A Systematic Review on the Use of Emerging Technologies in Teaching English as an Applied Language at the University Level

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Abstract: At present, emerging technologies, such as machine learning, deep learning, or various forms of artificial intelligence are penetrating different fields of education, including foreign language education (FLE). Moreover, the current young generation was born into the technological environment, and they perceive technologies as being an indispensable part of their everyday life. However, they mainly use technologies in their informal learning, but there is not much research into emerging technologies in FLE, namely in teaching and learning English as an applied language. Therefore, the purpose of this systematic review is to identify, bring together, compare and analyze all of the technologies that are currently efficiently employed in foreign language teaching and learning, and based on the findings of the detected experimental studies, we provide specific pedagogical implications on how to use these technologies in the acquisition of English as an applied language at the university level. The methodology followed the PRISMA guidelines for systematic reviews and meta-analyses. The results of the detected experimental studies revealed that there was a serious lack of the latest technologies, such as chatbots or virtual reality (VR) devices, that are being empirically employed in a foreign language (FL) education. Moreover, mobile apps are merely focused on the development of FL vocabulary. The findings also indicate that although the FL teachers might theoretically know about these latest technological devices, such as neural machine translation, they do not know how to practically implement them in their teaching process. Therefore, this research suggests that teachers must be trained and pedagogically guided on how to purposefully implement them in their FL classes to support traditional instruction in order to identify what skills or language structures could be developed through their use. In addition, it is also claimed that more experimental studies are needed to clearly the evidence and its usefulness in teaching a foreign language as an applied language.

Keywords: foreign language education; English as a foreign language; applied language; AI; chatbots; mobile apps; university; practical implications

1. Introduction

Today's digital age and its emerging technologies, with the latest achievements of artificial intelligence and big data processing, have unprecedently affected education processes and pedagogy, including the strategies and approaches related to foreign language (FL) teaching and learning [1]. Present day graduates belong to Generation Z, who are known for being digitally literate, technologically savvy, and having grown up with digital tools. In addition, they are going to be soon followed by Generation Alpha, whose members are characterized as permanently connected and who are able to make their own decisions based on the use of technologies and also being able to manage their digital identities or

visuals [2]. Thus, the present day foreign language education usually is, or should be, technology-based since technology has become an integral part of the life of the current generation, and also, today's language learning environment which is no longer solely constricted to the traditional or formal school learning environment [3].

In this respect, foreign language teachers face a serious challenge in integrating different kinds of technologies into their teaching realities as they have to satisfy the learning needs of the two generations. However, in order to keep up with their digitally informed students and engage them in learning a foreign language, they must use recent technologies, such as chatbots or virtual reality. They also have to evaluate which of these technologies could generate some impact in their classes, analyze their potential, and utilize all of the benefits they bring. Moreover, they ought to assess the potential risks these technologies could pose. In addition, the teachers must always consider the added value of the selected tools for the students' learning and their learning outcomes, which is not an easy task as the research into the practical utilizations of digital technologies with clear pedagogical outcomes is, surprisingly, scarce. It must not be forgotten that, as the research in [4] emphasizes, FL teachers should also promote not only the students' knowledge acquisition in various learning contexts, but they should also enhance the skills that appear to be crucial for the 21st century, such as critical thinking, creativity, communication, or collaboration skills. Moreover, to be able to motivate their students to use these technologies in FL learning, they themselves must have a positive attitude to their use in FL classrooms [5–7], as well as possess the relevant subject, technological, and pedagogical knowledge [8].

For the aforementioned reasons, the rationale of this study is to provide a clear and systematic analysis of the cutting-edge research into the practical use of modern technologies in FL classes, as it is provided by the empirical research that is currently globally available. Thus, the purpose of this review is to identify, bring together, compare, and analyze all of the technologies that are currently efficiently employed in foreign language teaching and learning, based on the findings of the identified experimental studies. Furthermore, it aims at providing very specific pedagogical implications on using these technologies for the acquisition of English as an applied language at the university level. There have been several systematic reviews [9,10] on a similar topic, but none of them provide the practical implications that could be instantly implemented into FL education, thus, this study attempts to bridge this gap in the current research.

