AI-GENERATED ANIMATED VISUALS AND THEIR EFFECT ON EFL LEARNING OUTCOMES: A SYSTEMATIC REVIEW WITH PEDAGOGICAL IMPLICATIONS FOR PRACTICE

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Abstract: In an era marked by the rapid rise of modern technological instructional trends and the increasing integration of Artificial Intelligence (AI) in education, AI-generated animated visuals have emerged as significant and innovative tools within various pedagogical domains. Nonetheless, their academic exploration remains limited with no comprehensive analytical document consolidating current empirical findings in a systematic manner. Accordingly, this systematic review aims to identify the types of these tools that are commonly used in educational contexts and then investigates their effectiveness in English as a Foreign Language (EFL) learning environments. Special emphasis is placed on their role in improving language learning outcomes while also providing relevant pedagogical implications for practice. Following the PRISMA 2020 methodology, this paper synthesises 11 open-access manuscripts published between 2020 and 2025. These studies were sourced from well-established academic databases, namely Google Scholar, ERIC, and ScienceDirect. The results highlight the positive impact of AI-generated animated visuals on multiple aspects of EFL learning, including vocabulary acquisition and retention, listening comprehension, writing fluency, and overall learner engagement. In addition, these tools contribute to increased immersion and motivation. However, the findings also reveal key challenges, particularly issues related to insufficient teacher training and the potential over-reliance on technology. Based on these results, implications for practice are provided for educators and policymakers in Algerian higher educational contexts. Eventually, AI-generated animated visuals represent a valuable innovation in EFL instruction, and their integration should be considered a strategic priority within the Algerian higher education, especially amid the accelerating shift toward digitally mediated learning environments.

Keywords: AI-generated animations; AI in education; EFL education; instructional technology; multimodal learning; systematic review; visualisation tools

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1. Introduction

In the modern context, Artificial Intelligence (AI) has revolutionised educational spheres across the globe (Kamalov et al., 2023). Applying AI technologies to help developing education has created novel approaches to learning and teaching in multiple contexts (Mishra, 2020, p.9). AI in education aims to use computer intelligence to help instructors and students perform better, increasing the educational system's creativity and efficiency but not substituting human teachers with robots (Mishra, 2020, p. 9).

In the same vein, immersive technologies, such as Virtual Reality (VR) and Augmented Reality (AR), represent a substantial opportunity to enhance and modernise educational curricula (Bamanger, 2025; Pitura et al., 2024). From a complementary perspective, AI-generated animated visuals can be regarded as an integral component of immersive technologies (Ratican et al., 2023). In fact, Ratican et al. (2023) use the term Meta-Reality Immersive Development Pipeline to describe the workflow where AI-generated animated visuals are core components and a formal stage in creating Extended Reality (XR) content, which means they are an integral part of the structured pipeline that defines immersive technologies. Furthermore, immersive technologies offer a promising pathway in language education, precisely in English as a Foreign Language (EFL) contexts (Bamanger, 2025; Pitura et al., 2024).

VR and AR, also labeled Mixed Reality (MR) or Extended Reality (XR) when blending the two, are umbrella concepts encompassing a variety of information technologies, location and motion (Bonner & Reinders, 2018). They enhance reality with digital resources (AR), or create a whole immersive digital environment, in which participants engage and interact with other participants and information (VR) (Bonner & Reinders, 2018). AR is commonly used through applications on smartphones which display information in a real space, whereas VR is the type of technology used via headsets to experience an entirely immersive 3D virtual world by the user covering all his field of vision (Bonner & Reinders, 2018).

Equally important, AI-Generated Animations or AI-Generated Animated Visuals refer to animated content including anime characters, their motions, avatars, scene rendering, and transitional frames, created and augmented through artificial intelligence technologies; basically, based on minimal input like text, audio, or static images (M. Tang & Chen, 2024; Hossain & Deb, 2025). Parallelly, AI generated animated visuals in the educational context are reflected as multimedia materials such as animations, computer-generated instructional videos, simulations, and virtual agents created using AI techniques to dynamically present educational content (Leiker et al., 2023; Dai & Ke, 2022). Generally, they are produced through the use of tools like AnimAlte, VTutor, and AI-based text-to-animation platforms which enable instructors to visualise abstract content, create contextual learning scenarios and simulate real-world dialogues in the domain of language acquisition (Tsang et al., 2025; Chen et al., 2025; Fadillah & Bariyyah, 2024).

According to the Dual Coding Theory (DCT) of Paivio (1971, 1986), combining visual and verbal input (information) improves recall, comprehension, and strongly enhances learning (Clark & Paivio, 1991). Starting from this, extensive research has explored a variety of systematic literature reviews, which have shown that, related technologies such as VR and AR have been excessively applied in EFL contexts to improve vocabulary acquisition, listening comprehension and learner engagement and motivation (Çakır, 2024; Pataquiva & Klimova, 2022; Majid & Salam, 2021).

The intense exploration of VR and AR in EFL education throughout systematic literature reviews underscores a well-established research area. However, a systematic analysis of the application of AI-Generated Animated visuals in EFL is still limited and under-researched. There remains a paramount necessity to discover the effect of using these technologies by teachers and learners. Thus, this study aims to address this gap and contribute to Algerian higher educational framework by assisting language practitioners and policymakers who are seeking innovative tools to enhance English language learning outcomes with identifying these tools, clarifying their evidence-based impacts on language learning, and providing valuable pedagogical insights.

2. Literature Review

2.1 Existing Systematic Reviews on Immersive Technologies in educational settings

Lampropoulos and Kinshuk (2024) presented a systematic review in which they explored how gamified virtual reality environments enhance learners' motivation, immersion, self-efficacy, engagement, academic performance, active involvement and satisfaction across educational contexts. Also, students' imagination, curiosity, focus, skills, and interest were developed. 112 articles were analysed using PRISMA and MMAT (Mixed Methods Appraisal Tool) frameworks. This creative immersive technology has evolved as an efficient instructional tool which can strengthen learning outcomes at all educational levels and contexts (Lampropoulos & Kinshuk, 2024).

In another systematic review, Khamis et al. (2024) analysed 29 studies using the PRISMA method to clarify conceptual frameworks guiding the implementation of AR, VR, and MR in higher education. Moreover, this paper identified trends and highlighted the need for sound theoretical foundations when integrating immersive technologies for educational purposes (Khamis et al., 2024).

2.2 Existing Systematic Reviews on Immersive Technologies in EFL learning

Ece et al. (2023) examined 21 VR-based EFL studies from 2017 to 2022, in a research paper as a systematic review. They identified VR contexts, strategies of integration, and impacts on English learners' performance. The review resulted in the idea that VR applications significantly and positively improved performance in higher education EFL settings, and it concluded by noting limitations, including its focus only on English-language contexts, and suggested directions for future research (Ece et al., 2023).

