

Enhancing Oral Proficiency through Computer-Assisted Language Learning: A Quasi-Experimental Study

Imad Hamdanat

Moulay Ismail University, Meknes Morocco

Abstract- This study investigated the impact of computer-assisted learning (CAL) on Moroccan high school students' speaking skills. A quasi-experimental design compared a group exposed to ten sessions of CAL-enhanced instruction, featuring short videos of real-world English language situations, with a control group receiving traditional instruction. Data were collected through pre- and post-tests assessing speaking proficiency. Results indicated significant improvements in speaking skills for both groups, with the experimental group demonstrating substantially greater gains as evidenced by a significant difference in post-test scores ($t(85) = -12.786, p < .001$). These findings suggest that CAL, particularly when integrated with authentic language exposure, can be an effective tool for enhancing oral language development in high school students. The study holds significant implications for teachers, curriculum designers, and educational stakeholders in Morocco, underscoring the potential of CAL to transform language education.

Index Terms- Computer-Assisted Language Learning (CALL), Speaking Skills, High School Students, Quasi-Experimental Design, Moroccan Education

I. INTRODUCTION

The integration of technology into education has significantly transformed pedagogical approaches, with computer-assisted learning (CAL) emerging as a crucial tool in enhancing language acquisition (Levy, 1997). This study investigates the impact of CAL on high school students' speaking skills, an essential component of language competence. The role of technology in facilitating the development of oral proficiency has gained increasing scholarly attention (Swain, 2005; Krashen, 1981). Extensive oral practice is critical for developing fluency and confidence in speaking a foreign language (Swain, 2005; Hamdanat, 2024). However, traditional classroom settings often struggle to provide sufficient opportunities for such practice due to constraints like limited time and large class sizes (Ratnaningsih, Nofandii, Purba, & Wiratno, 2019).

CAL offers a promising alternative by enhancing students' exposure to the target language through interactive activities and digital materials (Al-Mansour & Al-Shorman, 2012; AbuSeileek, 2011). This increased exposure can create a more immersive learning environment, encouraging spontaneous language use and improving students' speaking abilities (Davies, 2002). While numerous studies have explored CAL's effectiveness in various language skills, such as reading comprehension (Marzban, 2011) and vocabulary acquisition (Getkham, 2004), there remains a notable gap in research

specifically focusing on the impact of CAL on speaking skills in high school settings.

Employing a quasi-experimental design, this study compares the outcomes of students exposed to CAL-enhanced instruction with those receiving traditional language teaching methods. The primary objective is to assess CAL's effectiveness in improving students' speaking abilities. Through rigorous analysis of pre- and post-test data, this research contributes to the expanding body of knowledge on technology integration in language education.

The findings of this study have significant implications for language educators, curriculum developers, and educational policymakers. By elucidating the potential benefits and challenges of CAL in developing speaking skills, this research provides stakeholders with critical insights for informed decision-making regarding the incorporation of technology in language classrooms (Rahimi & Yadollahi, 2011).

Furthermore, the results serve as a foundation for future research on the effective use of CAL to foster oral proficiency. In essence, this study enriches the ongoing discourse on the role of technology in education by critically examining its impact on a specific, vital language skill: speaking. By exploring the intersection of CAL and oral proficiency, this research offers valuable perspectives on the potential of technology to enhance language learning outcomes.

II. LITERATURE REVIEW

1. Introduction

The advent of technology has significantly transformed educational landscapes, with computer-assisted learning (CAL) emerging as a prominent pedagogical approach. This study delves into the intersection of CAL and language learning, specifically focusing on its impact on high school students' speaking skills. Oral proficiency is widely recognized as a crucial component of language competence, enabling effective communication and intercultural interaction (Swain, 2005; Hamdanat, Azzouzi, & El Jemli, 2024). However, traditional classroom settings often face constraints in providing ample opportunities for students to practice speaking, limiting their oral development.

Despite the growing body of research on CAL and its applications in language learning, studies specifically examining its impact on high school students' speaking skills remain relatively limited. While previous research has explored the effectiveness of CAL in enhancing various language skills, such as reading comprehension and vocabulary acquisition (Al-Mansour & Al-Shorman, 2012; Marzban, 2011), the focus on speaking skills within the high school context warrants further investigation. By addressing this research gap, this study aims to contribute to the understanding of CAL's potential in fostering oral proficiency among adolescent language learners.

2. Theoretical Framework

Constructivism and Language Learning

Constructivism, a learning theory positing that learners actively construct knowledge through interaction with their environment, provides a theoretical framework for understanding language acquisition. This perspective emphasizes the learner's role in creating meaning and constructing knowledge rather than passively receiving information from teachers.

