strategy for improving oral expression and communication. It can generate excitement, which refers to the psychological factor that makes learning enjoyable. Mathew and Alidmat (2013) found that using audio-visual aids like conversations and dialogues motivates learners to study English. Once a student becomes excited about the learning process, they are more likely to incorporate these materials into their learning strategies. Repetition using AT may help reduce vocabulary-related issues. Kaur (2012) found that repetition, whether in listening or speaking, leads to improvements in understanding and clarity of newly learned concepts. Initially, learners may not grasp the meaning or accent of a new word, but with repetition, learning becomes easier.

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Participant Three mentions two additional strategies that help with listening. First, recording is a significant method for practising listening, as it helps learners with the pronunciation of new words. Second, they learn new terms by looking them up in a dictionary. Acquiring new words and expressions is a common challenge in listening. MALL tools provide online dictionaries to facilitate this process. Participant Four highlights that writing down listening expressions also contributes to learning. Writing difficult words can help learners understand their spelling and meaning, which is a main challenge in listening tasks. This challenge is often related to the vocabulary of different topics or specialised languages. After looking up a specific term, learners may jot it down and use it in their daily lives. Although this process is complex, it can lead to successful results.

3. 2. 2. 3. b. Speaking

Speaking is a productive skill that enhances expressive abilities. Utilising AT can effectively facilitate the learning of speaking skills. All participants in this study rely on communication-based applications to practice speaking. Participant One emphasises the success of social media platforms for speaking practice. Participant Two relies on educational apps like HelloTalk, which features voice rooms where various topics are discussed in multiple languages. For example, this app enables learners to communicate with English speakers, exposing them to different accents and ways of speaking, thereby enriching their vocabulary. This technology supports language learners by motivating them to speak and participate more actively in discussions. Meetings, where learners engage in English discussions, are particularly effective tools for enhancing language proficiency and gaining information on diverse subjects. These interactions help students improve their communication skills and expression.

While adopting these strategies, feedback is provided not by the technology but by the group members themselves. They correct each other on improper use of expressions or pronunciation, fostering a collaborative learning environment. Participant Three uses

educational apps like Goodnight. He has a friend from Mexico who is an English teacher, and through their interactions, he has focused on improving his English pronunciation, especially the American accent. This reflects how he engages with speaking practice using MALL. It is noted that AT often lacks functions for providing feedback on speaking, a gap identified by the participants.

In contrast, participants four and five do not rely on these platforms to enhance their speaking skills. Regarding speech recognition technology, which is available on smartphones and converts text to speech and vice versa, none of the participants found it reliable for learning to speak. Participant Three, who is studying translation, does not use this feature because it does not contribute to his speaking or translation skills. For instance, the app Jieshuo offers a translation function but only supports literal and word-by-word translation, which may help with other linguistic aspects but not with improving speaking skills.

3. 2. 2. 3. c. Reading

Reading is a crucial skill that facilitates communication and the acquisition of information. It is particularly fundamental when discussing Visually Impaired Students (VIS). According to data collected from interviews, one participant uses both CALL and MALL for reading. Three participants rely primarily on mobile phones. Participant Two, for instance, utilises a smartphone screen reader in conjunction with the Tech Freedom app. This app allows the user to share Word or PDF documents, making reading more accessible. Tech Freedom offers several beneficial features. Firstly, it can read documents through a screen reader or convert them to audio using AI-generated voices from Eleven Labs. Secondly, it can read images and provides instant reading by allowing VIS to point the camera at a hard copy for text recognition. However, the app struggles with reading scanned documents, which is a challenge for this participant. This issue may stem from a lack of experience or knowledge in using other screen reading software.

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Participants Three and Four use apps like Instareader and Envision AI; these are accessible assistive programs that read text-based documents. Regarding computer use, Participant Four mentions using a book reader software, although they rarely use a computer. In contrast, Participant Five relies entirely on a computer for reading, using the JAWS screen reader. This demonstrates that reading can be made accessible for each VIS through various technologies.