Wan Shamsuddin et al. (2024) reviewed 40 manuscripts issued between 2019 and 2023, addressing the integration of VR in EFL instruction. They found that VR tools targeting vocabulary and speaking tasks, significantly improve student performance, engagement and overall outcomes due to their immersive interactive nature.

Another study conducted by Alshumaimeri and Mazher (2023) provides a systematic review and meta-analyses of AR applications in EFL education. Using PRISMA protocols, it highlighted three AR game-based strategies, augmented reality spelling games, card-supported word visualisation tasks, and lexical annotations. While AR promotes learners' engagement, this Meta-analysis calls for additional research to further inform trainers and learners on the effectiveness of AR technology integration in learning (Alshumaimeri & Mazher, 2023).

Majid and Salam (2021) wrote a systematic review, in which they tracked trends in AR use within language learning in the period from 2016 to 2021. They found that AR contributed mainly to vocabulary learning, word recognition, spelling, and pronunciation.

However, its usage in more complex skills such as writing and reading remains rare (Majid & Salam, 2021).

Looking at 2020/ 2024 studies, Hoe et al. (2024) published a review that explored the intersection of AR with learning English as a Second Language (ESL) through game-based approaches. Findings encompassed increased motivation, engagement, learner satisfaction, and collaboration despite cost constraints and technical challenges.

Additionally, Huang et al. (2021) analysed 88 previous academic papers regarding the implementation of VR and AR in language instruction. This review demonstrates positive impacts on students' learning outcomes, motivation, immersion, creating interaction, and anxiety reduction. Also, it highlights the importance of teacher training, using larger study samples, and investigating other learner factors such as engagement and satisfaction (Huang et al., 2021).

3   Methodology

This study uses the PRISMA 2020 methodology to ensure a transparent process for selecting and synthesising studies. PRISMA is a standardised, evidence-based guiding principles intended to assist authors report systematic reviews and meta-analyses clearly, improving the quality, clarity, and reproducibility (Page et al., 2021).

3.1 Research Objectives

This systematic review aims to:

1. Capture recent research findings from 2020 to 2025 to map the types of AI-generated animated visuals utilised in EFL education.
2. Deduce and describe the way these visuals affect EFL learning outcomes.
3. Provide the Algerian higher education with pedagogical implications associated with implementing AI-generated animated visuals in EFL classrooms and highlight certain challenges.
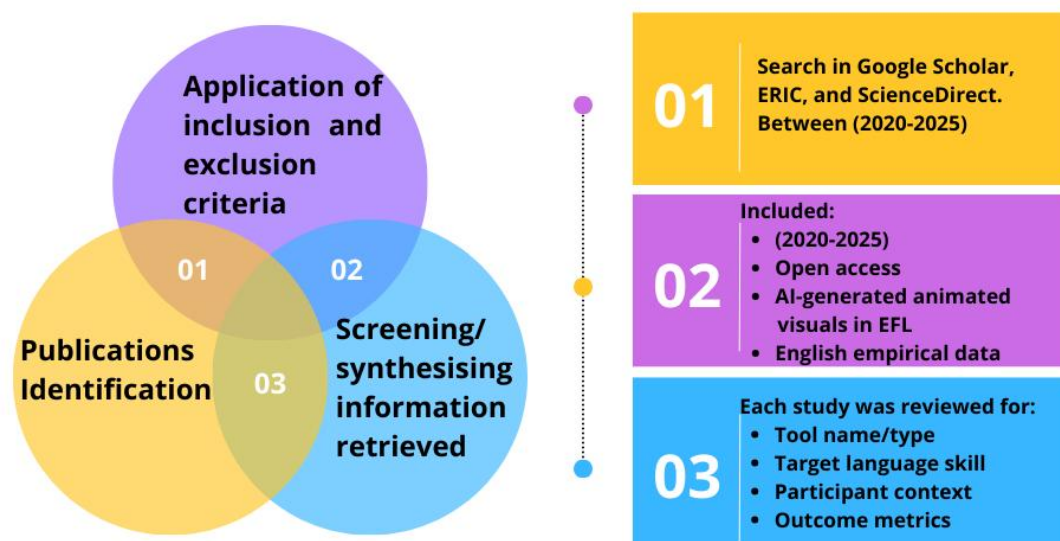
3.2 Research Questions (RQs)

This paper targets to analyse the Research Questions outlined below:

1. What types of AI-generated animated visuals are utilised in EFL and language education?
2. How do these visuals impact language learning outcomes?
3. What are the pedagogical implications and challenges correlated with implementing AI-generated animated visuals in EFL classrooms?

3.3 Data Sources and Search Strategy

To capture a broad and recent overview of the topic, articles published between 2020 and 2025 were electronically searched in three main databases: Google Scholar, ERIC, and ScienceDirect. Suitable publications for inclusion were chosen through a manual keyword search using the following terms: "AI animation in language learning", "AI-generated visuals EFL", "AI cartoon tools ESL", "animated videos artificial intelligence", "AI visualisation tools". Figure 1 summerises the overall workflow of this research paper.

Figure 1:

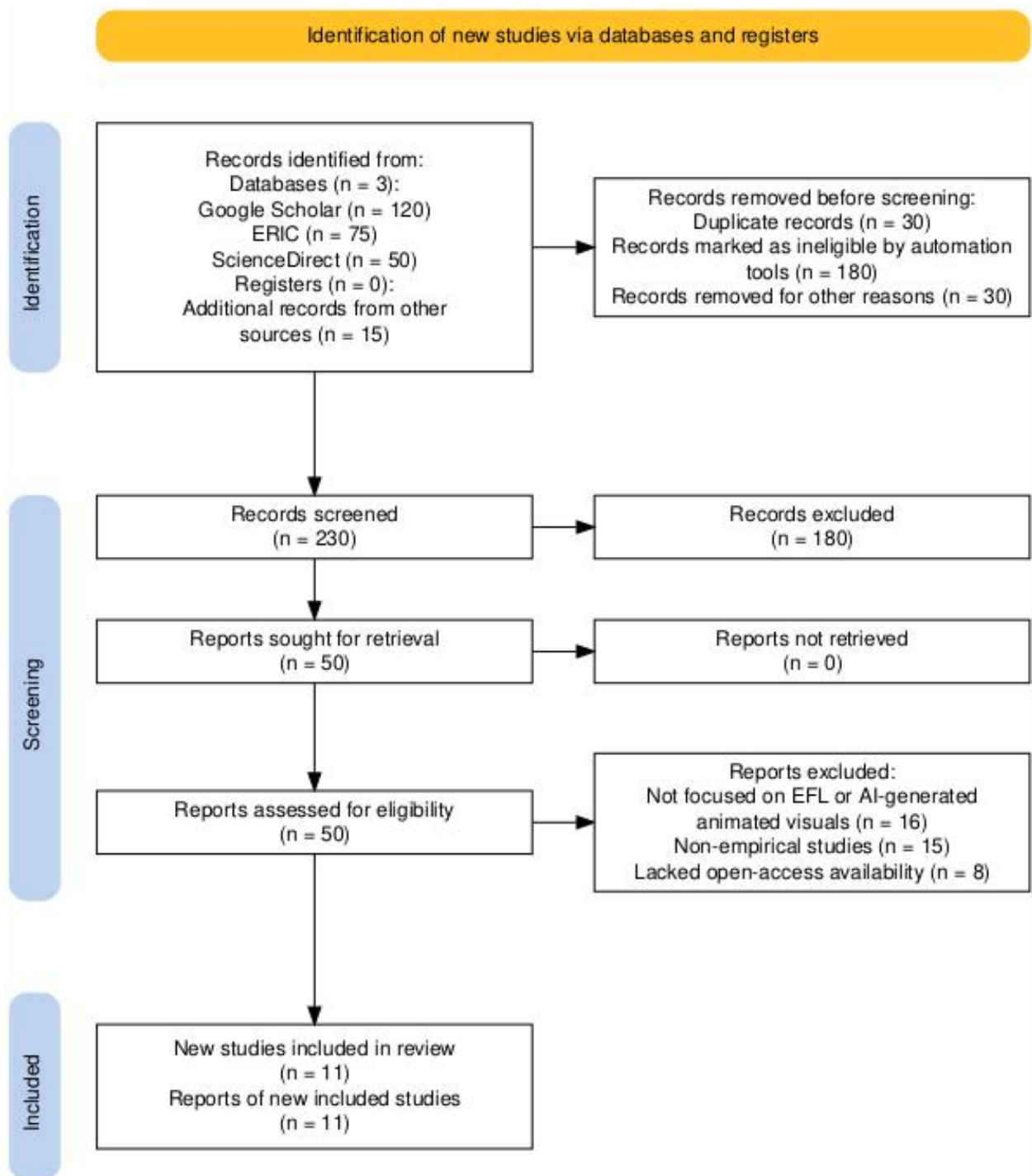*This systematic review's workflow.*

Following the PRISMA 2020 guidelines, this work applied a group of criteria for including and excluding studies, the included publications were:

• Published during the period 2020 – 2025

• Open-access

• Focused on AI-generated animated visuals in language learning

The excluded publications were:

• Studies not involving AI-animated visuals or EFL

• Non-English articles

• Non-empirical reports

Figure 2 depicts the screening process following the PRISMA 2020 procedure.

Figure 2:

The flow diagram of this systematic review following PRISMA 2020 guidelines.

Considering the research strategy of this work according to the PRISMA 2020 method, the search process yielded a total of 260 records, 245 from the aforementioned databases and 15 from other sources such as reference list screening and citation tracking. After removing 30 duplicate records, 230 titles and abstracts were screened, of which 180 were excluded for not meeting the inclusion criteria. The full texts of the remaining 50 records were then sought and successfully retrieved. Then, after full-text assessment, 30 reports were excluded for these reasons: 16 of them were not focusing on EFL or AI animated visuals, 15 were non-empirical studies and 8 were not openly accessible. In the final synthesis, 11 studies were successfully included, each study was represented by a single report which means all the eleven reports were new and unique.

3.4 Data Extraction

The data extraction process was performed manually using a standardised coding sheet (see table 1). For each study, key information was collected to ensure comparability and alignment with the research objectives. Extracted data included the name and type of AI-generated animated visual tool used, the specific language skills targeted, the participant context (educational level), and the outcome measures employed. This structured extraction process facilitated the identification of consistent learning gains across diverse educational settings. Only studies that provided clear empirical results were included in the synthesis.

Table 1:

The standardised coding sheet for this systematic review.

Study ID	Tool Type	Target Skill	Educational Level	Outcome Measure	Key Findings
Fadillah and Bariyyah (2024)	AI-animated video	Vocabulary Listening	Elementary school	Pre/post vocabulary test	Improved scores and engagement
Tsang et al. (2025)	AI-cartoon video	Listening Speaking	Preschool	Observation and feedback	Increased attention and vocabulary
Leiker et al. (2023)	AI-Synthetic learning Video	Listening Comprehension	Adult learners	Mixed method approach	Equal gains, less time and cost of production
Chen et al. (2025)	VTutor	human-AI multi-media interactions	University	Mixed-methods	Realistic engagement, feedback
Woo et al. (2024)	AI Natural Language Generation (NLG) tools	Writing and Creativity	Secondary School	Activity logs and analysis	Improved narrative structure and fluency
Garaicoa Silva et al.	Meta Animated	EFL vocabulary	Elementary	A quantitative	Effective vocabulary

(2025)	Drawings	retention	school	approach	retention
Kaşkaya and Ateş (2025)	(AI)-supported visualisation applications	Writing disposition	Primary school	Explanatory sequential design (a mixed methods approach)	Significant improvements in confidence, continuity, and passion dimensions
Kim (2024)	AI vs. Human Instructional Videos	Caused-Motion Constructions	High School EFL learners	Mixed-methods design	AI-produced videos offer a practical alternative to traditionally human-created videos
Belda-Medina and Goddard (2024)	AI Digital Storytelling	Material Creation	Pre-service teachers.	Mixed-methods approach	Positive shift in attitudes towards AI integration
Unal Tufekcioglu (2024)	Text-to-Speech Avatars	Listening and Engagement	University	Comparative Study	Videos featuring real trainers are more effective than AI-generated text-to-speech avatars
Miranda and Vegliante (2025)	AI-virtual speakers	Multilingual E-Learning	Mixed levels	System Implementation	Improved accessibility and learner engagement

4 Results

The reviewed studies have resulted in a diverse range of AI-generated animated visuals used across Language and EFL settings.