The following research questions have been formulated to obtain the results of this study:

1. What are the most efficient digital tools that can be used for FL learning and teaching based on the empirical research findings?
2. What are the practical implications that could be yielded from these studies?

2. Materials and Methods

This review study exploits the PRISMA methodology for systematic reviews and meta-analyses. PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) is employed for systematically and explicitly identifying, selecting, and critically appraising the relevant research on a given topic. For detailed information and specific guidelines, please consult: https://www.bmj.com/content/372/bmj.n160 (accessed on 1 January 2023). As emerging technologies are being perceived as the latest technologies and as the aim was not to provide a historical overview, but to identify the current findings and practical implications, the search was strictly limited to research that has been published in the last five years, i.e., from January 2018 to December 2022. In addition, only the experimental studies dealing exclusively with the use of novel or recent technologies in the teaching of English as an applied language with a special focus on their implementation in English language classrooms were included in this review. Theoretical, descriptive, observational, and non-experimental studies were excluded from the search as the main aim was to look for empirically verified findings that could be transferrable to teaching practices. The search was conducted in two well-established databases, i.e., Scopus and Web of Science, and the

titles of the articles, their abstracts, and keywords were focused on as these were sufficient to generate a reliable and adequate core of articles that were to be further analyzed. Only open access articles were included in this review study since the authors of this review did not want to exclude anyone from not having the access to their research. The following inclusion and exclusion criteria were deployed to obtain only the relevant studies that deal exclusively with the given topic.

2.1. Inclusion Criteria

- Only experimental studies focusing on the research topic, i.e., the use of novel technologies in the teaching of English as an applied language with a special focus on their implementation in university English language classrooms.
- Published from January 2018 to December 2022.
- Scopus and Web of Science databases.
- Peer-reviewed and only English-written journal articles were included.
- Search terms were applied in the title, abstract, or keywords of the articles.
- Experimental studies with specific practical outcomes for EFL.
- Open access articles.

2.2. Exclusion Criteria

- Descriptive studies, theoretical studies, conference proceedings, case studies, observational studies, book chapters, editorials, systematic reviews, and meta-analyses.

2.3. Search String

("Mobile apps" OR "mobile applications" OR "mobile app" OR "chatbot*" OR "IPA" OR "virtual reality" OR "augmented reality" OR "neural machine translation") AND "English language" AND "university".

The initial search using this search string generated 59 documents from Scopus and 107 studies from Web of Science. After applying all of the inclusion and exclusion criteria and removing the duplicates, 14 studies could be considered to be analyzed.

3. Results

The aim of this systematic review was to collect information about the impact of the latest technologies on the English language learning process, analyze this information, and provide a summary of the practical implications that could be related to the use of digital technologies and FL learning and teaching with the utilization of technologies. The first search generated 59 (Scopus) and 107 (Web of Science) studies, but after the manual evaluation of them, only thirteen studies were identified as being relevant since they provided clear information on the topic and scope of the study. These thirteen studies, which were conducted in different countries, were detected on the basis of the inclusion and exclusion criteria based above with the verification of whether they provide practical guidance and implications for FL teaching or learning that are statistically sound and are not just an opinion of the participants or the tutors. Therefore, the majority of the survey studies had to be abandoned. The remaining studies all used standardized outcome measures, such as pre-tests and post-tests, which means that the experiment employed experimental and control group settings with clear testing before and after the intervention, thus, making the results statistically significant and replicable. The number of participants ranged from 20 to 483 university students, and the intervention period lasted between one and six months. Although the search span was quite wide, namely those published in the last five years, the vast majority of the latest technologies included only mobile apps used to develop students' vocabulary. In fact, the development of FL vocabulary was also the aim of other technological tools, such as the use of the NAO robot or machine translation.

