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ANALYSIS OF TECHNOLOGY-BASED PRACTICES IN LANGUAGE INSTRUCTION: A LITERATURE REVIEW

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RESUMEN

La inclusión de la tecnología en el contexto EFL es un tema destacado que requiere un análisis exhaustivo sobre las tecnologías más destacadas aplicadas en este campo. En este sentido, el uso de las tecnologías implica una serie de ventajas y consideraciones que los profesores de EFL deben tener en cuenta. Aunque en esta área de investigación hay estudios que se centran en tecnologías específicas aplicadas en el campo, es importante reunir los estudios más relevantes con el objetivo de analizar y comparar los estudios recientes (2015-2024) en un análisis temático para llegar a una conclusión que ayude a los instructores de EFL en su inclusión. La presente revisión analizó y comparó 37 artículos de alto impacto indexados en Scopus de una base inicial de n = 229 utilizando una cadena de búsqueda que incluía bloques temáticos como VR/inmersión; gaming/gamification; IDLE y TPB; SPOC y blended. Los resultados concluyeron que el uso de herramientas tecnológicas en contextos de EFL es beneficioso siempre que haya objetivos pedagógicos bien definidos que estén firmemente vinculados a la herramienta aplicada.

PALABRAS CLAVES: inglés como lengua extranjera (EFL); aprendizaje basado en tecnología; análisis temático; integración tecnológica; tecnología educativa.

ABSTRACT

The inclusion of technology in EFL context is a prominent topic that requires a comprehensive analysis on the most prominent technologies applied in the field. As for such the use of technologies implies a series of advantages and considerations that EFL instructors should notice. Although in this research area there are studies that focus on specific technologies applied in the field, it is important to gather the most relevant studies with the objective of analyze and compare recent studies (2015-2024) in a thematic analysis to reach a conclusion that help EFL instructors on its inclusion. The present review analyzed and compared 37 high impact articles indexed to Scopus from an initial base of n = 229 using a search string that included thematic blocks such VR/immersion; gaming/gamification; IDLE and TPB; SPOC and blended. The results concluded that the use of technological tools in EFL contexts is beneficial as long as there are well-defined pedagogical goals that are firmly linked to the tool applied.

KEYWORDS: English as a foreign language (EFL), technology based learning, thematic analysis, technology integration, educational technology.

1. INTRODUCCIÓN (OBJETIVO DEL ARTÍCULO)

The inclusion of technology in education has been a topic of thorough analysis among the English educators' community, as for such, this discussion evolves with every innovative technology that meets the market. According to Arias Soto et al. (2012), Information and Communication Technology (ICT) in learning environments allows teachers to explore content and technology usage. Lobanova et al. (2024) states that using Immerse virtual reality (VR) technology significantly improved students' overall English language performance, particularly in pronunciation, speaking, listening, and conversational skills, with notable improvements from pre-test to post-test results.

Nowadays, according to Rahimi (2024) the access to information, digital and pedagogical knowledge and positive perceptions of ICT is a determinant on enhancing students' abilities in communication, collaboration, problem-solving, and digital content creation. It is important to consider that the incorporation of technology in language teaching and acquisition requires that teachers modify their pedagogical strategies and gain proficiency in digital literacy. In spite of the obstacles, the integration of technology into the classroom makes English language lessons livelier and more interactive.

Technological innovation is also a highly regarded topic in the related literature. Innovative technologies are crucial elements that significantly improve teaching and learning experiences, this makes the educational experience authentic and meaningful for students (Ansyari, 2015). The use of innovative technology implies the opportune inclusion of tools that fosters the learning process of students as for the teacher it facilitates the teaching process. Another factor to consider is the importance of feedback as a way of guiding the learner in the classroom. Teacher-student interaction and teacher presence are also valuable elements in EFL learning (included but not limited to online education) (Yang & Xu, 2023).