4.1 Types of AI-Generated Animated Visuals utilised in language education

4.1.1. AI-Animated videos

As reported by Fadillah and Bariyyah (2024), creating a 3D animated video used to be one of the hardest tasks that require considerable time, producers had to use multiple computers, complex software, and devote substantial time to produce and render the final video. However, at present with using AI, they are able to produce a 3D animated video easily and effectively relying on any computer within a few hours. Using AI websites like Gravitywrite to write a movie story, Midjourney to obtain an image of the script related to the story, Clipdroop and Leonardo to generate images for the script, and then RunwayML to turn the images into a scene. The next step is to merge all the scenes and create one movie. After that, it comes the editing process in which the final animated video is edited. Editing requires four steps; adding a dialogue for the animated characters and displaying the character lips into it, this can be done through the website called Lalamu; combining all the scenes into one and editing them via Clipchamp; adding voiceovers to the scenes through the website Ttsmaker, which converts text into audio; and finally adding a background music using the website Pixabay. The final part is downloading the video; exporting the movie into video format and save it. Improving the quality of the video through the Vmake application from PlayStore. This is the way how to create a 3D animated video using AI according to Fadillah and Bariyyah (2024). They claim the absence of a specialised AI website to generate animated videos in a straightforward manner, and producers might make them by following multiple steps via various platforms and applications.
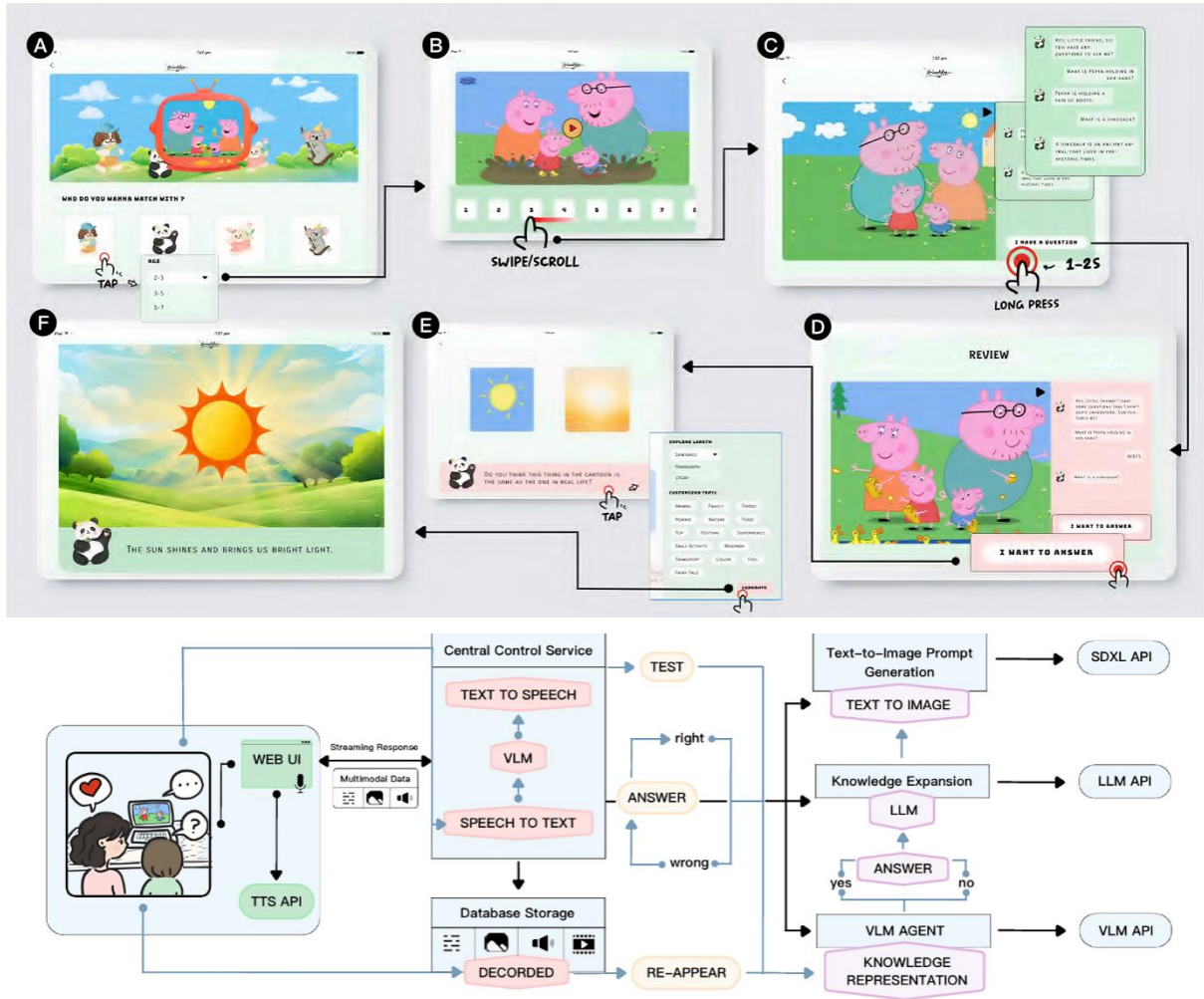
4.1.2. AI-powered cartoon videos (AnimAlte)

AnimAlte is an AI-powered cartoon video system originally developed to promote preschoolers' language learning, which facilitates vocabulary learning via synchronous answers to questions, dynamic review and feedback, and actual connections by linking real-world and animated pictures, and situational learning with stories and sentences (Tsang et al., 2025). Figures 3 and 4 are images of AnimAlte captured from the original article of Tsang et al. (2025).

Figure 3:

AnimAlte visualisation: (an image adapted from the article of Tsang et al. (2025)).

Figure 4:

An overview of AnimAlte system architecture adapted from the original article of Tsang et al. (2025)
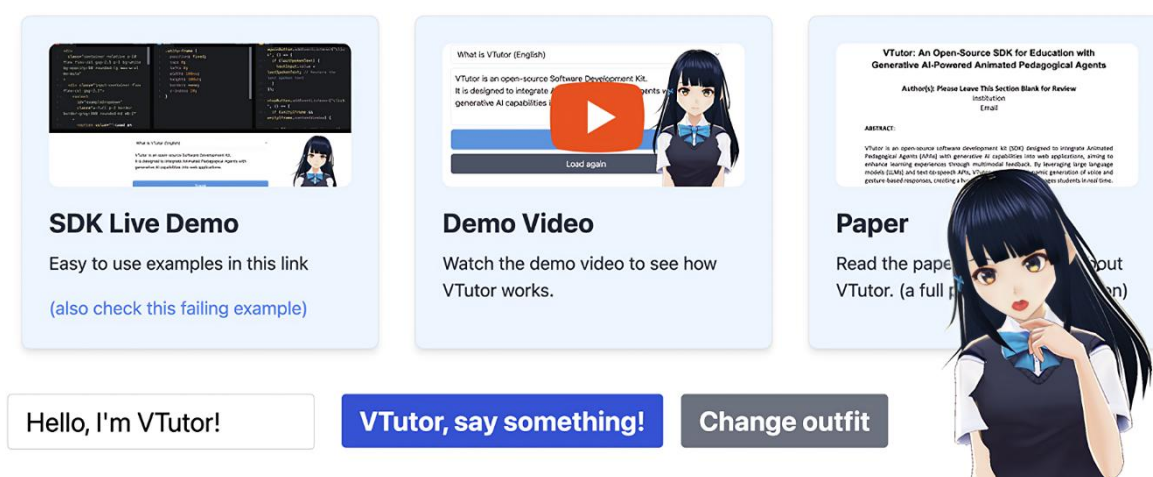
4.1.3. AI-Generated synthetic videos

The creation of an AI-Generated synthetic video takes a zero cost of production and is no time-consuming compared to the traditionally-made video (Leiker et al., 2023). Grounded in Leiker et al. (2025) research paper, the traditional video production process required several hours and days of people work, media production tools and specialised software. Meanwhile, an AI-powered synthetic video is strongly effective and beneficial, it was created based on the AI-supported platform for creating videos from Synthesia, this latter was employed to formulate text to videos (TTV) with artificial lifelike virtual agents (Leiker et al., 2023). Moreover, in case of error, the correction process in the traditional video necessitates a new production cycle, recording, and processing. But the AI-powered synthetic video approach requires solely revising the input of the text script before producing a new video in a quicker way taking only minutes to be completed (Leiker et al., 2023).