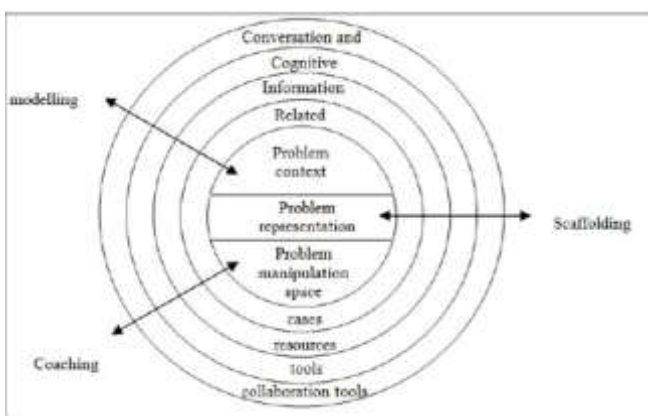


Figure 1: Key Components of Constructivist Learning Environments (adapted from Jonassen, 1999)

In the context of language learning, constructivism highlights the importance of authentic communication, problem-solving, and collaborative activities. By engaging in meaningful language use, learners are able to construct their own understanding of the target language and develop communicative competence.

Constructivist learning theory, pioneered by Jonassen (1999), posits that learners actively construct knowledge based on their experiences rather than passively receiving information. This contrasts with objectivist approaches, where knowledge is seen as fixed and transmitted from teacher to student. Importantly, constructivist learning environments prioritize problem-solving and knowledge application over mere content acquisition.

The alignment of constructivism with computer-assisted learning (CAL) is evident in the increasing number of studies demonstrating its positive impact on student achievement (Farzana, 2009; Vickneasvari, 2007). These studies have shown that constructivist CAL environments, characterized by interactive elements, problem-based learning, and learner autonomy, can significantly enhance students' understanding and motivation compared to traditional, objectivist approaches.

3. The Role of Technology in Language Education

The advent of technology has significantly transformed language teaching and learning. The integration of digital tools and resources has opened up new possibilities for language acquisition, offering learners access to authentic language materials, opportunities for interactive practice, and personalized learning experiences. Technology can facilitate communicative language teaching by providing platforms for authentic communication, such as online forums, chat rooms, and video conferencing. Additionally, it can support the development of language skills through interactive multimedia content, language learning software, and mobile applications.

4. CAL as a Pedagogical Approach: Definition and Components

Computer-assisted language learning (CALL) refers to the use of technology to support and enhance language teaching and learning. It encompasses a wide range of applications, including computer-based instruction, language learning software, and online platforms. CAL offers opportunities for individualized learning, interactive exercises, and immediate feedback, thereby promoting learner autonomy and engagement.

Key components of CAL include:

- **Interactive Exercises:** Providing opportunities for students to practice language skills through games, simulations, and drills.

- **Multimedia Integration:** Incorporating audio, video, and images to enhance language learning experiences.
- **Authentic Materials:** Offering exposure to real-world language use through authentic texts, audio, and video materials.
- **Learner Autonomy:** Empowering students to take control of their learning process through self-directed activities and personalized learning paths.

5. The Impact of CAL on Language Learning in General

Computer-assisted language learning (CALL) has significantly influenced language education by providing innovative tools and resources for learners. By integrating technology into the learning process, CAL offers opportunities for increased learner autonomy, personalized instruction, and interactive engagement (Levy, 1997). Studies have shown that CALL can enhance various aspects of language learning, including vocabulary acquisition, grammar development, and reading comprehension (Al-Mansour & Al-Shorman, 2012; Marzban, 2011). Furthermore, CAL can facilitate the development of intercultural competence by exposing learners to different cultures and perspectives through authentic materials.

6. CAL and Oral Proficiency

While research on the impact of CAL on overall language learning has been extensive, studies specifically focusing on its influence on oral proficiency are relatively limited. However, existing research suggests that CAL has the potential to enhance speaking skills through various means. For example, speech recognition software can provide learners with immediate feedback on pronunciation, while online language exchanges and virtual classrooms offer opportunities for authentic communication practice (Ehsani & Knodt, 1998). Additionally, the integration of multimedia elements, such as video and audio, can help learners develop listening comprehension and pronunciation skills, which are essential components of oral proficiency.

7. Challenges and Opportunities in Implementing CAL for Speaking Skills

Despite the potential benefits of CAL for developing speaking skills, several challenges must be addressed. Issues such as access to technology, technical difficulties, and teacher training can hinder the effective implementation of CAL. Moreover, the quality of CALL materials and software varies significantly, and careful selection is crucial to ensure that learners benefit from high-quality resources. On the other hand, CAL also presents numerous opportunities for enhancing oral proficiency. By incorporating interactive activities, simulations, and virtual language environments, teachers can create engaging and immersive learning experiences. Furthermore, CAL can facilitate differentiated instruction, allowing learners to work at their own pace and receive personalized feedback. By addressing the challenges

and capitalizing on the opportunities, educators can effectively leverage CAL to support the development of students' speaking skills.