In spite of the multiple stated arguments associated with the benefits of technology-based practices on learners' content management and abilities development, there is limited literature that offers aid to EFL instructors to better decide the most appropriate and efficient technological tool for a given EFL goal and context. Although scholars discuss diverse

practices like game-based teaching, augmented reality, virtual reality and even virtual reality each with a variety of outcomes (e.g. motivation and skills gains) (Fleckenstein et al., 2023; Ngo et al., 2024; Zhang & Hasim, 2023), a literature review analyzing the most prominent studies in this field and comparing them is a useful guide for class design and teachers' decision-making.

In this sense, this article presents a deeper analysis and comparison of recent and different studies focused on the inclusion of technology in EFL settings. It evidenced findings across different studies on the subject matter in order to clearly state the effectiveness or disadvantages of diverse technology-based practice in EFL context. The present review relies on providing EFL teachers and instructors a reliable study comparing the inclusion of technology in the classroom.

2. MARCO TEÓRICO

English teaching has become a stepping stone in Ecuadorian education and as such, it should always advance utilizing the best of the usable resources at disposal. Additionally, it is important to highlight the important role that students have inside the classroom as the main character in the classroom. Drugova et al. (2021) emphasized the importance of integrating technology to enhance student-centeredness, improve learning outcomes, and address challenges like outdated teaching methods and resource shortages.

On the other hand, the author Richards (2013) added that curriculum design in EFL involves making informed decisions about what students need to learn, how to structure the learning processes, and how to evaluate progress, often guided by different design approaches such as forward, central, or backward design. Communicative tasks inform curriculum structure in EFL by aligning syllabus content and instructional processes with real-world language use that learners encounter outside the classroom (Nunan, 1991). It proved that a well-designed curriculum is deeply linked to the individual need, and it is through careful planning of the different activities that students can reach proficiency in the language.

Technology and learning content

Considering the relevance of technology in nowadays education and the impact of a well-designed EFL curriculum, the inclusion of technology is a stepping stone in the improvement of EFL education. For instance, Ma et al. (2024) underscored the effectiveness of online teaching nevertheless, it also requires specific competences such as technological skills, online environment management, and interactional competencies. The study served as further proof of how the inclusion of technological tools can enhance teaching and learning experiences and it also served as a way of furthering the reach of EFL instruction.

The inclusion of technology refers to tools and resources that can facilitate new approaches to instruction and learning, often requiring significant change in teachers' practices, beliefs, and classroom approaches (Ertmer & Ottenbreit-Leftwich, 2010). Due to the continuous change and evolution of technology tools, educators have adopted new approaches to instruction widely shown in the taught content. Alongside the mentioned aspects of tech-inclined learning, content and technology have to be aligned with clear pedagogical objectives in order to improve and foster the acquisition of a foreign language.

Technology, as an educational tool, improves mastery of disciplinary content when it is aligned and designed with clear pedagogical objectives. The implementation of technology inside the classroom alongside scaffolding shows positive outcomes forteachers (Chauhan, 2017; Cheung & Slavin, 2013). For instance, promising technology in this field is the use of virtual reality which has the potential to immerse students in highly interactive environments with meaningful content and thus far, it has demonstrated promising results in education research improving language gains (Cunha et al., 2023; Szczepocka et al., 2024). In the same line, studies on cognitive theory of multimedia in learning such the one conducted by Mayer (2014), explains that these gains occur when learners benefit when words and visuals are integrated.

Tech-Enhanced EFL Acquisition: Alignment & Cognition

Technology can accelerate EFL learning, especially vocabulary and speaking, when aligned to communicative goals. Technologies such as mobile assisted language learning (MALL), offers teachers the possibility to foster vocabulary learning with structured practice when compared with traditional instructions (Mihaylova et al., 2022). The latter mentioned

technological approach to teaching along with well-defined goals foster acquiring a second language in a way that technology, content, and language work together as means of facilitating the acquisition process. Authors such Thompson & von Gillern (2020) stated their view on the proposed matter, however they focused on digital game-based language learning and the reliability it offered across skills (vocabulary).