Another method of creating AI-powered videos is deduced from the study conducted by Kim (2024). He assures that creating an AI-generated video is based on three main Generative AI tools; ChatGPT 4.0, with text-to-text for script generation; Vrew, via text-to-video for video generation for *A&B-roll*, text-to-image for image generation for *A-roll*, text-

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to-voice for avatar generation; and Gen3, image-to-video for transforming the image generated by Vrew into video for A-roll (Kim, 2024). The process of producing an AI-generated video is noticed to be more efficient than the purely human-made and filmed video, it took only 30-40 minutes to accomplish the entire work including the human-supervised quality control and curation (Kim, 2024).

4.1.4. VTutor

VTutor is an open-source Software Development Kit (SDK) which integrates Generative AI with developed animated instruments to produce interactive, realistic and adaptable Animated Pedagogical Agents (APAs) for human–AI multimodal interactions (Chen et al., 2025). It utilises Large Language Models (LLMs) to deliver real-time and personalised feedback, incorporates advanced lip synchronisation technology for realistic speech alignment, and employs WebGL for smooth integration within web platforms (Chen et al., 2025). VTutor's compatibility with 3D and 2D animated figures enables developers and researchers to construct learning agents that are emotionally expressive and context-aware (Chen et al., 2025). Figure 5 is an image represents a captured display of the VTutor demo website adapted from the original article of the VTutor study by Chen et al. (2025).

Figure 5:

An image represents a screenshot of the VTutor demo website. Source: https://vtutor.tools (Chen et al., 2025).

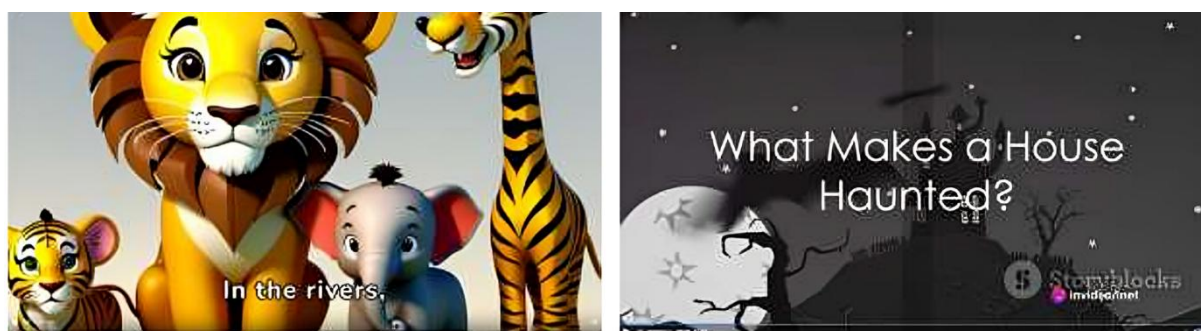### 4.1.5. Natural Language Generation (NLG) tools

AI-NLG instruments are AI-powered technologies developed using the Python programming language and open-source machine learning repositories. For instance, Hugging Face platform, in which students select their generated optional avatar and create their own space according to their needs (Woo et al., 2024). Considering Woo et al. (2024) research paper, students created their personal NLG tools on Hugging Face to help themselves with their story writing. For example, a student inputs a prompt in the text box of the NLG tool then this latter generates the output text. Students who practiced writing a story which is composed of their personal articulation combined with other generated words from their personal NLG mechanisms, had the option to choose whether they write from scratch or simply reconstruct a pre-generated narrative (Woo et al., 2024). At last, they formed a Human-AI story loaded with creative ideas, improved grammar and rich vocabulary, facilitating efficient and impactful Human-AI collaboration.

4.1.6. Animated Drawings developed by Meta

Animated Drawings is a Meta-powered AI platform, launched in 2023. It is a creative technological tool which brings static drawings (sketches, doodles) to life by providing a group of animation options, including actions like jumping and dancing, enabling them to move in dynamic ways (Garaicoa Silva et al., 2025). These animated characters can be shared across multiple social media platforms (Keegan, 2023, as cited in Garaicoa Silva et al., 2025). It can be used to induce students' creativity by engaging them through activities which support vocabulary acquisition via visual representation. Teachers can display the students' animated characters, enhancing a more creative, imaginative, and interactive learning environment (Garaicoa Silva et al., 2025).

4.1.7. AI-Driven Animated Digital Storytelling

In a study conducted by Belda-Medina and Goddard (2024), pre-service teachers' teams produced 16 digital stories aiming at enhancing learning English, using multiple AI instruments and platforms, targeting different learners' categories (young learners and older advanced ones). Canva AI, Fliki, Invideo AI, Animoto, and Jasper AI are amid the AI instruments which were utilised for various EFL learning storytelling goals (vocabulary, tenses, past participle, adjectives, phrasal verbs, prepositions, comparatives, present perfect, irregular verbs, conditional sentences, reported speech, idioms, articles, present continuous, modal verbs, and future simple) and to create engaging and interactive educational content (Belda-Medina and Goddard, 2024). Many participants discovered the synergy among these multiple AI technologies, smoothly combining image design, video production and audio optimisation characteristics in order to produce rich multimedia storytelling that are designed to fit different learning preferences (Belda-Medina and Goddard, 2024). Figure 6 is a screenshot captured from the original article of the study, which represents two illustrations of AI computer-based storytelling *The Magical Forest* (Left) using Canva AI and *The Haunted House* (Right) using Invideo AI (Belda-Medina and Goddard, 2024).

Figure 6: A screenshot adapted from the study conducted by Belda-Medina and Goddard (2024).