3. 2. 2. 3. d. Writing.

Writing is a fundamental productive skill essential for completing academic tasks. Assistive Technology significantly facilitates this process for Visually Impaired Students (VIS) by providing various functions and programs. In this context, Participant One relies on both a phone and a computer for writing activities. On his computer, he uses Dragon NaturallySpeaking (DNS) to convert speech to text and also utilises Notepad as an alternative tool. For phone use, he employs functions such as Dragon Anywhere and voice typing on the keyboard, illustrating the role of speech recognition technology.

Participant Two uses Braille, a traditional tool, for writing. This method does not hinder his learning and does not present an obstacle. He does not use AT for writing due to a lack of information about technological implementations and is still learning about computing and writing software. He aims to adopt new learning strategies using CALL once he becomes more familiar with these tools.

Like Participant One, Participant Three relies on MALL for writing, using voice typing as a key method. Participants Four and Five depend on computers for writing, using Microsoft Office Word. They do not encounter significant challenges in their writing process. The primary challenge faced is by Participant One, who finds proofreading tedious. On a smartphone, a VIS needs to swipe with one finger across the screen to move letter by letter, word by word, or line by line, which can be time-consuming when correcting spelling errors.

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However, NonVisual Desktop Access (NVDA) and JAWS on personal computers are designed to provide auditory cues. Unlike sighted individuals who rely on visual red underlines to indicate mistakes, these screen readers emit a beep when a spelling or grammatical error is detected. This feature helps eliminate difficulties or misunderstandings in written materials for participants who use laptops for writing.

3. 2. 2. 4. Assistive Technologies in EFL Teaching

Assistive technologies (AT) that facilitate teacher-learner interactions are becoming increasingly common and are continuously being developed. Data from this study indicate that three participants are familiar with using AT to communicate with their teachers, while two have had limited experience with these tools. This discrepancy may be attributed to the time factor, as technological adoption varies across different periods and contexts. For instance, before 2019, online learning was less prevalent in Algeria.

Participants who are familiar with AT primarily use email and Google Classroom for feedback and communication. Additionally, they utilise Google Forms to complete assignments. However, Participant Two does not engage in collaborative learning through AT, possibly due to stress or fear of making mistakes. In contrast, Participant Three feels at ease using AT to discuss lectures with teachers and classmates.

In classroom settings, while teachers can use technology, VIS often face barriers to its effective use. Participant Two mentioned that some teachers use recordings, which may enhance communication and oral expression skills. However, Participant Three noted that English teachers generally do not use these technologies, suggesting a lack of training and familiarity with AT. Furthermore, English as a subject does not inherently rely on technology, which could be another reason for its limited use in this context.

VIS can benefit from individualised learning plans incorporating AT to address these challenges. Participants Three and Five have employed such strategies, although their

familiarity with these methods varies. For example, Participant Three uses Envision AI to convert homework into readable text, focusing primarily on completing assignments. Participant Five has also created individualised learning plans, such as using YouTube channels to expand his knowledge of technology, thereby fostering greater autonomy in learning. Overall, it appears that many teachers are not well-acquainted with using AT to support VIS effectively.

Assessment through AT can facilitate student achievement and streamline teachers' work. It serves as a crucial strategy for enhancing communication between teachers and learners. However, the results indicate that all participants are not very familiar with using AT for assessments. Three participants mentioned using Google Forms and Gmail to take online tests, which may reflect a lack of teacher training in AT. Moreover, some older instructors prefer traditional methods, which could further limit the adoption of AT for assessments. Additionally, the preferences of VIS themselves may also influence the extent to which they utilise these technologies for testing purposes.

While assistive technologies hold significant potential to enhance the learning and assessment experiences of VIS, there remains a gap in both teacher training and the practical use of these tools in educational settings. Addressing these gaps through increased training and support for both teachers and students could lead to more effective and inclusive educational practices.