Cognitive processing and the influence of technology is also a palpitant side of language acquisition. Evidence suggests that technology is most effective when instructionally aligned and when it supports cognitive processing (Tamim et al., 2011). In EFL contexts, the stated alignment matters because tech-inclusion can foster and operationalize language acquisition. Additionally, technology enhances English acquisition when tools are aligned to communicative goals and designed considering cognitive principles.

3. METODOLOGÍA

The present investigation was based on a qualitative thematic analysis study that explored diverse technology-based practice implemented in language instruction. The analysis was carried out through an exploratory-documental literature review design. To diminish the impact of including non-trustable studies or journal, for this review, inclusion criteria comprised peer-reviewed articles indexed in Scopus database, published between 2015 and 2024, written in English, addressing technology-based practices in language instruction, and having a citation per year of at least ten times. The inclusion criteria that limits the data base was decided on the basis that it represented studies with the highest regard from peer researchers. The review period reflected the timeframe during which the study was planned and executed, articles published in 2025, since this year was still ongoing at the time of the investigation, only articles published during the mentioned timeframe were included. Zotero citation software was used for the management of the diverse citations utilized across the research process.

The data was collected through a deep revision of the literature using Booleans to narrow search in the Scopus search string (see Annex 1). The search was directly linked to the use of technological tools in English classroom settings associated with the enhancement of language instruction. The used search string was designed considering four thematic blocks

(VR/immersion; gaming/gamification; IDLE + TPB; SPOC + blended). Based on this initial data collection process, 229 documents were selected (n=229).

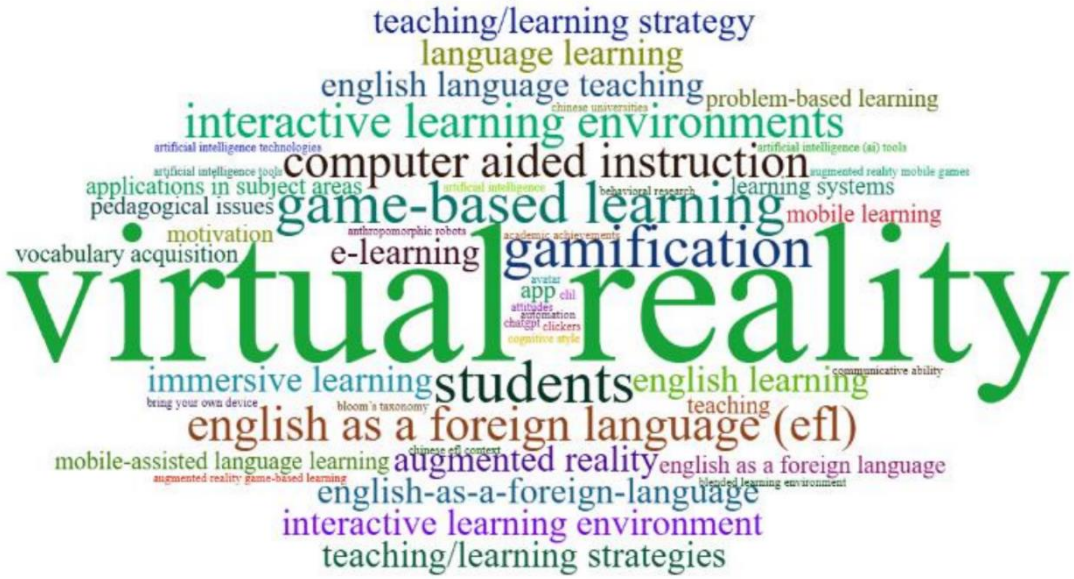
Then, Biblioshiny (package utility from R studio) was also used to go deeper on the data selection based on the full accomplishment of the proposed inclusion criteria. Among the fields exported from the database were authors, year, country, all key words, and abstracts. The data was screened following the criteria and as a result the documents were reduced to: n=37. This extraction of data facilitated the analysis of the documents as it was later exported to Text Analysis for ALL, TALL (package utility from R studio). The mentioned software was utilized in order to facilitate the identification of recurrent themes and core concepts that emerged from the collected data based on a thematic coding analysis. This software uses an R-based Shiny interface and focuses on text analysis

4. ANÁLISIS DE RESULTADOS

The first step in the analysis of the literature found, was to identify the most prominent keywords in the different assessed articles at first glance. In Figure 1 it is clearly noticed that terms such as virtual reality, game-based learning, and gamification were highly mentioned throughout the different documents.