Furthermore, certain AI-powered platforms such as Twee, Magic School, and Curipod, which are specially developed for language learning and educational objectives, were utilised to design EFL activities derived from the digital stories they had created (Belda-Medina and Goddard, 2024). These platforms present an extensive set of features and functionalities specially designed to enhance language instruction (Belda-Medina & Goddard, 2024).
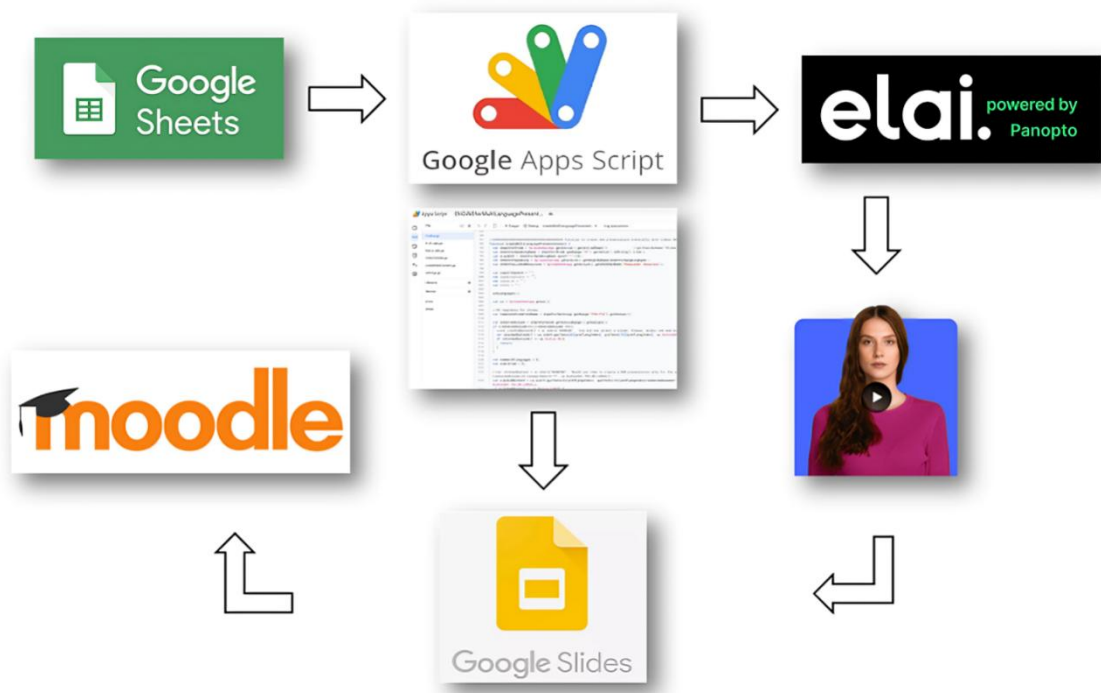
4.1.8. AI-Supported visualisation applications

In an attempt to measure the efficacity of AI-supported visualisation applications in promoting fourth-grade primary school pupils' writing tendencies during the creative writing process, Kaşkaya and Ateş (2025) conducted a study with the use of DALL·E and Canva. The combination between these tools resulted in promoting creative thinking and strengthening the writing skill. In essence, the experience was built on integrating the AI- supported visualisation through two main parts. The first one, the students' written stories were systematically segmented into clear parts, mainly they were divided as the introduction, development and conclusion. Then, each segment was crafted out carefully into DALL·E, these written descriptive prompts were generated to visual content in response to each segment. The second part, the visual output from DALL·E was refined and adjusted clearly by Canva to fit the stories' parts, then each story was transformed to a digital storybook. Both qualitative and quantitative findings noted that the utilisation of the two visual applications turned the writing process into a more creative multimodal experience. It deepened their engagement, increased motivation among them, supported idea generation, and made abstract content concrete.

4.1.9. AI-Generated Virtual Speakers

In order to address certain linguistic barriers in e-learning experiences, AI-powered virtual speakers were integrated within an e-learning platform (a customized Moodle), to deliver courses in students' native languages (Miranda & Vegliante, 2025). A study, conducted by Miranda and Vegliante (2025), exposed the effectiveness and utility of AI powered digital presenters in enhancing multilanguage web-based learning courses. At first, they implemented a system developed to manage content using Google Sheets and their Google Apps Script programming language, and Google Translate to create three multilingual presentations (Miranda & Vegliante, 2025). Afterward, with the help of ELAI engine and its API functions, a video with a talking avatar was generated, imported and incorporated into Google Slides using Google Script procedures (Miranda & Vegliante, 2025). The Google Sheet used to make multilingual videos with virtual speaking avatars contained multiple languages translated through Google Translate to fit different native speakers (Miranda & Vegliante, 2025). Lastly, they added these videos into Google Presentations, and then they uploaded the presentations as resources onto Moodle platform. Figure 7 is a screenshot of the rationale of the management system of this process, and Figure 8 is an image of the final product which contains a video in English with an AI-supported speaking avatar, all adapted from Miranda and Vegliante (2025) study.

Figure 7:

A screenshot of the rationale of the management system adapted from Miranda and Vegliante (2025) study

Figure 8:

A screenshot represents the AI-supported speaking agent technology adapted from Miranda and Vegliante (2025) study

5   Discussion

This systematic review explored the effect of AI-generated Animated Visuals throughout language and EFL instructional realms. In response to RQ1, the aforementioned results have demonstrated the types of AI-generated animated visuals utilised in language and EFL education. Varying from AI-generated videos including AI-animated videos, AI-cartoon videos, and AI-synthetic videos with avatars to Generative AI-Powered Animated Pedagogical Agents (VTutor), NLG tools, AI-powered platforms like Animated Drawings by Meta, AI-animated storytelling, and AI virtual speakers. Despite the fact that these tools are under-researched in terms of meta-analyses, they occupy a focal role in enhancing language learning outcomes for the future of language and EFL instruction. The findings of this work contribute to the ongoing literature discussion of Generative AI and immersive technologies. The discussion is presented in alignment with the remaining research questions.
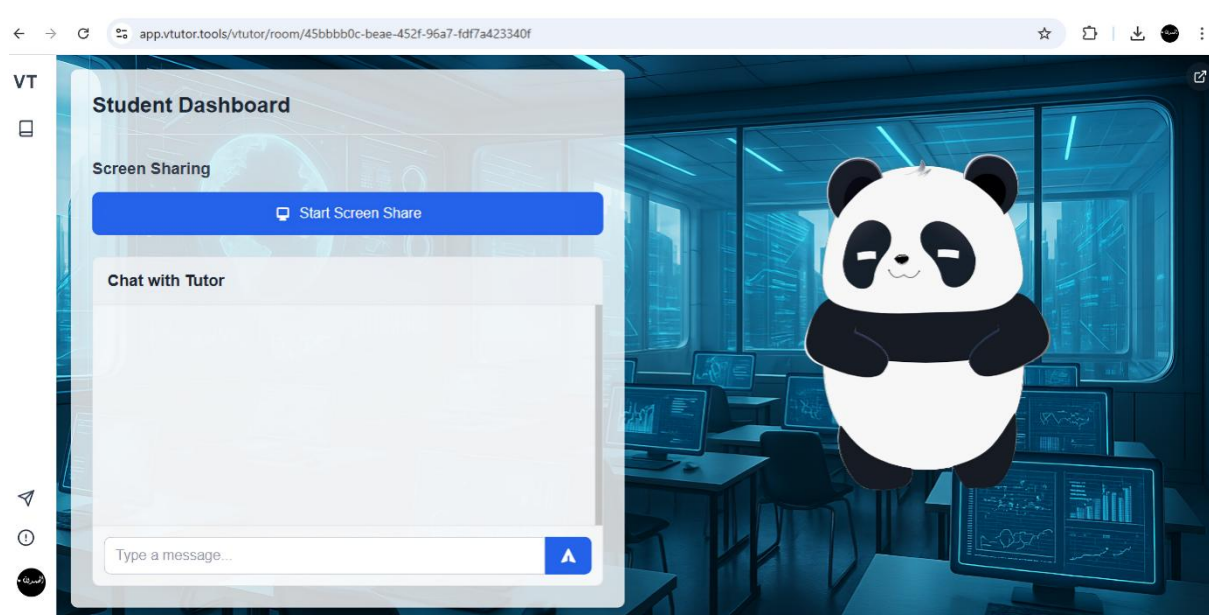
5.1 The impact of these visuals on Language Learning Outcomes (RQ2)