3. 2. 2. 5. Artificial Intelligence and Language Learning Strategies

Artificial Intelligence (AI) significantly impacts both students and teachers in academic settings. Despite its potential, many participants are not fully familiar with the features AI offers. For instance, while they use screen readers enhanced by AI, they often overlook their potential to aid in reading comprehension and literacy.

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Participant Four stands out as the only individual who actively utilises AI-driven websites to address language-related challenges and accomplish academic tasks. One notable example is "Smoddin," an AI-powered writing assistant that summarises written material and offers translation capabilities. Such tools can substantially enhance linguistic abilities by providing diverse functionalities that aid in understanding and producing language.

Research supports the benefits of AI in language learning. According to Dodigovic (2007), AI tools facilitate error correction, enhancing written materials in various ways. For example, Grammarly, an AI software, detects grammatical errors and guides users in refining their text or paragraphs. Similarly, Rusmiyanto et al. (2023) highlight that AI fosters improved communication by providing applications and features like speech recognition and chatbots, which are particularly beneficial for language learning.

However, the integration of AI is not without its drawbacks. Khanzode and Sarode (2020) discuss several limitations of AI across different fields, particularly in research. They argue that relying heavily on AI can undermine creativity, as it diminishes the human touch required to interpret and understand a phenomenon thoroughly. The authors emphasise that while AI can aid in the production of work, it cannot replace the nuanced understanding and personal perspective that human researchers bring to their studies.

AI plays a crucial role in the learning strategies of Visually Impaired Students (VIS), provided it is implemented with ethical considerations and proper guidance. By integrating AI tools effectively, VIS can overcome many educational barriers, making learning more accessible and tailored to their needs. While AI substantially improves language learning and academic performance, it is essential to balance its use with the need for human insight and creativity. For VIS, AI can be a powerful tool if used correctly, enabling them to achieve greater autonomy and success in their academic endeavours.

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3. 2. 3. Discussion of the Findings in relation to RQs and RHs

After an extensive discussion of the findings, several key conclusions can be drawn regarding the use of AT for VIS. These findings are structured around two primary research questions (RQs) and their associated hypotheses (RHs). Several crucial factors, such as VIS preferences, time constraints, and knowledge and training, influence the effectiveness of AT for VIS.

The individual preferences of VIS play a fundamental role in determining how effectively they use technology. The degree of engagement with AT depends significantly on each student's personal inclination and comfort level. Time is a critical factor that affects the extent to which VIS can take advantage of new AT innovations. Rapid technological advancements often leave VIS with insufficient time to familiarise themselves with and master new tools, hindering their learning process. Both students and teachers face challenges due to a lack of knowledge and training in using AT. Teachers, in particular, often lack sufficient training in incorporating AT into their teaching practices, which limits their ability to support VIS effectively. VIS also struggle with mastering new software, which can impede their learning.

Both research tools, auto-ethnography and semi-structured in-depth interviews, aim to discuss using CALL and MALL as AT devices in learning experiences for VIS. Two research questions have been formulated. First, the impact of CALL and MALL on VIS in learning. Second, the influence of these devices and software on facilitating teachers' work to meet VIS needs.

Research Question 1: How effective are CALL and MALL in enhancing Visually Impaired students' language learning strategies and skills?

CALL and MALL are increasingly integrated into educational systems worldwide and are particularly influential in language learning for VIS. These technologies act as both

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educational and assistive devices, significantly improving language learning strategies and skills. The data collected through auto-ethnography and semi-structured, in-depth interviews interviews provide robust evidence of their positive impact.