Adolescence is a critical period for language development, characterized by rapid cognitive, social, and emotional growth. CAL offers unique opportunities to cater to the needs and interests of adolescent learners. By incorporating interactive elements, multimedia content, and opportunities for social interaction, CAL can enhance motivation and engagement, making language learning more enjoyable and effective. Furthermore, the ability to access language learning materials and practice independently aligns with the increasing autonomy and responsibility that adolescents develop during this stage.

8. Previous Studies on CAL and Speaking Skills in High School Settings

Research on the impact of Computer-Assisted Language Learning (CALL) has proliferated over the years, with a substantial body of literature demonstrating its effectiveness in various aspects of language acquisition. However, when it comes to high school settings, particularly in enhancing speaking skills, the body of research remains somewhat limited. Despite this, there are notable studies that have highlighted the potential of CALL to improve oral proficiency, albeit with varying degrees of focus on this specific skill.

One of the seminal works in this area is by AbuSeileek (2011), who explored the effectiveness of CALL in enhancing speaking skills among high school students. His study found that students exposed to CALL-based activities showed significant improvements in their ability to articulate ideas and engage in spontaneous conversation. The use of technology facilitated an environment where students could practice speaking in a low-pressure setting, receive instant feedback, and repeat exercises until they felt confident in their abilities. Similarly, Al-Jarf (2004) emphasized that CALL programs, which often include features like speech recognition and interactive dialogues, provide students with more opportunities for speaking practice than traditional classroom settings.

More recent studies have continued to support these findings, indicating that CALL can be particularly beneficial for developing speaking skills in high school students. For example, Ahmed and Hussain (2021) conducted an empirical study in Pakistan, where they found that CALL not only improved students' speaking abilities but also boosted their confidence in using the language in real-life situations. This is corroborated by Chapelle, Wang, and Hu (2022), who argue that CALL's interactive nature makes it an effective tool for language development, particularly in speaking, by offering a dynamic platform for practice and feedback.

Chen and Liu (2019) conducted a meta-analysis that further highlighted the positive effects of CALL on learners' motivation and achievement, which are critical factors in language acquisition, including speaking skills. Their findings suggest that when students are motivated and engaged through technology-enhanced learning environments, they are more likely to take risks and practice speaking, leading to better outcomes. Similarly, Lee and Chien (2022) found that CALL, when combined with pronunciation training, can significantly improve pronunciation accuracy, a key component of speaking proficiency.

In addition, studies by González-Lloret (2020) and Lai and Li (2022) have expanded the scope of CALL research by examining how technology-enhanced language learning environments can integrate speaking practice into broader language learning activities.

González-Lloret (2020) introduced the concept of Technology-Enhanced Language Learning (TELL), which builds on CALL by incorporating more advanced technologies and pedagogical strategies. Her research suggests that TELL environments can provide high school students with more authentic and immersive speaking experiences, which are crucial for developing fluency and accuracy.

Moreover, Gao, Chen, and Wang (2022) explored the impact of CALL on vocabulary acquisition, which indirectly supports speaking skills by expanding students' lexical resources. Their findings indicate that a rich vocabulary is essential for effective communication, and CALL can play a pivotal role in enhancing students' vocabulary knowledge, thereby improving their speaking abilities.

Despite these promising findings, there is still a need for more research specifically targeting high school students and focusing on speaking skills. The current literature provides a strong foundation, but further studies are necessary to explore the long-term effects of CALL on speaking proficiency and to identify the most effective CALL-based interventions for this age group.

In brief, while the research on CALL's impact on speaking skills in Moroccan high school settings is still emerging, existing studies suggest that CALL can be a valuable tool for enhancing oral proficiency.

By providing opportunities for practice, feedback, and interaction, CALL offers a promising approach to developing speaking skills in high school students. Future research should continue to build on these findings, exploring the specific features of CALL that are most beneficial for speaking practice and examining their effectiveness in diverse educational contexts.

III. METHODOLOGY

1. Research Design

A quasi-experimental design was employed to investigate the impact of computer-assisted learning (CAL) on high school students' speaking skills. This research design, as outlined by Creswell (2012), was selected due to the practical constraints of randomly assigning participants to experimental and control groups within an intact classroom setting. This approach allowed for the comparison of two groups of students: an experimental group exposed to CAL-enhanced instruction and a control group receiving traditional language teaching methods. By comparing pre- and post-test scores on speaking assessments, the study aimed to determine the effectiveness of CAL in enhancing students' oral proficiency.