The visuals demonstrated significant effects on language learning outcomes. Starting with AI-videos, the results have highlighted three types; AI-animated videos, AI-powered cartoon videos using AnimAlte programme as a main tool, and AI-synthetic videos with a virtual instructor. AI-animated videos strategy improved vocabulary listening skills for elementary school students effectively (Fadillah & Bariyyah, 2024). Also, AI-cartoon videos using AnimAlte system achieved success by enhancing the children's vocabulary learning, fostering parental collaboration, encouraging self-reflection and deeper communication beyond vocabulary (Tsang et el. 2025). However, the AI-synthetic videos experiment had different dimensions concerning the results. The learners had equal gains, acquisition, and learning experiences with an AI-generated synthetic video that is made of a virtual instructor or APA (Animated Pedagogical Agent) which is a synthetic avatar, as they did with a traditional video. The main difference between a traditional instructional video and an AI generated synthetic video is that the latter had significant advantages in terms of production and time consumption. These advantages could contribute to the delivery of high-quality educational content in less consumed time compared to the traditional video. Moreover, the adoption of Generative AI as a pedagogical method to produce or generate AI synthetic educational videos, has the potential to function as a practical replacement for videos with a real instructor constructed through traditional techniques in computer-mediated instructional contexts (Leiker et al., 2023).

Approximately, the same idea was found by Kim (2024), AI-generated videos present a viable substitute or 'complement' to human-created videos, opening up new opportunities for 'scalable' and effective educational resources. No less important, educators and content developers should consider the production of high-quality AI-generated materials and ensure integrating visual and linguistic elements thoughtfully for optimising learning outcomes. This idea resonates with the importance of integrating AI tools within higher educational settings, as Zaim et al. (2024) declares that AI has become the center of educational purposes, with its support to multiple activities starting from content discovery to material creation. This fact caused a significant radical transition in academia that educators harness AI to refine and strengthen the learning atmosphere and boost educational resources (Zaim et al., 2024). From a parallel perspective, Generative AI has demonstrated significant potential for language learning, accompanied by a notable increase in learners' acceptance of these tools (Hongfei, 2025).

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Revisiting the AI-video strategy and examining it from a different angle, Unal Tufekcioglu (2024) emphasises that the involvement of a real trainer (human) in a Video-Based Learning Material (VBLM) is more efficient than that of AI generated text-to-speech avatar and can significantly boost the interaction and learning motivation among learners. This may lead to an overall trend and a mediated solution explained by Guan et al. (2025) that the strategy of integrating AI in EFL settings has the capacity to optimise learning outcomes by harnessing the advantages of AI technology, while keeping efficient human interaction (Guan et al., 2025). In other words, this idea stands for promoting collaboration and not replacing AI-driven technologies with human teachers within the AI-supported educational reformations (Guan et al., 2025).

The results have exposed another important and creative AI-generated animated visual named VTutor. This innovative AI tool offers a powerful toolkit to create anime-style pedagogical agents which enhance learner immersion, improve responsiveness to feedback, and enrich human-AI interactions (Chen et al., 2025). All while building a solid ground for trustworthy AI principles in education (Chen et al., 2025). VTutor designs a new direction for next-generation APAs, providing reachable and adaptable solutions to boost effective and immersive human-AI interaction experiences (Chen et al., 2025). Chen, Tang, et al. (2025) revealed another facet of Vtutor, an internet-based platform designed to provide effective tutoring at scale within hybrid learning environments. Mainly, it supports real-time feedback and multi-student monitoring via one-to-one screen sharing and stylised animated avatars (Chen, Tang, et al., 2025). Figure 9 presents a screenshot of the Vtutor platform from one of the classes.

Figure 9:

The Vtutor platform. Source: https://ls2025.vtutor.ai (Chen, Tang, et al., 2025).

A further significant issue that warrants discussion is to spotlight the outcomes of promoting writing skills using Natural Language Generation (NLG) tools and AI-supported visualisation applications. NLG tools helped students write effective Human-AI stories by addressing writer's block, fostering growth, broadening, and enhancing their written texts (Woo et al., 2024). Additionally, Zou et al. (2025) contributed to the swift expansion of Large Language Models (LLM) and Natural Language Technologies (NLT) by exploring the effect

of visual enhancements to Generative-AI chatbots on students' proficiency and affective responses. They utilised a self-created Generative AI–based writing assistant to explore how visual feedback influences EFL learners' writing outcomes and affective experiences in the revision stage (Zou et al., 2025). Findings demonstrated that visualised feedback effectively enhanced learners' writing coherence and cohesion, decreased negative emotions, and reduced cognitive load (Zou et al., 2025). Alongside this, Kaşkaya and Ateş (2025) confirmed that AI-driven visualisation applications yielded supportive effect on Learners' approaches to writing throughout multiple dimensions. In the experimental group, learners reflected important enhancements in their "confidence", "continuity", and "passion" (Kaşkaya & Ateş, 2025). Meanwhile, the control group, who had traditional instructional strategies, manifested an evident decrease in terms of confidence and passion (Kaşkaya & Ateş, 2025). Further, the results showed that AI- supported visualisation applications act like transformative pedagogical tools, and their integration within AI-learning environments is more effective than just applying the traditional pedagogical approaches (Kaşkaya & Ateş, 2025).

According to Garaicoa Silva et al. (2025), Animated Drawings showed significant results in enhancing vocabulary learning and retention among primary school students. This is consistent with Saab and Abu Melhem (2025) findings, which reveal that the incorporation of AI tools can effectively promote and support vocabulary acquisition among EFL university students. Beyond this, by equipping educators with practical experience using technologies such as AI-based tools and digital storytelling platforms in classroom settings, institutions may foster a culture of innovation and adaptability, thereby supporting instructors in adopting novel pedagogical approaches and enhancing student learning outcomes (Belda-Medina & Goddard, 2024).