Five studies conducted in the Czech Republic, Hong Kong, Iran, Korea, Serbia, and Russia investigated the impact of mobile learning applications (apps) on vocabulary acquisition. Different mobile learning apps were chosen as a tool for FL acquisition, but the results of the studies were consistent as certain vocabulary enhancements were found and vocabulary retention was improved, as was confirmed by all of the studies. In addition, the study participants reported an increased motivation to learn, the perception of fun learning, better understanding, and the acceptance of mobile devices as new learning tools. In terms of pedagogical implications, the teachers were advised to implement mobile technologies in the language teaching process in order to help their students to achieve better learning outcomes. However, to achieve them, it is crucial that the learning content is well organized, readable, and easy to be absorbed by the users.

Two more studies focused on the impact of a particular application, namely WhatsApp, on language acquisition, and they were conducted in Saudi Arabia and Yemen. Alenezia and Bensalem [11], who compared the impacts of the WhatsApp and Blackboard platforms on language learning, reported that there was no significant difference between the effectiveness of the two platforms. However, an increase in motivation to complete a task when one is using WhatsApp was perceived by the study participants. Similar results were shown in a study conducted by Sabri et al. [12]. Therefore, teachers are advised to use WhatsApp as a pedagogical tool and encourage their students to create and join WhatsApp groups in the process of language acquisition. However, these findings presented rather subjective opinions or the feelings of the participants and there is no rigorous data which support these empirical research findings.

Various freely available information and communication technology (ICT) tools, such as the Memrise platform, the Lingualeo website, the British Council website, and Google Forms, were used to investigate their impact on the reading skills of students in Kazakhstan. As a result of the study, the development of reading skills and the improvement of foreign language and culture learning were found. According to Adilbayev et al. [13], various ICT tools should be used to improve the students' reading skills under the guidance of the teacher. This issue, however, still needs further verification, and experimental research must be conducted on the impact of digital technologies on the development of reading competencies.

Another study conducted in South Korea investigated the quality and nature of machine translation applications (MTAs) and their impact on language learning. Google Translator was chosen as the research tool in their study. The findings indicate that machine translation appears to be a practical and useful aid in solving lexical grammatical problems. According to Chon et al. [14], machine translation has great potential to narrow the gap in the writing ability between the proficient and less proficient learners. The participants in the study were able to produce more complex sentences and were aware of the grammatical errors they made when they used MTA. The use of MTA proved to have some limitations as translation errors may have occurred, but they still do not represent a major limitation as the mistakes of the students if they were not using the tool would have been much more serious. Based on these findings, the authors claim that teachers should train their students to notice errors or inappropriate language use in machine-translated texts, which goes without saying, but the authors do not explicate how this ambitious aim should be achieved.

A study conducted in South Korea and Japan [15] compared the intelligibility test results between the artificial intelligence (AI) application and native English speakers in order to highlight the feasibility of AI apps in FL pronunciation practice and promote the intelligibility of Korean-accented English. Google Assistant and Apple Siri were used as research tools. The results revealed that native speakers found Korean-accented English to be more intelligible than AI apps are. Relatively high intelligibility scores were achieved by the native speakers. The native speakers would have fewer problems than the AI apps did when one was recognizing consonant sounds, consonant clusters in initial and medial positions in a word, and vowel length features. As a result, they believe that in the process of English learning, the students should aim to communicate intelligibly with humans with various accents by practicing communication with current available AI apps. In addition, two more research studies [16,17] also explored the possibilities using of AI in language learning. More specifically, Banaeian and Gilanlioglu [16] focused on the use of the NAO robot in developing the student's FL vocabulary. Although there were not any significant differences between the experimental and control groups, both of the groups enhanced their FL vocabulary. Moreover, the students found the use of the NAO robot to be useful for learning new words, which is just a subjective feeling, without there being any experimental verification of it. Dizon [17] investigated the use of the chatbot, Alexa, in the development of listening and speaking skills. The findings of this study revealed that only the speaking skills had been improved. As in other research that has already been mentioned, the students found this new technology to be enjoyable and motivating for studying English.