The researcher's auto-ethnographic account highlights several ways in which CALL and MALL enhance language learning. The following extracts are taken from the researcher's narrative. In improving communication skills, the participant mentioned some points in this field:

> In the first and second years, our teacher was using audio-visual aids that improved listening and pronunciation. He used to introduce songs and recordings to us. I remember he was giving us hard copies, so we followed them while listening. I depended on a computer to improve my listening skills. I relied on the BBC and some YouTube channels that offer English conversations. By using this strategy, I started to recognise various English accents like RP and American. . . . Technology was highly adopted in oral expression. One of the EFL teachers was focusing on listening and speaking. She used to provide recordings from multiple English-speaking people so that we could learn lexis on different topics. The way to communicate with different people and to detect varied accents of English.

The researcher noted that the use of audio-visual aids, such as songs and recordings, significantly improved listening and pronunciation skills. The participant relied on computer resources like BBC and YouTube to recognise various English accents, such as Received Pronunciation (RP) and American English. This indicates that CALL and MALL are effective tools for enhancing communication skills through exposure to diverse linguistic inputs.

Reading and writing are also mentioned in the participant's extract:

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> When I got a computer, I began to practice writing in MS Word. In this period, the computing teacher brought the keyboard to teach us how letter keys are organised and how controlling keys are shaped. . . we were supposed to read books and articles in many fields, such as literature, civilisation, and language sciences. As a VIS, I did my best to get English voices and software that play a fundamental role in reading. The idea is that these voices read for VIS the content of written material. I remember one day when one of the EFL teachers asked us to read a novel. It was my first time to discover what a PDF file is. I started using AT in learning language aspects like reading and writing through doing assignments and learning communication.

The participant described the transition to using a computer for writing, which was facilitated by learning to use MS Word and understanding keyboard organization. This shift enabled the participant to read books and articles, thereby improving reading comprehension and writing skills. The use of AT, such as screen readers, played a crucial role in this process by making written content accessible.

Concerning grammar and lexis, this auto-ethnography has shed light on this aspect. The participant states: In this period, I started using apps to improve English fluency and proficiency. I have used English games like vocabulary builder, English grammar tests, English quiz….". This might be influential for the participant to enhance his level in grammar and vocabulary. The participant highlighted the use of language learning apps, such as vocabulary builders and grammar tests, which contributed to improving grammar and vocabulary proficiency. These apps provide interactive and engaging ways to practice and reinforce language skills.

The second data collection tool has also provided evidence about the positive impact of AT in language learning. The fifth question in the second part of the interview, Assistive

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Technology in EFL learning, represents the effect of these technologies on language learning. The question aims to know how these technologies affect the learning strategies of the participants. The following answers prove the influence of CALL and MALL in learning. Participant Three provides: "Technologies helped me in studying English. I can say that they help me more than the traditional way of learning. When I started using technology, I felt that I am learning faster". The best service provided by AT is to make learning better than traditional learning materials. The participant points out that its use in EFL learning is effective. Participant Two says: "Technology affects my learning when I   listen to videos or read articles. I can develop my language fluency and proficiency". Participants expressed that technology-facilitated faster and more effective learning compared to traditional methods. They noted that using technology, such as listening to videos and reading articles, helped improve language fluency and proficiency by expanding vocabulary and enhancing comprehension.

In the same vein, Participant Four states: "AT helped me in everything. I use it to improve my English level. I use it to make differences between accents like British and American". This strategy might improve my English level. AT contributes to improving the determination of English accents by providing videos and apps. Reading and spelling might be enhanced. Participant Five asserts: "Concerning the influence of AT, especially computers, it provides us with resources. First, it provides a way of listening to the language since we rely on it. Since we cannot see the word, the computer can detect the wrong word". This might be due to the assistance of screen readers.

Overall, the data gathered from both tools, auto-ethnography and semi-structured interviews, with participants confirm the selected hypothesis that CALL and MALL significantly enhance language learning for VIS by providing tools and resources that facilitate various aspects of language acquisition.

CHAPTER THREE : DISCUSSIONS AND RECOMMENDATIONS

Research Question 2. What impact do CALL and MALL as assistive technology materials append for teachers to meet visually impaired students' needs?