Table 1: Speaking Rubric (Brown, 2004: 172-173)

Aspect	Explanation	Scale	Weight	Score
Grammar	Frequent grammatical errors even in simple structures; meaning is obscured.	1	4	
	Frequent grammatical errors even in simple structures that at times obscure meaning.	2		
	Frequent grammatical errors that do not obscure meaning; little variety in structures.	3		
	Some errors in grammatical structures possibly caused by attempt to include a variety.	4		
	Accuracy and variety of grammatical structures.	5		
Comprehension	The speech is incomprehensible; the speaker does not know anything about what he has said.	1	6	
	The speech is incomprehensible and the speaker knows little things about the speech.	2		
	The speech is difficult to understand; the speaker knows little things about the speech.	3		
	The speech is understood by listener; the speaker knows and understands about the speech.	4		
	The speech is easy to understand by both speaker and listener.	5		
Fluency	The speech is slow and exceedingly hesitant; difficult to perceive continuity in utterances.	1	10	
	The speech is frequently hesitant and jerky with some sentences left uncompleted.	2		
	The speech is relatively smooth but is characterized by some hesitation and unnatural pauses.	3		
	The speech is smooth with few hesitations.	4		
	The speech is smooth delivery.	5		
Total Score				

2. Participants and Sampling

The study population comprised 87 second-year Baccalaureate students majoring in physical sciences from Al Mansour Addahbi High School in Sidi Kacem, Morocco. The sample was divided into two groups: an experimental group (N=44) exposed to computer-assisted learning (CAL) and a

control group (N=43) receiving traditional instruction. The sample included 65% female and 35% male students, all from middle-class backgrounds. Due to practical constraints, a convenience sampling technique was employed to select participants from this specific high school. It is essential to acknowledge that this sampling method limits the generalizability of the findings to the broader population of Moroccan high school students.

3. Data Collection Instruments

To assess the impact of computer-assisted learning (CAL) on students' speaking skills, pre- and post-tests were administered. These assessments were designed to measure students' oral proficiency before and after the intervention. The tests included a variety of tasks, such as oral presentations, exchanges, and role-plays, to comprehensively evaluate students' speaking abilities. The assessment instruments were adapted and developed based on established language proficiency frameworks of Brown (2004) and aligned with the learning objectives of the curriculum. Inter-rater reliability was ensured through the use of multiple raters to assess student performance consistently.

4. Piloting

Prior to the main study, the speaking assessment instruments were piloted with a group of 10 students to ensure their reliability and validity. The purpose of the pilot testing was to identify any ambiguities or inconsistencies in the assessment tasks and to refine the scoring rubrics. Additionally, inter-rater reliability was assessed among the raters to ensure consistent scoring. The Cronbach's alpha coefficient for the assessment rubrics was calculated to be .86, indicating a high level of internal consistency among the rating criteria. The feedback obtained from the pilot testing was used to make necessary adjustments to the assessment instruments before administering them to the main study sample.

5. Data Collection Procedures

The study employed a pre-test, post-test design to assess the impact of computer-assisted learning (CAL) on students' speaking skills. Initially, all participants completed a pre-test, which consisted of oral presentations, exchanges and role plays on assigned topics. Two teachers assessed the students' performance using predetermined rubrics, with each student receiving a score out of 20. Following the pre-test, the experimental group was exposed to ten sessions of CAL, incorporating short videos with real-world contexts. The control group continued with traditional language instruction. After the intervention period, both the experimental and control groups completed a post-test using the same assessment procedures as the pre-test. The same two teachers rated the students' oral performance using the identical rubrics. By comparing the pre-test and post-test scores for both groups, the study aimed to determine the effectiveness of CAL in enhancing students' speaking skills.

IV. RESULTS

1. Descriptive Statistics

This section delves into the efficacy of computer-assisted learning (CAL) in enhancing the speaking abilities of Moroccan high school students. The primary objective is to determine whether CAL significantly impacts students' oral proficiency compared to traditional instruction. The study employed a quasi-experimental design to investigate this relationship. Speaking skills were assessed numerically through pre- and post-tests, serving as the dependent variable. Conversely, the implementation of CAL acted as the independent variable. The study seeks to answer the following research question:

RQ: Does computer-assisted learning (CAL) significantly enhance high school students' speaking skills compared to traditional instruction?

The Directional Hypothesis: Students exposed to computer-assisted learning will demonstrate significantly higher speaking proficiency than those receiving traditional instruction.

The null hypothesis for this study posits that there is no significant difference in speaking proficiency between students exposed to computer-assisted learning and those taught through traditional methods. To analyze the data and determine the impact of computer-assisted learning (CAL) on students' speaking skills, both paired samples t-tests and independent samples t-tests were employed. The paired samples t-test was utilized to compare pre-test and post-test scores within each group (experimental and control), allowing for an assessment of within-group changes in speaking proficiency. This analysis helped determine the overall effectiveness of both instructional methods in enhancing students' oral skills. The independent samples t-test was conducted to compare the mean speaking scores of the experimental and control groups at the post-test stage. This analysis aimed to identify any significant differences in speaking proficiency between the two groups, providing evidence for the differential impact of CAL on students' oral performance.