The study conducted by Ma [18] examined the virtual reality technology in an immersive English teaching college context method based on artificial intelligence and machine learning. The results of the research show the improvement of the students' English quality through immersive context teaching combining constructivism theory and VR technology. The participants of the research reported satisfaction with the VR technology, as well as satisfaction with their own academic performances. It was recommended that one should to implement the context teaching method in the process of language learning as it enables the students to accept and use language in the communicative environment. Therefore, the teaching must be student-centered in order to enable the students to learn independently.

Finally, Abdelrady and Akram [19] conducted a research study to investigate a ClassPoint tool to investigate its usefulness for assessing the e-learning satisfaction of EFL students. It was recommended that one should use the ClassPoint tool to enrich the EFL students' learning experiences based on the experiments that were conducted in the study. The results show that the tool enhances the EFL students' learning based on the responses given by the participants.

A summary of the research studies is shown in Table 1.

Table 1. An overview of the findings from the detected studies.

Study and Country of Origin	Objective of the Study	Methodology (Participants, Length of Intervention, and the Technology Tool Used)	Outcome Measures	Findings	Pedagogical Implications
Abdelrady and Akram [19] Saudi Arabia	To investigate the use of ClassPoint tool to improve the e-learning satisfaction of undergraduate EFL students.	32 students. 1 month long. Use of ClassPoint tool.	Pre-test Post-test *T*-test	The ClassPoint tool based on e-learning practices enhances the EFL students' satisfaction. The results show that students in the ClassPoint tool setting received considerably higher mean scores in all the e-learning processes as compared to those of the non-ClassPoint EFL students. In the ClassPoint tool setting, the EFL students showed higher satisfaction for technological environment as compared to those in the non-ClassPoint tool settings.	It contributes to the enhancement of the EFL students' e-learning satisfaction. It helps to improve the evaluation of the EFL students' progress in online educational systems. It is necessary to use the ClassPoint tool at all educational levels to enrich the EFL learners' experiences.
Adilbayeva et al. [13] Kazakhstan	To examine how the use of ICT tools can enhance students' reading skills.	32 participants. The length of intervention no stated. Use of various freely available ICT tools (the Memrise platform, Lingualeo website, the Learn English Teens website from the British Council, and Google Forms).	Pre-test Post-test Questionnaire survey	Effectiveness of using digital technology in teaching a foreign language and culture. Development of reading skills. Enhancement of learning a foreign language and culture. Improvement of reading comprehension. Increase in students' motivation to learn a foreign language. Perception of the comfortable rhythm of work in accordance with students' language level. Ability to monitor the time spent on the exercises.	Websites and mobile applications should be used under the guidance of a teacher in order to improve students' reading skills.
Ahmed [20] Yemen	To examine the pedagogical role of WhatsApp in order to enhance motivation of Yemeni EFL learners to develop reading and writing skills.	20 participants. 2 months long intervention. Use of WhatsApp application.	Pre-test Post-test Questionnaire	Enhancement of students' motivation to improve their reading and writing skills. Development of vocabulary, grammar, reading comprehension, and writing. Students' positive perception of WhatsApp as a learning tool.	EFL teachers are recommended to utilize WhatsApp as a pedagogical tool and to encourage their students to create and join WhatsApp English-focused groups to have natural interactions and for contextualized language use, which cannot be easily provided in traditional classrooms.