Figure 1.

All keywords word cloud.



Further analysis evidenced the most core technology practices discussed in EFL classroom widely include the use of virtual reality (VR), fourteen percent of the analyzed document, and game-based learning (GBL) with only four percent of the analyzed documents. Also, GBL, gamification, and students (each accounting for four percent of the documents) were also notorious terms in the analysis of the literature.

Holistic Revision

Although the raw frequencies were helpful to have a glance on the topics covered, it was necessary to undertake a close reading of the proposed literature.

Game-Based Learning and Virtual Reality for Vocabulary Improvement

Authors such as Alfadil (2020), Chen & Hsu (2020), Lee (2022) and Yang et al. (2020) focused their studies on the benefits of game-based teaching; however, each offered a different view or scope on the matter. Additionally, it was possible to find similarities, at least at a glance, across these articles. A big point of interest in this regard was the shared embed language tasks in game contexts. Alfadil (2020) agreed that the use of serious games contribute to the improvement of vocabulary outperforming traditional instruction. It was found that the latter author's results came in agreement with others such Chen & Hsu (2020) and Yang et al. (2020) although the said agreements, there were also presented divergence in results across studies.

About the found divergence, a point of concern across studies was the level of students' engagement that game-based learning offers and whether the use of technology alone adds enough value. Documents about VR games, adaptive games, and serious games center their scope on vocabulary tests gains, meanwhile others focus on engagement and perceived attitudes (Lee, 2022). However, the mentioned literature ended in a positive note about the use of games-based teaching, declaring that gamebased teaching is an effective option for EFL vocabulary learning. They considered the inclusion of scaffolding and technology inclusion as positive for English learning. Furthermore, La Cruz et al. (2022) conducted a systematic review which synthesized, after the analysis of various studies, that there was a high motivation and engagement, and overall positive attitudes toward gamified English learning in higher education.

In the reviewed literature, there were also found authors who mixed games-based teaching with technology thus creating tech-enhanced immersive classes which highly foster educational outcomes and environments. Chen et al. (2021), Hung (2017), and Yang et al. (2020) have a convergence point that educators can improve higher motivation and engagement through technology-rich classes and playful/immersive designs. Each study demonstrated positive educational results mostly in motivation although vocabulary, speaking, and interest were also key highlights of each literature. The mentioned literature converges in how playful and theology-rich class designs increased learners' motivations and engagement. It was also noticeable that the most important and consistent gains were in the mentioned increase, nevertheless it was also reported additional benefits for vocabulary and speaking behavior.

Panmei & Waluyo (2023) demonstrated that there were no significant differences between groups (experimental and control) when using Quizizz as game-based practice across the four vocabulary tests in EFL classrooms. Although there were clear benefits of gamification, it is suggested in the literature the inefficiency of gamification as a tool alone for EFL. The latter is contrasted with the need of adding well-defined pedagogical goals and in-class instruction.

It was also found that more recent works show nuance to the "medium vs. pedagogy" issue. Lee (2022) deepened into this debate by focusing on a comparison between mobile gaming augmented reality and its printed version. In spite of the positive outcomes, it was declared that the only significant difference was the perceived usefulness favoring the print game at the moment of learning English. Among the reasons stated by the author, there was the fact that learners might be more used to more traditional tools rather than mobile games which adds up to the matter of the user interface management and the over-stimuli this can produce. This difference, as declared by the author, was statistically significant in the means of perceived usefulness, which favored the print game at the moment of learning English. However, the analysis conducted by the mentioned authors highly contrasts the positive impact that technology embedded and VR games inclusion have in EFL classes.