Table 2: Descriptive statistics of the pretest and posttest scores

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Pretest	Control	43	9,6395	2,45271	,37403
	Experimental	44	9,7727	1,97427	,29763
Posttest	Control	43	9,5233	2,57958	,39338
	Experimental	44	15,3636	1,57141	,23690

Descriptive statistics for the pre-test and post-test scores are presented for both the control and experimental groups. The control group consisted of 43 participants with a mean pre-test score of 9.64 and a standard deviation of 2.45, while the experimental group comprised 44 participants with a mean pre-test score of 9.77 and a standard deviation of 1.97.

For the post-test, the control group exhibited a mean score of 9.52 with a standard deviation of 2.58, whereas the experimental group demonstrated a mean score of 15.36 with a standard deviation of 1.57. These descriptive statistics provide an initial overview of the data, indicating potential differences in performance between the groups and over time.

Table 3: Paired Samples Correlations of the pre-test and post-test

Pair 1	Pretest & Posttest	N	Correlation	Sig.
		87	,370	,000

The paired samples correlation analysis reveals a statistically significant positive correlation ($r = .370, p < .001$) between pre-test and post-test scores, indicating a moderate relationship between initial and subsequent performance. This suggests that students who performed better on the pre-test tended to also perform better on the post-test.

Table 4: Paired Samples Test

Pair 1	Pretest - Posttest	Paired Differences				t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			
		-2,77011	3,47546	,37261	Lower -3,51084 Upper -2,02939	-7,434	86	,000

The paired samples t-test results indicate a statistically significant difference in speaking proficiency between the pre-test and post-test scores ($t(86) = -7.434, p < .001$).

The negative mean difference of -2.77011 suggests a substantial improvement in speaking skills over time for both the experimental and control groups.

Table 5: Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretest	Equal variances assumed	,671	,415	-,279	85	,781	-,13319	,47682	-1,08123	,81485
	Equal variances not assumed			-,279	80,502	,781	-,13319	,47800	-1,08436	,81797
Posttest	Equal variances assumed	5,986	,016	-12,786	85	,000	-5,84038	,45676	-6,74855	-4,93221
	Equal variances not assumed			-12,718	69,109	,000	-5,84038	,45921	-6,75645	-4,92431

The independent samples t-test was conducted to compare the mean scores of the control and experimental groups for both the pre-test and post-test. Levene's test for equality of variances indicated that the assumption of equal variances was not violated for the pre-test, but was violated for the post-test. The results of the t-test revealed no significant difference in mean scores between the two groups for the pre-test, suggesting similar starting points for both groups. However, for the post-test, there was a significant difference between the groups, with the experimental group having a significantly higher mean score than the control group.

Table 6: Levene's Test of Equality of Error Variances^a

Dependent Variable: Postest			
F	df1	df2	Sig.
,040	1	85	,841
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			
a. Design: Intercept + Pretest + Group			

The Levene's test for equality of variances indicates that the variances of the post-test scores between the control and experimental groups are not significantly different ($F(1,85) = .040, p = .841$). This suggests that the assumption of equal variances is met, which supports the use of the pooled variance estimate in the independent samples t-test.

Table 7: Tests of Between-Subjects Effects

Dependent Variable: Postest						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	876,290 ^a	2	438,145	146,535	,000	,777
Intercept	205,120	1	205,120	68,601	,000	,450
Pretest	134,495	1	134,495	44,981	,000	,349
Group	722,116	1	722,116	241,507	,000	,742
Error	251,164	84	2,990			
Total	14671,250	87				
Corrected Total	1127,454	86				
a. R Squared = ,777 (Adjusted R Squared = ,772)						

The analysis of variance (ANOVA) results indicate that the model is statistically significant ($F(2, 84) = 146.535, p < .001$), explaining 77.7% of the variance in post-test scores. Both the pretest and group variables significantly contribute to the prediction of post-test scores, as indicated by their respective F-values and p-values. This suggests that students' initial performance (pretest) and group membership (control or experimental) are associated with differences in post-test outcomes.

2. Discussion

The findings of this study, demonstrating the efficacy of computer-assisted learning (CAL) in enhancing high school students' speaking skills, contribute significantly to the expanding literature on technology integration in language education. This study's results align with those of numerous studies conducted across diverse educational contexts, reinforcing the potential of CAL to facilitate language acquisition effectively. For instance, Ahmed and Hussain (2021) reported substantial improvements in English language

acquisition among Pakistani students exposed to CAL, underscoring the universality of CAL's benefits across different educational settings.