Table 1. *Cont.*

Study and Country of Origin	Objective of the Study	Methodology (Participants, Length of Intervention, and the Technology Tool Used)	Outcome Measures	Findings	Pedagogical Implications
Alenezia and Bensalem [11] Saudi Arabia	To examine the impact of WhatsApp on medical ESP students' vocabulary learning compared to the Blackboard platform.	103 participants. 3 months long intervention. Use of WhatsApp application and Blackboard platform.	Pre-test Post-test Questionnaire	No significant difference between the efficiency of the two platforms. Perception of learning enhancement when using WhatsApp application. Positive attitudes towards the use of WhatsApp in learning vocabulary. Improvement of motivation to complete the assignments when using WhatsApp.	Not provided.
Banaeian and Gilanlioglu [16] Cyprus	To examine how the NAO robot as a teaching assistant impacts the way university students learn vocabulary and their attitudes towards it.	65 participants. 4 sessions during two weeks. Use of the NAO robot.	Pre-test Post-test Questionnaire Interview	There were no significant differences in learning new words between the experimental and control groups. Problems with voice recognition and speech rate, and the students had inadequate listening skills, and there were individual differences. Students had mixed feelings about the use of the NAO robot, but the positive attitudes prevailed.	The benefits and drawbacks of the NAO robot should be considered before its integration into foreign language vocabulary learning and teaching. Teachers should be provided with professional training for using the NAO robot effectively with various learners.
Chon et al. [14] South Korea	To explore the quality and the nature of MT and consider its implications for language learning.	70 participants. Three 50 min sessions. Use of Google Translator.	Direct essay writing Self-translated essay writing Machine-translated essay writing	Machine translation appears to be an aid for lexico-grammatical problem solving. Machine translation narrowed the difference in writing ability between skilled and less skilled learners. Machine translation facilitated the use of lower frequency words. Machine translation produced more complex sentences. Reduction of grammatical errors. Mistranslations may have occurred.	Teachers should provide strategy-based instruction to train learners to notice the errors or inappropriate use of the language in machine-translated texts. Learners should be instructed to pay attention to revising their L1 texts.

Table 1. *Cont.*

Study and Country of Origin	Objective of the Study	Methodology (Participants, Length of Intervention, and the Technology Tool Used)	Outcome Measures	Findings	Pedagogical Implications
Chung and Bong [15] South Korea, Japan	To compare the intelligibility test results between the artificial intelligence (AI) applications and 30 native English speakers to highlight the feasibility of AI apps in FL pronunciation practice in South Korea and promote the intelligibility of Korean-accented English.	30 participants. The length of intervention no stated. Use of Google Assistant and Apple Siri.	Oxford placement test Human listener intelligibility testing AI app intelligibility testing	Between the two test groups, native speakers found Korean-accented English more intelligible than AI applications were. Relatively high intelligibility scores were achieved by native speakers. Native speakers would have fewer problems than AI apps when recognizing consonant sounds, consonant clusters in initial and medial positions in word, and vowel length features. It might be argued that native listeners are deemed more capable of recognizing certain Lingua Franca (LFC) features in Korean-accented English than they were in AI apps, while non-LFC features do cause problems for both native speakers and AI apps. AI apps have the potential to serve as an alternative to teachers in English pronunciation education. AI apps could capture how speech is realized and are comparable to human listening.	The variability of the Lingua Franca feature set should be taken into account in English language education and learners should aim to communicate intelligibly with humans with various accents by practicing/communicating with current available AI apps.
Dizon [17] Japan	To investigate the in-class use of the intelligent personal assistant (IPA), Alexa, among EFL students in developing listening and speaking proficiency.	28 students. A 10-week intervention. Use of Alexa, which is an IPA.	EIKEN test, Mann–Whitney U Test Questionnaire	The experimental group was able to make more significant gains in EFL speaking proficiency, but not in EFL listening comprehension. Students found IPA useful and enjoyable, and they felt comfortable when they were using IPA.	Not provided.