Immersive VR Environments for Speaking, Anxiety, and Motivation

Authors such Chen & Hwang (2022), Chien et al. (2020), and York et al. (2021) focused on immersive contexts for speaking, anxiety and motivation. In their study, they discussed the use of immersive/VR-like settings to scaffold oral production and examine their effects on learning. In the same vein, there were notorious points of divergence across literature. Chien

et al. (2020) underscored that peer assessment and SVVR (Spherical Video-Based Virtual Reality: 360°) led to a better oral performance & reduced speaking anxiety while exchanging peer feedback, and revision. The peer assessment and SVVR group outperformed the control on speaking, reported higher motivation and critical thinking, and showed reduced anxiety.

On the other hand, York et al. (2021) found, when comparing Synchronous Computer-Mediated Communication (SCMC) modalities (voice, video, and VR), that all the presented modalities reduced FLA (foreign language anxiety). This reduction was shown without significant differences even with the tendency to elicit stronger perception ratings VR. In contrast Chien et al. (2020) evaluated peer assessment within VR underscoring that feedback design, not just VR, drives the gains and improves speaking. The latter was reached through rubric-guided peer assessment against teacher-only feedback and it helped to demonstrate that it increased motivation and lowered anxiety across the participants. Taken together, it is important to mention that in spite of the positive outcomes, the authors state that the mode (voice, video, and VR) is less important for anxiety reduction than a well-designed feedback and scaffolding.

For instance, Çelik & Yangın Ersanlı (2022) showed that the inclusion of VR technology in the classroom situate culture learning in authentic, immersive contexts and argue for culture as an essential strand of EFL competence. Their research showed that when content and language are tightly integrated (CLIL) and the immersive feature iswoven into the task, English achievement and attitudes improve. This was consistent with the idea that the alignment of medium and pedagogy is the recipe for generating language gains on students. Taken together the studies from York et al. (2021) and Çelik & Yangın Ersanlı (2022) converged in the conclusion that VR/AR adds value when its affordances are integral to the learning objective and when learners are scaffolded to produce.

In contrast, Yeh et al. (2022) introduced VR technology as a way of enhancing intercultural learning. In this study, they investigated how creating VR content enhances the intracultural learning experiences of EFL college students. The authors proposed the integrations of VR technology into EFL instructions, in this case for enhancing intercultural learning experiences. Through the use of features such as panorama, audio, interaction, and structuring, the study concluded that the involved population improved intracultural awareness and that VR technology can improve language learning. In addition, it delegated the role of VR functions as a supportive context instead of the principal cause of improvement. Although they

underscore the potential of VR to offer authentic, engaging learning experiences over the traditional tools used in EFL classroom; nonetheless, this work treated VR as a production space to build cultural competence, not primarily a drill/assessment environment centered on vocabulary or speaking.

Implementation Factors of IDLE Integration Via TPB and SPOC-Based Blended Learning Authors Liu & Wang (2024) in their study addressed the integration of Informal Digital Learning of English (IDLE) in EFL classrooms. In this study researchers investigated factors on the mentioned integration through the theory of planned behavior (TPB) framework. They revealed the perception of teachers was highly influenced by social pressure, perceived control over integrating such technologies. They particularly highlighted the importance of the psychological factors that drove technology adoption among teachers. It is relevant to mention that the corpus of this research did not necessarily recognize the inclusion of a specific technology, nevertheless it looked to dive into the perception of teachers on the inclusion of digital learning in the EFL classroom. They argued that understanding teachers' intentions can be helpful for informing teacher training and professional development. Liu & Wang (2024) research shared ground with the past mentioned authors by underscoring the design and implementation of technology over the gadget, although it was stated that the combination of them helped to determine the learning value (Çelik & Yangın Ersanlı, 2022; Gao et al., 2021; La Cruz et al., 2023; Yeh et al., 2022).