The teaching process involves employing diverse strategies and materials to effectively convey knowledge to students. However, the auto-ethnography findings and interviews indicate that teachers often lack the necessary knowledge and training to fully utilise AT in their instruction for VIS. Teachers frequently lack awareness of effectively integrating AT into their teaching practices. This gap in knowledge means that while CALL and MALL have the potential to facilitate lesson preparation and communication with students, they are not fully utilised to support VIS.

Some teachers are willing to get information about these techniques. In the auto-ethnography, the researcher states: "I remember one of my teachers told me about her curiosity to know how to work with AT and what are the materials provided for VIS". Despite the lack of formal training, some teachers were curious and willing to learn more about AT and how it can assist VIS. This interest suggests that with proper training and resources, teachers could become more proficient in using these technologies to support their students.

In addition, the hard work that features any VIS may make teachers help him in his learning process. In the other side of interviews this idea is presented in the third part of interviews. All participants who have witnessed e-learning assert that they have used similar platforms in their studies. Participant Three noted that teachers are not trained in the field of technology. CALL and MALL, as educational technologies, might facilitate teachers' work in meeting students' needs. However, these materials, such as AT, do not help teachers meet VIS's needs. This lack of training results in a reliance on traditional teaching methods, which are less effective for VIS, which benefits more from technology-based learning tools.

The data indicate that while CALL and MALL can potentially facilitate teachers' work in supporting VIS, the lack of knowledge and training prevents these tools from being

CHAPTER THREE : DISCUSSIONS AND RECOMMENDATIONS

effectively implemented. Therefore, the findings do not support the hypothesis that CALL and MALL would decrease and facilitate teachers' work with VIS.

3. 3. Suggestions and Recommendations

After the research findings derived from the collected data using auto-ethnography and in-depth semi-structured interviews, research participants proposed and agreed upon some recommendations to academic institutions. First, government and academic institutions should provide more AT devices and programs that are needed inside inclusive schools and universities so that VIS can benefit from its use in learning, such as computers, screen readers, and Braille devices. These tools might assist VIS in exams and tests.

Second, dictionaries do not suit VIS. They should be provided in the Braille system or encourage the development of AT programs like apps and software that help with the issue of dictionaries in general and phonetic symbols in specific. Using these materials at high schools and universities is essential for foreign language learners. In the case of vocabulary learning, dictionaries are highly utilised.

Third, the government should benefit from computer science specialists. These students can collaborate with VIS to fulfil their specific learning needs as they are required to be more involved in the fields of programming, creation and invention. Government and academic institutions should allow them to use their competence in this field and support what they achieve as efforts.

Fourth, researchers should conduct more research studies in this field so that problems that come with ICT updates can be solved. For example, they might conduct a comparative study on how technology is effective between sited and blind students.

The last suggestion is to train teachers in the field of technology. E-learning is increasingly being settled in educational systems. Teachers should have knowledge about technology, especially AT, which facilitates their work with VIS. Not all teachers master these

devices. The government should provide sessions on how to use computers in the field of teaching, what techniques should be followed by teachers T, and how to use them with VIS.

3. 4. Pedagogical Implications

After the research findings, some instructions need to be followed by teachers and instructors in order to fill the gap in the use of AT by VIS.

First, teachers need to avoid using platforms that do not suit screen readers so VIS does not find barriers to the accessibility of online learning tools. For instance, NVDA is not compatible with Google Docs. When VIS do their assignments in Google Classroom, they write their answers without guidance from the screen readers in Google Docs. Consequently, they might make mistakes.

Second, curriculum development and syllabus design should be clarified for VIS, in which the content of a graph or a table should be explained. In addition, Braille printing machines should be provided to help in printing questions for tests and exams.

Third, teachers should do research to get information about how AT for VIS works, including screen readers, reading software and apps, and all accessibility properties included in useful writing programs like MS Word. Consequently, they would be able to solve the issues coming with new updates.