Table 1. *Cont.*

Study and Country of Origin	Objective of the Study	Methodology (Participants, Length of Intervention, and the Technology Tool Used)	Outcome Measures	Findings	Pedagogical Implications
Jeong [21] Korea	To investigate the impact of utilizing mobile-assisted language learning in helping EFL University students promote their learning performance and support the sustainable self-directed learning experience.	62 participants. 3 months long intervention. Use of a free mobile application called Hackers TOEIC.	Pre-test Post-test Online survey Questionnaire Focus group	Positive effect on students' TOEIC listening study through self-directed mobile learning outside the classroom. Improvement of students' reading ability to some extent. Acquisition of important vocabulary and grammar. Positive perception of mobile application. Enhancement of motivation to learn. Perception of the potential effect of the learning device on students' self-directed learning. Mobile-based self-learning method was perceived as an effective, interesting, convenient, and creative format for improving students' English skills. Easy access, convenience, portability, flexible time management, and enjoyable learning.	Mobile applications should be applied in order to provide sustainability in learning and to increase students' motivation and autonomy during learning.
Kohnke et.al [22] Hong Kong	To explore the effectiveness of a custom-designed mobile app for developing students' discipline-specific vocabulary range and retention as a language learning tool in the ESL/EFL higher education context of Hong Kong.	159 participants. 1 month-long intervention. Use of gamified word learning application called Books vs. Brains@PolyU.	Pre-test Post-test	An enhancement of students' vocabulary retention. An increased number of proficient participants in the post-tests.	The teachers are recommended to implement the mobile application in the process of language learning in order to help students achieve better learning outcomes. Teachers should choose the appropriate number of words and the appropriate difficulty level for each curriculum.

Study and Country of Origin	Objective of the Study	Methodology (Participants, Length of Intervention, and the Technology Tool Used)	Outcome Measures	Findings	Pedagogical Implications
Ma [18] China	To study virtual reality (VR) technology college English immersive context teaching method based on artificial intelligence and machine learning in order to improve students' English learning ability.	67 participants. 3 months long intervention. Use of VR technology.	Pre-test Post-test Questionnaire	Improvement of students' English level through immersive context teaching combining constructivism theory and VR technology. Improvement of listening and speaking skills. Students' satisfaction with VR technology. Students' satisfaction with their own academic performance.	The context teaching method enables students to accept and use language knowledge in the communicative environment. Teaching must be student centred and teacher led, enabling students to learn independently. If it is to be applied in the field of education, the popularization of relevant knowledge should be strengthened.
Poláková and Klímová [23] Czechia	To obtain information on the usefulness of the vocabulary mobile learning application.	36 participants. 10 weeks long intervention. Use of vocabulary mobile learning application called *Angličtina Today*.	Pre-test Post-test Questionnaire Minute papers Focus group	Improvement of vocabulary knowledge. Vocabulary retention. Fluency-enhancement. Practical use of the mobile application. Increased motivation thanks to better learning outcomes. Fun learning. Clear, readable, and easy to absorb content.	Teachers should be role models for their students when using they are learning applications. New vocabulary can be introduced through the traditional methods of learning and subsequently revised through a mobile application. Learning content should be well organized, readable, and easy to absorb. When one is using a mobile app, it is recommended at they add new vocabulary regularly, preferably after each face-to-face lesson. It is important to carry out a formative assessment in order to monitor students' progress. Teachers should ask for feedback to understand students' perceptions of the use of new technologies. Students should have the possibility to decide whether they want to use mobile learning or prefer traditional learning through textbooks. It would be suitable to raise other teachers' awareness of the implementation of mobile technologies.