On the other hand, the authors assessed teacher side determinants of bringing informal, tech-mediated learning into class. The study presented by the researcher Jiang (2024) focused on factors influencing EFL teachers' implementation of Small Private Online Courses (SPOC). It addressed the gap on the lack of research on the mentioned topic and underscored the need for insight into this educational context. Based on the new findings, the author concluded that the teacher's intentions directly impacted their implementation of SPOC based teaching. The literature highlighted that the resistance to change of EFL teachers on integrating technology teaching, teachers' lack of confidence on the use of technology, and the disconnection between the online content and traditional classroom teaching, and in a way, hinders the use of technology in EFL classrooms. Nevertheless, it can be devised various opportunities majorly linked to the advances of technology. Furthermore, the author explained that the use of 5g technology and AI (Artificial Intelligence) can enhance technological experiences. Additionally, SPOC based teaching improves learning outcomes by combining online self-

study and traditional classroom methods. Lastly, it is important to highlight that Jiang (2024) and Liu & Wang (2024) studies converged on the affirmations of pedagogy over tools, thus linking their results to Chen & Hsu (2020) and Yang et al. (2020) conclusions.

Artificial intelligence technology in EFL classrooms

An important point throughout the analyzed literature was the clear emergence of virtual reality across studies and, at least in the analyzed literature, there was not a wide appearance of artificial intelligence. Of course, one considers this as a result of the retrained scope of the present thematic analysis. However, despite the low appearance of the mentioned term or related terms, there were some authors that in certain ways involved the use of AI technology in class. Clear examples were the authors Alhalangy & Abdalgane (2023) who explored the impact of Artificial intelligence on EFL context in Saudi Universities. The authors found that teachers and students perceived AI tools positively, seeing them as beneficial for learning and teaching if properly integrated. The found results can be contrasted with the systematic analysis of Alshumaimeri & Alshememry (2024) who confirmed that AI enhances language learning when aligned with pedagogical needs and ethical considerations.

Other authors that also focus on AI are Rezai et al. (2024) who denoted the LLM chatbots' potential for vocabulary acquisition and other skills. The cited authors used chatbots to scaffold EFL students' argumentative writing and concluded and highlighted it as effective supports. Both studies focused their conclusion on the importance of including continuous feedback to support learners' gains rather than only include AI technology alone. Also, it was noticed the importance of aligning clear pedagogical goals along with the mentioned technological tools.

5. DISCUSIÓN

After the thorough review it was important to synthesize comprehensible the patterns that have emerged, also it is important to analyze and discuss the different key points that emerged across the literature. Across the analyzed literature, there was a clear agreement about how immersive game-based classes design were fundamental at boosting motivation and engagement among students. For instance, Chen et al. (2021) reported higher language engagement when learners created and navigated VR content as part of the task structure. Additionally, the research positions VR as a vehicle for problem-based work, not as a gadget in isolation that can function without clear pedagogical goals. In the same vein, Lin & Wang

(2021) integrated a VR creative project ("hometown tours") and found increases in creative self-efficacy alongside intrinsic motivation, because the language production (script drafting, voice-over, revisions) is built into the VR workflow. Nevertheless, Çelik & Yangın Ersanlı (2022) showed that AR-gamified CLIL can lift English learning achievement and attitudes, aligning with the general "playful plus content-embedded task" effect seen in the immersive studies.

In the same vein, documents referencing game mechanics showed gains in engagement and formative interaction as long as the included technology is tied up to feedback cycles and well defined pedagogical objectives rather than a work-alone tool. The presented results across the mentioned studies demonstrates that the inclusion of technological tools such as VR and AR have a positive impact on EFL classes. Furthermore, these tools promote the use of the language in creative and effective ways, nevertheless, teachers should consider certain aspects for its correct application. First and foremost, the use of technology is repeatedly mentioned that could not reach its full potential when it is used without the supervision and management of an instructor. Secondly, the inclusion of these tools did not necessarily demonstrate a considerably higher performance than traditional means. Lastly, technology and clear pedagogical goals must work together to show reliable outcomes which makes its implementation fully dependent on the instructor's experience, conceptions and techexperience in order to fully take advantage of technology in EFL context.