The effectiveness of CAL can be attributed to several critical factors. A primary contributor is the interactive nature of CAL, which provides students with immediate feedback and active engagement with language materials. This aligns with Chen and Liu's (2019) findings, which highlight the positive impact of CAL's interactive features on learners' motivation and overall achievement. The integration of authentic language materials and simulations within CAL environments further supports the concept of "learning by doing" (Rogers, 2004), as these features foster a more engaging and immersive learning environment. Stepp-Greany (2002) emphasized that such interactive and authentic experiences are particularly effective in developing speaking skills, as they simulate real-life language use and provide learners with practical contexts in which to apply their knowledge.

Additionally, CAL programs often include built-in features such as speech recognition and pronunciation analysis, which offer targeted support in areas traditionally challenging for language learners. Lee and Chien (2022) emphasized the significant role of computer-assisted pronunciation training in improving learners' pronunciation accuracy, a critical component of overall speaking proficiency. This finding is consistent with earlier research by Ehsani and Knodt (1998) and Seferoglu (2005), who also identified these technological enhancements as crucial for effective language development. The ability of CAL to provide personalized and immediate feedback on pronunciation and other aspects of speaking skills likely contributed to the significant improvements observed in the experimental group.

However, it is essential to recognize and address the limitations of the current study. The quasi-experimental design, while valuable for exploring the potential effects of CAL, does not establish causality definitively. As Kim and Lee (2021) suggest, future research should employ more rigorous experimental designs, such as randomized controlled trials, to strengthen the validity of the findings and allow for more robust conclusions. Furthermore, the lack of detailed information regarding the specific content and implementation of the CAL program used in this study limits the generalizability of the results. This limitation is echoed by González-Lloret (2020), who advocates for greater transparency and specificity in describing the technological tools and pedagogical approaches used in CALL research. Such detail is crucial for enabling better comparisons across studies and facilitating meta-analyses that can provide deeper insights into the effectiveness of different CAL interventions. The implications of these findings extend beyond the immediate context of this study and have significant relevance for language educators and curriculum developers. The

demonstrated benefits of CAL suggest that it can be an effective supplementary tool in language classrooms. However, as Davies (2002) and other scholars have noted, it is crucial to maintain a balanced approach that integrates both technology-mediated and traditional face-to-face instruction. This balanced approach ensures that the human elements of teaching, such as personalized feedback, emotional support, and the ability to respond dynamically to students' needs, are not overshadowed by the technological aspects of CAL.

Moreover, the need for ongoing research into the long-term effects of CAL is critical. While studies such as those by Lai and Li (2022) and Wang and Sun (2021) have begun to explore the impact of CAL on specific language skills, including speaking fluency and listening comprehension, there remains much to be understood about how CAL can be optimized to support sustained language development. Future research should focus on exploring how different types of CAL activities and pedagogical strategies can be tailored to meet the diverse needs of learners, particularly in high school settings where students' developmental stages and learning needs are distinct.

In a nutshell, while this study contributes valuable evidence supporting the use of CAL in language education, it also underscores the need for more rigorous and detailed research in this area. By addressing the limitations identified in this study and continuing to explore the various factors that contribute to the success of CAL programs, future research can help develop evidence-based practices that maximize the benefits of technology in language learning. This approach will ultimately lead to improved student outcomes and more effective language instruction across a variety of educational contexts, ensuring that the integration of technology into language education is both meaningful and impactful.

V. CONCLUSION

The findings of this study underscore the potential of computer-assisted learning (CAL) as a valuable tool for enhancing high school students' speaking skills. By providing opportunities for interactive practice, immediate feedback, and exposure to authentic language, CAL can significantly contribute to the development of oral proficiency. These findings align with previous research emphasizing the role of technology in language learning (Levy, 1997; Gündüz, 2005). However, it is crucial to acknowledge the limitations of this study, such as the quasi-experimental design and the specific context of the research. Future research should explore the long-term effects of CAL on speaking skills, investigate the optimal integration of CAL with traditional instruction, and examine the role of teacher training in maximizing the benefits of this technology. By addressing these areas, researchers can further refine our understanding of how CAL can be effectively utilized to support language learning.

In brief, this study offers valuable insights into the potential of CAL to enhance students' speaking abilities. While the findings are promising, further research is necessary to fully realize the potential of technology-mediated language learning. By building upon the foundation laid by this study, educators and policymakers can make informed decisions about the integration of CAL into language curricula and create optimal learning environments for students.

1. Implications

Implications for the Moroccan Context

The findings of this study hold significant implications for the Moroccan educational landscape. Given the increasing emphasis on technology integration in Moroccan schools, the results underscore the potential of computer-assisted learning (CAL) to enhance language teaching and learning. By leveraging digital tools and resources, educators can create more engaging and interactive learning environments that cater to the diverse needs of Moroccan students.