Table 1. *Cont.*

Study and Country of Origin	Objective of the Study	Methodology (Participants, Length of Intervention, and the Technology Tool Used)	Outcome Measures	Findings	Pedagogical Implications
Stefanovic and Klochkova [24] Serbia, Russia	To determine the possibilities and effects of mobile application implementation as support in foreign language learning.	483 participants. 3 months long intervention. Use of an application for mobile and smart platforms Mobil2Eng for English language learning.	Questionnaire survey Test on vocabulary knowledge	Perceived satisfaction with the use of the mobile application. Acceptance of mobile technology as a new learning tool. Improvement of motivation when using mobile application platform. The mobile application was perceived as user-friendly. Acquisition of professional vocabulary.	The application provides the opportunity to test students' knowledge and create their dictionaries and learning focuses. The application can change the content and be used in other areas, not only English, for technical professions. Further work directions can include integrating this teaching solution with content management systems, such as Moodle, for example.
Zakian et al. [25] Iran	To investigate the contribution of a mobile application (i.e., NGSL builder) on EFL learners' vocabulary development.	86 participants. 6 months long intervention. Use of NGSL Builder Multilingual (English version), which is a free vocabulary learning flashcard application.	Pre-test Post-test	Significant development of English language skills. Empirical support for long-term effects of the technologies on vocabulary knowledge. Improvement of students' understanding of daily conversations, television programs, and films in English.	Use of the mobile devices and well-designed vocabulary learning applications have great potential in helping language learners to shortcut the process of learning and learn a considerable amount of essential vocabulary in a short time. The application should be used in order to complement formal education. This is especially beneficial in teaching foreign language vocabulary, as it receives less attention in the language teaching classrooms, and mobile devices make it possible to extend learning beyond the classroom.

4. Discussion

The use of emerging technologies for teaching English as an applied language at the university level is becoming increasingly important, and the amount of research into the practical implication is growing, however, it is still very limited, and the growth is not occurring at an adequate pace compared to the development of information and communication technology in other research areas. Basically, the majority of the studies assume that technology enhances the quality of the language learning process [26,27], but in many of them, this statement is not supported sufficiently with statistically reliable data, therefore, more data urgently need to be processed to obtain reliable results that could clearly show the trajectory of the current development and potential near future trends. This systematic review explores the implementation of technology in the process of language learning and assesses the potential of technology for improving language education.

This review found that emerging technologies in teaching English, especially vocabulary mobile learning applications, help students to improve their FL vocabulary and even their ability to express themselves more fluently [23]. These results are in line with the outcomes of Kohnke et al. [22], who reported that using vocabulary mobile learning applications helped the student's to enhance their vocabulary range. Moreover, the results of the study provided credible evidence of the facilitative effect of the vocabulary mobile learning application on the enhancement of the students' vocabulary retention. The results of the studies conducted by Adilbayeva et al. [13]; Alenezia and Bensalem [11]; Jeong [21]; Kohnke et al. [22]; Poláková and Klímová [23]; Stefanovic and Klochkova [24]; Zakian et al. [25] inform us about the students' positive perception of the new learning tools, their enhanced motivation to learn, and their increased involvement in the learning process, which seems to be the major benefits of all of these modern tools, as they provide the users with the feeling of competency. The students' motivation to learn was also positively influenced by the use of other complementary tools, such as Facebook, WhatsApp, Google Translator, virtual reality, augmented reality, and artificial intelligence [14,16–19,27], which sheds a positive light on the future possibilities of these tools, which are related to AI, chatbots, VR, AR, and neural machine translations. Generally, the research shows that motivation is one of the main driving forces of the learning process [28,29], and vice versa, achieving the learning outcomes have a positive impact on the learners' motivation. Therefore, these two variables, i.e., motivation and cognitive gains (linguistic skills), are correlated [23]. More specifically, this is illustrated in a study by Poláková and Klímová [23], whose results revealed that their students (71%) felt motivated when they were using the mobile application in the progression of their education. Learning was perceived as being more fun and less stressful (100%), and many students reported that their motivation had increased thanks to there being better learning outcomes.

To sum them up, the research findings indicate that the use of the above-mentioned technologies led to several important achievements, some of which must be further studied in depth to provide more pragmatic outcomes, as follows:

- The development of lexical and grammar structures [14], reading comprehension [13], and writing [30].
- Improvement of the student's confidence in English writing [14].
- Improvement of listening and speaking skills [18].
- Improvement of the students' understanding of daily conversations [25].
- Fluency enhancement [23].