Another area of agreement concerns speaking performance and affect when immersive practice is combined with structured feedback. Chien, Hwang & Jong (2020) found that SVVR practices improved oral performance, boosted motivation, and reduced speaking anxiety when paired with rubric-guided peer feedback. This resonates with the VR-as-task-space perspective above: it's the feedback design in the experience, not only the headset, that moves outcomes. Notice that feedback has been a crucial part across every tech-inclusion mentioned thus making it important for EFL teachers to consider it as an inseparable part of the teaching process.

In a more general review, the "pedagogical design over device" message was a recurring topic across literature. This perspective is also crucial as it stated that teachers' well-planned class and defined objectives are more important than the mere inclusion of technology. Nevertheless, it was possible to find clear disagreement or divergences across the exposed studies. As a matter of fact, several of the analyzed documents underscores that VR and AR alone did not guarantee better educational outcomes.

Lin & Wang (2021) called for adding direct measures of speaking and writing, and for non-immersive comparison conditions to produce stronger evidence. A key consideration for EFL instructors were the comparisons between VR vs print or non-VR as in the wider literature VR show only modest differences on standardized outcomes even when learners report high engagement. For instance, Chien et al. (2020) noticed that feedback design was a key component of improving while using VR. This further proved that immersion alone reduces anxiety and boosts performance; the study showed its immersion plus carefully designed peer assessment that matters. It is important to note that relying solely on Scopus may omit regional or nonindexed EFL journals, and the citation threshold could exclude newly published yet significant studies. Additionally, selecting 37 studies highly constrains the scope of the review, making the present study open to future peer scrutiny. The present review worked as a means of further analyzing a not widely covered topic as it is a comprehensive literature review. As stated beforehand, the scope of the presented study highly constrains the results of the investigation. Furthermore, one is conscious about the limited amount of technologies covered. Due to these limitations, it would be reasonable to understand this review as an analysis and comparison of a specific set of educational technologies. It fosters a holistic comprehension of the said area and provides help to EFL instructors to improve their understanding on ways of implementing technologies in EFL contexts.

Peer researchers are exhorted to conduct a wider review on the topic as means of furthering the understanding on technology implementation in education and its positives and negatives points of its integration. Future research on the topic can be conducted as case studies in which the objective is to analyze and compare EFL classes with and without the inclusion of technology nevertheless, it should be presented considering different socio-cultural levels and demographics. EFL instructors should consider technology as a crucial tool for the development of EFL education. However, traditional means of education (books, paper, pen and pencils) are not necessarily bad options for education. Technology offers a wide catalogue of tools and means for interactive learning but its full potential can only be achieved as a result of a well-designed academic planning. The same way as traditional tools require well-set pedagogical objectives, technology based-instruction also needs to be included into this planning when integrating it.

6. CONCLUSIÓN

The presented literature review delved deeper into high impact academic articles referring the topic of the inclusion and application of technology in EFL contexts. This research analyzed documents from 2015 – 2024 in order to obtain a clear overview on the divergence and convergence point across literature results. It was required a holistic analysis of the stated literature.

Across the different documents, it was found a clear beneficial relation between the use of technology in EFL context and well-defined pedagogical objectives. Across different studies, it was notorious the convergence points on how the use of tools such VR, AR, and SVVR can foster the learning process as long as there is the continuous instructor assistance. In the same vein, results came up in a positive regard on the impact of using technology to foster creativity, vocabulary, writing, and speaking. Although the clear positive impact stated in the present research, there were also important remakes on how technological tools did not show a clear superiority over traditional approaches to education. The latter remark was stated without diminishing the positive aspects of the application of technology in EFL contexts.

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