Fourth, instructors should keep in mind that phonetic transcriptions are not available in Braille. Creating new features related to the international phonetic alphabet (IPA) is recommendable for computer science specialists.

Fifth, computers with screen readers must be involved In an academic institution. There are a lot of students who lose their vision and do not get the opportunity to learn Braille. Therefore, technological implementation is the main solution to facilitate the accomplishment of tests and exams.

CHAPTER THREE : DISCUSSIONS AND RECOMMENDATIONS

3. 5. Conclusion

Assistive technology is increasingly essential in academic settings, particularly in enhancing language learning strategies through various tools and extensions. This chapter focuses on the discussions of the findings from the auto-ethnography and the interview of each participant's experiences and perspectives. Both data sets are integrated into a unified section where research questions are comprehensively addressed. Furthermore, the chapter acknowledges research limitations and concludes with suggestions and recommendations for better use of AT as far as VIS are concerned.

General Conclusion

GENERAL CONCLUSION

Assistive Technologies (ATs) are modern tools that are increasingly being utilised in academic settings to address various challenges and enhance learning strategies and activities for Visually Impaired Students (VIS). Language learning is one of the fields where ATs, such as Computer-Assisted Language Learning (CALL) and Mobile-Assisted Language Learning (MALL), are being widely incorporated globally. These technologies play a crucial role in improving the competencies, skills, and language strategies of VIS.

This paper explores the impact of integrating CALL and MALL on the learning processes of VIS. A multimethod qualitative approach was employed, involving auto-ethnography, where the researcher also served as a participant, and semi-structured, in-depth interviews interviews with five VIS collaborators. Among these participants, four were English as a Foreign Language (EFL) learners, and one was studying English as part of a translation program.

The findings indicate that all participants hold positive attitudes towards the use of CALL and MALL in English language learning and teaching. All participants were familiar with these AT tools and software, and four had practical experience using them in their studies. However, two participants had limited exposure to these technologies.

The research findings highlight the importance of time in learning how to use AT effectively in EFL contexts. The evolving nature of technology means that each generation has the opportunity to experience new innovations, including apps, websites, and software. Motivation also plays a significant role in the effectiveness of these devices for VIS. Personal preferences are key in determining how well VIS can take advantage of specific AT tools. Knowledge and practice are critical in enhancing the learning process through these technologies. Among students, there is variation in their knowledge of technological implementations. Practical experience helps VIS master these devices and integrate them into

GENERAL CONCLUSION

their studies effectively. On the other hand, EFL teachers often lack knowledge about using AT and its specific features for VIS.

The study concludes that CALL and MALL significantly positively impact the learning strategies of VIS, offering many features and functions that cater to their needs. However, these technologies do not necessarily help teachers meet the needs of every VIS, as teachers often lack the necessary training and knowledge.

The first hypothesis proposed by the researcher, which suggested that CALL and MALL could motivate VIS to study and provide them with tools like AT programs and multimedia to facilitate their academic activities, is confirmed. The use of computers and mobile devices encourages VIS to enhance their skills and enjoy their learning experience, which is further facilitated by AT software such as screen readers and multimedia resources like videos and audio recordings, which are particularly beneficial for VIS who rely on listening.

The second hypothesis, which posited that the use of CALL and MALL technologies might reduce the burden on EFL teachers and facilitate their work with VIS, is disconfirmed. This is likely due to the teachers' lack of knowledge and training in using AT for VIS. While CALL and MALL offer features that could potentially facilitate teachers' work, teachers are often unfamiliar with these tools and do not know how to use them effectively to support VIS.