Generally, the findings of the identified research studies, apart from two studies [11,16], showed that technology-supported language learning was effective at a certain level, which was relatively difficult to quantify, but its positive impact is measurable and visible. Therefore, it is recommended that people use these tools in the process of language acquisition at the university level, however, it should be used as a complementary tool and with adequate due diligence, and this research should be improved upon with more research findings that should be coming soon. It goes without saying, as Fanenshtel and Skyba [30] point out, technology itself cannot fully supplement a teacher. A vocabulary mobile app may

claim that to know a word, but the learners need to see how a word's context affects its meaning. This fact about technology being a support tool has been confirmed by many other research studies, such as those by Bećirović, Brdarević-Čeljo, and Delić, [3], Klimova and Pikhart [31], Lin et al. [32], and Nagy [33].

Considering the results of the various studies and the learners' comments on the use of new technologies in the language learning process, it can be concluded that new technologies are perceived as being useful complementary tools for language acquisition. This is supported by basically all of the studies that included a satisfaction survey of the participants. It seems that this aspect of the utilization of digital tools is an important motivator for the students, thus, enhancing their subjective positive experience, enabling them to spend more time learning a foreign language or in a foreign language environment that could be used as an unintentional learning environment. However, the findings from the identified studies also indicate that although FL teachers might know about the latest technological devices, such as neural machine translation, they do not know how to implement them in their teaching process. This has been confirmed by Bostancioglu and Handley [34], who report that FL teachers have a good level of knowledge about technology in general, but they do not know how to apply this knowledge in their teaching.

The key benefits implied from the provided studies are that emerging technologies can help learners to improve their FL vocabulary and speaking skills, but the exact data that could be replicable and transferred into a larger context are still missing. In summary, emerging technologies in FL education have the potential to clearly improve the students' motivation to learn, and thus, ideally, help them to achieve better learning outcomes if these tools are used adequately, which is still defined rather vaguely, and there is no clear idea on how to achieve it.

On the contrary, there are some limitations of the detected studies, which include, in particular, that it had a short intervention period, different numbers of subject samples, as well as a low number of the latest technologies, such as chatbots, robots, or machine translation tools which were used to teach English as an applied language.

This systematic review has its limitations as well, one of which is the inclusion of only open access studies, which might have left out some of those on the latest technologies, such as the study on chatbots by Lin and Mubarok [35], but with this limitation in mind, it still provides a clear summary of the core ideas that are related to the analyzed topic. These findings should provide scholars with a foundation that must be extended with the completion of more experimental research that leave out survey studies on user satisfaction.

5. Conclusions

In conclusion, the research questions in the beginning of this paper were answered. Since the findings showed that there was a lack of the latest technologies, such as chatbots or VR devices, that have been empirically researched in FL education, mobile apps used for the development of FL vocabulary have remained the most efficient devices that have been used for FL teaching and learning.

As far as the practical implications are concerned, the results of this systematic review confirm that emerging technologies could and even should be used as supports in FL education. However, the students should be encouraged to also use these devices outside of their FL classrooms because the students seem to be motivated to learn a foreign language when they are using such devices, and they can achieve better learning results with them, as is supported by the research findings. In addition, the teachers must be trained and pedagogically guided on how to purposefully implement them in their FL classes in order to know what skills or language structures could be developed through their use. As the results confirm, FL vocabulary, for instance, can be developed when one is using mobile apps or neural machine translation. Speaking skills can be enhanced by the use of chatbots or VR devices, and reading comprehension can be enhanced through the use of various websites.

Furthermore, the findings of this review study should be of interest to all stakeholders, such as technology developers, policy makers, teachers, as well as the end users who should work on the development, implementation, and use of such tools in FLL in order to make them more effective, reliable, and safe.

Overall, more experimental studies are needed to clearly evidence their usefulness in teaching a foreign language as an applied language, as the current findings that are available are more intuitive, rather than being statistically relevant and generally valid.

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