Implications for Teachers

Moroccan language teachers can benefit from the findings by incorporating CAL into their instructional practices. This involves developing digital literacy skills, exploring various CAL tools and resources, and designing effective learning activities. Teachers should also focus on providing appropriate guidance and support to students as they navigate the digital learning environment. Furthermore, collaboration among teachers to share experiences and best practices in CAL implementation is essential for fostering a supportive learning community.

Implications for Syllabus Designers

Syllabus designers in Morocco can integrate CAL components into language curricula to enhance student learning outcomes. This involves carefully selecting CAL tools and resources that align with learning objectives and creating opportunities for students to practice language skills in authentic contexts. It is crucial to ensure a balanced approach that combines both technology-mediated and face-to-face instruction to cater to different learning styles and preferences. Additionally, syllabus designers should consider the accessibility of technology and digital resources for all students to promote equity in education.

Implications for Educational Stakeholders

Educational stakeholders in Morocco, including policymakers, administrators, and curriculum developers, have a vital role in supporting the integration of CAL into language education. This involves investing in infrastructure, providing teacher training, and developing relevant policies and guidelines. By allocating adequate resources and fostering a supportive environment, stakeholders can create the necessary conditions for successful CAL implementation. Moreover, conducting further research on the effectiveness of CAL in the Moroccan

context is essential for informing evidence-based decision-making and optimizing the use of technology in language education.

REFERENCES

1. AbuSeileek, A. F. (2011). Computer-assisted language learning: Merits and demerits. *Language Learning & Technology*, 15(1), 137-165.
2. AbuSeileek, A. F. (2011). The effect of computer-assisted cooperative learning methods and group size on EFL learners' achievement in communication skills. *Computers & Education*, 56(2), 231-239.
3. Ahmed, S., & Hussain, S. (2021). The impact of computer-assisted language learning on English language acquisition: An empirical study in Pakistan. *Journal of Language Teaching and Research*, 12(3), 613-630.
4. Al-Jarf, R. (2004). The effects of web-based learning on struggling EFL college writers. *Foreign Language Annals*, 37(1), 49-57.
5. Al-Mansour, N. S., & Al-Shorman, R. A. (2012). The effect of computer-assisted instruction on Saudi university students' learning of English. *Journal of King Saud University - Languages and Translation*, 24(1), 51-56.
6. Arias, J. J., Swinton, J. R., & Anderson, K. (2010). Online vs. face-to-face: A comparison of student outcomes with random assignment. *The American Journal of Distance Education*, 24(1), 27-36.
7. Brown, H. D. (2004). *Language assessment: Principles and classroom practices*. Pearson Education.
8. Chappelle, C., Wang, L., & Hu, G. (2022). CALL and language development. In M. N. Levy, F. Blin, C. B. Reinhardt, & P. Hubbard (Eds.), *The Routledge handbook of language learning and technology* (pp. 140-155). Routledge.
9. Chen, J., & Liu, M. (2019). The effects of computer-assisted language learning on English learners' motivation and achievement: A meta-analysis. *Educational Technology Research and Development*, 67(6), 1501-1524.
10. Chen, Z., & Liu, M. (2019). Technology-enhanced language learning: A meta-analysis of effectiveness on learner outcomes. *Computers & Education*, 140, 103106. <https://doi.org/10.1016/j.compedu.2018.08.003>
11. Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Pearson.
12. Davies, G. (2002). ICT and Modern Foreign Languages: Learning Opportunities And Training Needs. *International Journal of English Studies*, 2(1), 1-18. Retrieved from <https://revistas.um.es/ijes/article/view/48371>
13. Dlaska, A. (2002). Sites, sounds and texts: Language and culture in transition. *Language Learning & Technology*, 6(2), 41-47.
14. Ehsani, F., & Knodt, E. (1998). Speech technology in computer-aided language learning: Strengths and limitations of a new CALL paradigm. *Language Learning & Technology*, 2(1), 45-60. <https://doi.org/10.1017/S0261444800012970>
15. Farzana, M. S. (2009). *The role of computer-assisted language learning (CALL) in language teaching*. LAP Lambert Academic Publishing.
16. Gao, X., Chen, X., & Wang, Q. (2022). The effects of computer-assisted language learning on the vocabulary acquisition of English as a foreign language learners: A meta-analysis. *Frontiers in Psychology*, 13, 848.
17. Getkham, K. (2004). *The effects of using computer-assisted language learning on English vocabulary retention and recall in a Thai secondary school*. Unpublished Master's Thesis. Chiang Mai University.
18. González-Lloret, M. (2020). *Collaborative tasks and technology*. John Benjamins Publishing. <https://doi.org/10.1075/llt.50>
19. González-Lloret, M. (2020). From computer-assisted language learning (CALL) to technology-enhanced language learning (TELL): Integrating research on technology and second language learning. *Annual Review of Applied Linguistics*, 40, 3-18.
20. González-Lloret, M. (2020). Technology-mediated tasks in the classroom: A critical perspective. *Annual Review of Applied Linguistics*, 40, 37-52. <https://doi.org/10.1017/S0267190520000030>
21. Gündüz, N. (2005). Computer assisted language learning (CALL). *Journal of Language and Linguistic Studies*, 1(2), 193-214. <https://www.jlls.org/index.php/jlls/article/view/16>
22. Hamdanat, I. (2023). An investigation of the relationship between receptive skills among Moroccan high school students. *Journal of English as a Foreign Language Teaching and Research*, 3(2), 48-58. <https://doi.org/10.31098/jefltr.v3i2.1707>
23. Hamdanat, I. (2024). The interplay between French and English reading skills among Moroccan 9th-grade middle school students: A correlational study. *Journal of Child Language Acquisition and Development-JCLAD*, 989-1008. [DOI: 10.5281/zenodo.11504899]
24. Hamdanat, I., Azzouzi, L., & El Jemli, O. (2024). Investigating the correlation between receptive vocabulary knowledge in French and English among Moroccan EFL learners. *GPH-International Journal of Educational Research*, 7(06), 56-71. <https://doi.org/10.5281/zenodo.12819272>
25. Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.), *Instructional design theories and models: A new paradigm of*