In this research paper, some challenges have been encountered. First, lack of references is a fundamental issue. This might be because these research topics are rarely studied within the scope of VIS. Second, the difficulty of getting access to participants is another obstacle that has been faced. This might be due to several reasons. First, the participants' refusal has been witnessed. An interview with a VIS from Belabess University was planned, but he did not accept. Second, some participants are busy. The occupation might be related to each participant. It has been decided that I will conduct an interview with a VIS at Telemcen University. Since she was busy, she was not able to accomplish this work because of the time

constraints. The time limit is the third limitation, which caused some changes in the research methodology. The mixed method was chosen, and the teachers' questionnaire was used before the multimethod qualitative research was adopted.

Future research in this field could involve comparative studies to examine the differential impacts of technology on sighted and blind students. Researchers might also consider employing mixed methods further to investigate the effects of CALL and MALL on VIS, providing a more comprehensive understanding of how these technologies influence learning outcomes.

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Appendices

APPENDICES

Appendix 01: Information Sheet & A consent form

Research Topic: **Assistive Learning Technologies for Visually Impaired EFL Students:**

Implications of CALL and MALL

Researcher: Mr. Bilal BERREHAIL

Supervisors: Mrs Fatima YAHIA

Dear participant,

You are kindly invited to take part in this research study. Please read this information sheet carefully to understand why the research is being conducted and what your participation will involve.

Introduction:

Using technological devices like phones and PCs is widely spread these days. It has become highly available in the field of education. Students are becoming used to these tools; however, it is somehow different when talking about visually impaired learners. This research aims to explain how visually impaired learners can be integrated into their studies using CALL and MALL and to look at the problems they face during their studies.

Methodology:

The participants of this research will take part in a semi-structured interview session. The target population is visually impaired Algerian EFL learners at the university level. The interview will be recorded using Telegram's recorder to maintain good voice quality and save space. To Maintain confidentiality, the participant chooses the recording type, whether it is audio-recorded or video-recorded.

Data Confidentiality:

During the presentation of results obtained from data collection, your own words may be used in the text; nevertheless, your identity remains anonymous. In addition, all gathered data will

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be secured in a password-protected file from any data supplied. The data will be kept for the next two years.

Participant's rights:

·   You are free to decide whether you will take part in this study or not.

·   You are free not to answer any questions.

·   Your identity is kept anonymous during data collection and presentation.

·   You can withdraw from the study at any point within the next 15 days after the interview.

·   You can ask for more details related to the conduction of this research from me, my supervisor, and you can write to the headmaster to complain about your involvement in this research in the contacts list provided at the end of this page.

Contacts List:

Researcher:

Supervisor:

Headmaster:

Please answer the following questions by yes or no

- I have read the information sheet and have had details of the study explained to me

- My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point.

- I understand that I am free to withdraw from the study within the next 15 days outlined in the Information Sheet, without giving a reason for my withdrawal or to decline to answer any particular questions in the study without any consequences to my future treatment by the researcher.

- I agree to provide information to the researchers under the conditions of confidentiality set out in the Information Sheet.

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- I consent to the information collected for the purposes of this research study, once anonymised (so that I cannot be identified), to be used for any other research purposes.

- I understand that the provided information will be kept safe for the next two years.

Participant's name

Date of the interview

contact details: e-mail and phone number

APPENDICES

Appendix 02: Research Semi-Structured In-depth Interview

Part One: Background of the Participant.

1. Please introduce yourself and share your experience with studying English as a foreign language.

2. What is your type of vision impairment?

3. Have you attended special needs schools? If so, how do these schools vary from the others?

4. Have you mastered Braille?

Part Two: Assistive Technologies in EFL learning

1. Are you familiar with the notion of Assistive Technologies?

2. Are you comfortable with using computers and mobile phones?

3. Could you provide the exact assistive technology you use to study English?

4. How long have you been using assistive technology in your language learning journey?

5. How have these technologies influenced your language learning experience?

6. What challenges do you face as a visually impaired learner in the EFL context, and how do assistive technologies help address these challenges?