Incorporating AI-driven virtual presenters into online learning platforms can greatly enhance the accessibility of web-based educational content, in which students choose the content to be in their native languages to facilitate the learning process and acquire knowledge in an effective and engaging manner (Miranda & Vegliante, 2025). The deployment of AI-generated virtual speakers represents a progressive strategy for addressing linguistic barriers within digital learning platforms, offering customised and responsive learning experiences (Miranda & Vegliante 2025). This aligns with the idea that Ariya et al. (2025) addressed, they introduced a Generative AI–driven virtual assistant incorporated into an immersive VR museum context. This AI virtual speaker has varied features, it empowers immediate, adaptive to context, and voice-based multilingual communication (Ariya et al., 2025). Thus, it significantly improved and strengthened cultural learning and learner engagement (Ariya et al., 2025).

Regarding RQ3, the synthesised findings of this systematic review suggest a range of pedagogical implications for the Algerian higher education stakeholders and Algerian EFL teachers, and present important evidence-based challenges.

5.2 Pedagogical implications

Integrating AI-generated Animated Visuals in EFL classrooms cater well to diverse learmers' profiles by promoting multisensory learning and increasing classroom immersion and motivation. Based on the aforementioned results, AI-powered Animated visuals play a significant role in enhancing immersive learning, peer collaboration, self-reflection, critical thinking among EFL learners, fostering creativity and learner autonomy, and opens new horizons for a scalable, high-quality instruction.

Algerian universities and institutions should consider integrating AI animated visual tools into the curricula by including them in courses for listening, writing, speaking and learning vocabulary activities. These tools should supplement but not replace teachers.

Moreover, they better look forward to foster interdisciplinary collaboration between computer science education and language departments to develop localised AI-driven animation tools for EFL and language education. The Algerian higher education system better offer mandatory digital skills training for EFL learners and educators, and launch blended learning modules using tools like VTutor, AI avatars, and AI animated storytelling to effectively update learning environments and gather feedback.

Aligning with Dual Coding theory, EFL teachers in Algeria should consider applying Multimodal pedagogy and use AI animation strategically. They integrate AI animated visuals to reinforce and visualise vocabulary and grammatical points. Plus, they combine these animations with speaking, listening, and writing tasks to strengthen multi-sensory immersion. Furthermore, they need to select tools based on learner age, proficiency, and goals. For instance, using visual narration for beginners and AI digital storytelling platforms for creative writing tasks, then they gather students' feedback regularly and reflect on what AI animated visuals support or hinder in the learning process.

As a matter of fact, today's research findings indicate the necessity of integrating AI tools within pedagogical frameworks to ensure modern and creative instructional trends. Thus, Algerian policymakers of higher education need to develop a national digital pedagogical strategy and launch a framework which integrates AI-generated visual tools into the national curriculum, especially for EFL programmes. Also, they should adopt a teacher training policy, in which they mandate and support professional development programs that prepare educators to employ AI-based animation tools for pedagogical purposes. Besides, they should promote research initiatives and innovation centers focusing on educational AI to evaluate tools that align with Algerian linguistic and cultural background.

5.3 Pedagogical Challenges

Adopting AI-animated visual tools within instructional frameworks as a new trend presents certain inevitable challenges that we should highlight. First, it is noticed that many instructors struggle to use AI tools pedagogically, and without formal training, this may lead to underuse or ineffective integration (Elmahdi et al., 2024). In addition, without balanced pedagogy, there is a risk of overusing animations as replacements for human interaction rather than as supplementary aids (Kim, 2024). AI tools, AI-generated avatars and synthetic videos may lack the human warmth and emotional resonance and interaction of real instructors, students may feel less motivated and less emotionally connected to a purely AI-generated visual (Unal Tufekcioglu, 2024; Belda-Medina and Goddard, 2024). Hence, it is recommended to combine and collaborate between human instructors and AI animation tools in order to construct an effective and balanced e-learning basis (Kim, 2024; Unal Tufekcioglu, 2024; Miranda & Vegliante, 2025).

One of the most dominant challenges that has been highlighted by Belda-Medina and Goddard (2024) is the limited technological access by teachers along with technical problems that hindered the seamless incorporation of AI tools into instructional practices. Besides, their study revealed evident concerns about overreliance on technology, which may diminish the creativity and problem-solving skills among EFL teachers (Belda-Medina & Goddard, 2024).

Despite the fact that AI-based e-learning platforms enhance learning, make it fun and more engaging; data quality issues, algorithmic bias and the possibility of overreliance on AI tools may disrupt the process of learning (Miranda & Vegliante, 2025). In sum, these insights call for targeted professional development programmes and instructional investments in Algerian universities.

6 Conclusion

This systematic review investigated the effect of AI-Generated Animated Visuals in EFL education. Drawing on 11 recent empirical studies and guided by the PRISMA 2020 methodology, the findings reveal that AI-generated animated visuals, in line with contemporary innovations in instructional technology, significantly enhance language learning by promoting vocabulary acquisition and retention, listening comprehension, writing fluency, and learner immersion and motivation.

The analysed tools ranged from AI-powered animation videos, text-to-animation platforms and avatar-based tutoring agents to AI digital storytelling and AI virtual speakers. These tools demonstrated effectiveness in multiple educational levels, suggesting broad applicability across different learners' categories. Notably, the integration of AI-generated animations aligns with the established cognitive Dual Coding theory, and multisensory learning, offering a powerful pedagogical foundation for their use in EFL contexts.

For the Algerian higher educational stream, adopting AI-generated animated visuals can provide transformative benefits. Universities and institutions, teachers, and policymakers should work collaboratively to integrate these tools into curricula and foster AI-driven digital instructional programmes. Nevertheless, challenges remain inevitable, they include limited teacher training in AI integration and concerns over reduced emotional engagement compared to human-delivered instruction. All in all, the effect and advantages of AI-powered animated visuals in EFL learning, such as scalability, personalisation, and multimodal richness present promising directions for 21st century education.

Future Recommendations

Drawing on the findings of this systematic review and the challenges identified, it is highly important to suggest practical recommendations for global refinements. These recommendations target multiple stakeholders around the world, including policymakers, universities, language learning institutions, and EFL teachers and learners to facilitate innovative, effective, and sustainable AI-generated animated visuals integration within pedagogical frameworks.

It is highly recommended to prioritise teacher training funding, and consider certain ethical standards ensuring transparency, data privacy and bias mitigation when diffusing related AI-based technologies. Furthermore, it is recommended for universities to design AI literacy programs in which they offer tailored courses and workshops on AI pedagogy, ethical considerations, and technical skills. Universities should consider supporting multidisciplinary collaboration among departments like languages and computer sciences to co-develop AI-animated visuals tailored for their specific demographic localization and cultural backgrounds.

Teachers and learners from another angle, need to pay special attention to this matter. Teachers should use students' feedback and self-review AI animated visual tools to promote pedagogical strategies and content. Also, in order to encourage creativity and critical thinking, they should integrate these tools into project-based learning assignments. Besides, engaging with these tools for innovative revision by students might promote their autonomy and self-review.

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