- instructional theory (Vol. II, pp. 215-239). Lawrence Erlbaum Associates.
26. Kim, S., & Lee, J. (2021). Effects of flipped classroom and traditional classroom on student achievement and satisfaction: A meta-analysis. *Education and Information Technologies*, 26(2), 2167-2193. <https://doi.org/10.1007/s10639-020-10406-4>
27. Krashen, S. D. (1981). *Second language acquisition and second language learning*. Pergamon Press.
28. Lai, C., & Li, G. (2022). The impact of computer-assisted language learning on speaking fluency: A study of English learners in Hong Kong. *System*, 103, 102681. <https://doi.org/10.1016/j.system.2021.102681>
29. Lai, C., & Li, Y. (2022). The effect of computer-assisted language learning on second language speaking fluency: A meta-analysis. *Computer Assisted Language Learning*, 1-30.
30. Lee, H., & Chien, Y. (2022). Computer-assisted pronunciation training in language learning: A review. *Journal of Second Language Pronunciation*, 8(1), 33-56. <https://doi.org/10.1075/jslp.19025.lee>
31. Lee, S. J., & Chien, Y. C. (2022). The effects of computer-assisted pronunciation training on English learners' pronunciation accuracy: A systematic review and meta-analysis. *Language Learning & Technology*, 26(1), 96-120.
32. Levy, M. (1997). *Computer-assisted language learning: Context and conceptualization*. Clarendon Press.
33. Marzban, A. (2011). Improvement of reading comprehension through computer-assisted language learning in Iranian intermediate EFL students. *Procedia - Social and Behavioral Sciences*, 15, 2160-2164.
34. Rahimi, M., & Yadollahi, S. (2011). The impact of computer-assisted language learning (CALL) on Iranian EFL learners' task-based listening skill and motivation. *Procedia Computer Science*, 3, 10-17.
35. Ratnaningsih, D., Nofandii, F., Purba, D., & Wiratno, D. (2019). The influence of computer assisted language learning (CALL) to improve English speaking skills. *Research, Society and Development*, 8(10), 01-09. <https://doi.org/10.33448/rsd-v8i10.1413>
36. Rogers, C. R. (2004). *On becoming a person: A therapist's view of psychotherapy*. Houghton Mifflin Harcourt. (Original work published 1961). <https://doi.org/10.1037/10592-000>
37. Seferoglu, G. (2005). Improving students' pronunciation through accent reduction software. *British Journal of Educational Technology*, 36(2), 303-316. <https://doi.org/10.1111/j.1467-8535.2005.00460.x>
38. Stepp-Greany, J. (2002). Student perceptions on language learning in a technological environment: Implications for the new millennium. *Language Learning & Technology*, 6(1), 165-180. https://scholarspace.manoa.hawaii.edu/bitstream/10125/25152/06_01_article7.pdf
39. Swain, M. (2005). The output hypothesis: Theory and research. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning* (pp. 471-483). Lawrence Erlbaum Associates.
40. Vickneasvari, V. (2007). *The effectiveness of computer-assisted learning in teaching English as a second language*. Unpublished master's thesis, University of Malaya.
41. Wang, T., & Sun, Z. (2021). Long-term effects of computer-assisted language learning on speaking proficiency in EFL learners. *Language Learning & Technology*, 25(2), 31-50. <https://doi.org/10.10125/44662>