7. In your opinion, what are the most significant benefits of using assistive technologies in language learning?

The use of Assistive Technologies in Learning the Four Skills

A. Listening

1. How do you use assistive technologies to enhance your listening skills in English?

2. Can you describe specific features or tools within these technologies that assist you in understanding spoken English?

3. How do you engage with interactive listening activities, such as dialogues or audio-based exercises, using assistive technologies?

4. Are there specific challenges you face when working on listening tasks, and how do these technologies help overcome them?

5. Do you have a preference type of audio materials when using assistive technologies for English language learning? (e.g., podcasts, audiobooks, interactive dialogues)

B. <u>Speaking</u>

1. How do you practice and improve your spoken English using assistive technologies?

2. Are there features that provide feedback on pronunciation or speaking skills, and how valuable do you find them?

3. In what ways do you engage in interactive conversations or speaking exercises facilitated by assistive technologies? Including social media platforms if necessary

4. How do these technologies support your ability to communicate verbally in English?

5. Have you utilissed speech recognition features in your language learning tools, and if so, how has this impacted your speaking proficiency?

C. <u>Reading</u>

1. How do you access and interact with written English materials using assistive technologies?

2. Are there specific tools or functionalities that make reading tasks more accessible and enjoyable?

3. How do you navigate through different text formats, such as ebooks, articles, or online content, with assistive technologies?

4. Are there any challenges you encounter when dealing with varied reading materials?

D. <u>Writing</u>

APPENDICES

1. Can you describe the methods you use to write and edit content in English using assistive technology?

2. What features or programs help you with your writing process?

3. How do you use assistive technologies to edit and proofread written assignments and compositions?

4. Are there features that help address common writing challenges, such as grammar or spelling errors?

Part Three: The Use of Assistive Technologies in EFL Teaching

1. How would you describe your interaction and collaboration with your English language teachers in terms of using assistive technologies?

2. Are there any specific methods or procedures that you find particularly useful in your interactions with teachers?

3. How do you obtain feedback from your teachers, and what role does technology play in this process?

4. How do teachers integrate assistive technology into classroom tasks like reading, writing, and interactive discussions?

5. In group or collaborative learning environments, how do you participate, and how can assistive technologies help you?

6. Are you encouraged to use different AT inside the class? If yes, in which situations

7. Are there any specific instances in which various technologies have shown to be more or less beneficial in the classroom?

8. Have you been engaged in the creation of individualised learning plans that address your unique requirements as a visually impaired student utilising assistive technology?

Part four: artificial intelligence and language learning strategies.

1. Are you well-acquainted with artificial intelligence?

APPENDICES

2. In what ways Does this function facilitate your learning strategies?

3. Which AI applications do you implement in case of EFL context and what language aspects do they collaborate?

4. In your opinion, how do you examine the benefits and drawbacks of AI applications?

Part Five: Assessment and Feedback

1. How are continuous assessments / Exams typically conducted in your language learning programs with the use of assistive technologies?

2. In what ways do you see assistive technologies being adapted to facilitate fair and effective assessments for visually impaired learners?

3. How do you engage in self-assessment and reflection on your language proficiency, and do assistive technologies play a role in this process?

4. Are there tools or features that facilitate self-evaluation of your language skills?

5. Are there instances where you have had to advocate for specific assessment accommodations?

6. How do you receive feedback on your language skills, and how is technology involved in this process?

7. How do you receive feedback on your language skills, and how is technology involved in this process?

8. How do you communicate with instructors or peers regarding feedback and assessment results facilitated by assistive technologies?

9. Based on your experiences, do you have any suggestions for improving the feedback and assessment features within assistive technologies for visually impaired language learners?

Part Six: Preferences and Improvements

1. What improvements or additional features would you like to see in assistive technologies for language learning?

APPENDICES

2. How do you envision the role of technology in your future language-learning endeavours?

3. What recommendations would you provide to educators and academic institutions aiming to better support visually impaired English language learners/teachers using assistive technologies?