Reseach paper

Lola López-Molines[1]
https://orcid.org/0009-0006-7680-9406

[1] Universidad de Valencia, Facultad de Formación del Profesorado, Departamento de Didáctica de la Lengua y la Literatura, Grupo de investigación TALIS. Oricid: 0009-0006-7680-9406; lolomo2@alumni.uv.es

AI Beyond English Learning: Affective Development and Global Awareness in Primary Education

La IA más allá del aprendizaje del inglés: desarrollo afectivo y conciencia global en la educación primaria

https://doi.org/10.54104/papeles.v18n35.2453

Received: April 1st, 2026
Approved: July 19th, 2026
Published: September 23rd, 2026

Corresponding author:
Lola López-Molines. Universidad de Valencia, Facultad de Formación del Profesorado, Departamento de Didáctica de la Lengua y la Literatura, Grupo de investigación TALIS; Av. dels Tarongers, 4, Algirós, 46022, Valencia, España.
Orcid: 0009-0006-7680-9406
lolomo2@alumni.uv.es

To cite this article:
López-Molines, L. AI beyond English learning: Affective development and global awareness in primary education. *Papeles, 18*(35), e2453.
https://doi.org/10.54104/papeles.v18n35.2453



Abstract

Introduction: The present study forms part of a broader study conducted among 42 sixth-grade primary education students in Spain, which examines the pedagogical potential of Generative Artificial Intelligence (GenAI) for developing oral skills in English as a Foreign Language (EFL). From a complementary perspective, this exploratory perception-based study analyses how GenAI may influence learners' affective factors, including motivation, confidence, anxiety and frustration as well as how GenAI-mediated activities connected to the Sustainable Development Goals (SDGs) can enhance students' awareness of global issues. **Methodology:** Through a mixed-methods approach, with triangulation of quantitative and qualitative data, this study offers a nuanced understanding of potential findings based on students' perceptions. **Results and Discussion:** Findings show that GenAI can support students' awareness of global issues and increase motivation, confidence, and willingness to communicate, although some students experienced frustration or cognitive overload. Yet, variability in comprehension of the SDGs and different degrees of engagement and motivation among participants were also observed, highlighting the perceived limitations of these tools. **Conclusions:** Thus, GenAI combined with sustainability-focused themes can support personal growth and promote a more holistic education in EFL.

Keywords:
Affective Factors; Generative Artificial Intelligence (GenAI); English as a Foreign Language (EFL); Oral Communication; Sustainable Development Goals (SDGs)

Resumen

Introducción: El presente estudio forma parte de una investigación más amplia realizada con 42 estudiantes de sexto curso de Educación Primaria en España, que examina el potencial pedagógico de la Inteligencia Artificial Generativa (IAGen) para el desarrollo de las destrezas orales en inglés como lengua extranjera (EFL). Desde una perspectiva complementaria, este estudio exploratorio, basado en las percepciones de los participantes, analiza cómo la IA generativa puede influir en los factores afectivos del alumnado, entre ellos la motivación, la confianza, la ansiedad o la frustración, así como de qué manera las actividades mediadas por la IA generativa, vinculadas a los Objetivos de Desarrollo Sostenible (ODS), pueden favorecer la concienciación de los estudiantes sobre los desafíos globales. **Metodología:** Mediante un enfoque de métodos mixtos, con triangulación de datos cuantitativos y cualitativos, este estudio ofrece una comprensión matizada de los resultados potenciales basada en las percepciones del alumnado. **Resultados y discusión:** Los resultados muestran que la IAGen puede favorecer la concienciación del alumnado sobre cuestiones globales e incrementar la motivación, la confianza y la disposición a comunicarse, aunque algunos

Palabras clave:
Factores afectivos; Inteligencia Artificial Generativa (IAGen); inglés como lengua extranjera; comunicación oral, objetivos de desarrollo Sostenible (ODS)

estudiantes experimentaron frustración o sobrecarga cognitiva. No obstante, también se observaron variaciones en la comprensión de los ODS y diferentes grados de implicación y motivación entre los participantes, lo que pone de manifiesto las limitaciones percibidas de estas herramientas. **Conclusiones:** Así, la IAGen combinada con temáticas relacionadas con la sostenibilidad puede contribuir al crecimiento personal y promover una educación más holística en el aprendizaje del inglés como lengua extranjera.

1. Introduction

Generative AI (GenAI) has introduced multiple innovations in education, reshaping how students learn, communicate, and develop through intelligent systems capable of interacting like humans (Saúde et al., 2024). Added to this, the Sustainable Development Goals (SDGs), established within the 2030 Agenda to promote a more democratic, inclusive, and sustainable society, reinforce the importance of language learning and multilingualism as pathways towards cultural enrichment and social transformation in an increasingly interconnected world (Yu et al., 2024).

As a result, both GenAI and the SDGs have been placed at the forefront of 21st century education (Jiménez-García et al., 2025), contributing to a new paradigm in English as a Foreign Language (EFL), in which students not only need to achieve sufficient competence in English (Akpınar et al., 2025), but also cultivate personal and interpersonal competencies (Bauer et al., 2025), through more holistic and life-long learning experiences. In this context, current and future EFL programmes may benefit from incorporating GenAI and SDG-oriented approaches, enabling students to become proficient English speakers and socially responsible citizens capable of navigating our digitalised and information-rich society.

Based on this framework, this study explores the potential of GenAI as a nexus between affective development and awareness of global issues and sustainability in EFL contexts. First, it examines how GenAI may influence learners' affective factors during language learning, including motivation, confidence, anxiety, and frustration; second, it explores how this technology can enhance awareness of global issues and support sustainability education; and finally, it examines the challenges associated with its implementation.

1.1 GenAI and Affective factors (Motivation, Confidence, Anxiety and Frustration)

Beyond its evident benefits for language learning, generating content, guiding students, and providing corrective feedback (Solak, 2024), GenAI can also support the development and regulation of affective factors such as motivation, confidence, anxiety, and frustration (Zhou, 2025). However, despite their crucial role in the language acquisition process, either facilitating or hindering it, these affective factors have often received less attention in comparison with cognitive and linguistic aspects of language learning (AlTwijri & Alghizzi, 2024).

Firstly, GenAI has been shown to promote motivation among learners, which is a key factor for meaningful and life-long learning (Karataş et al., 2024). This motivational effect may be attributed to multiple affordances of GenAI-based systems, such as their interactive nature (Yeh, 2025), approachable design

(Belda-Medina & Calvo-Ferrer, 2022), and ability to provide learners immediate support (Dennis, 2024). In this sense, the "scaffolding" and constructive feedback that chatbots offer through mediation (Godwin-Jones, 2023), can invite and help students during speaking activities, indirectly improving aspects of oral proficiency, including fluency, coherence, lexical knowledge, grammatical range, accuracy and pronunciation (Fathi et al., 2024).

By creating a supportive learning environment, GenAI can foster rapport, which may enhance learners' confidence when speaking English (Tai & Chen, 2024), allowing them to practise in a safe, low-pressure context while triggering their motivation (Shikun et al., 2024). The constant reinforcement and input opportunities offered by GenAI technologies, combined with output opportunities, allows learners to build on their knowledge progressively, which is commonly known as "learning by doing" (Aluko et al., 2026). This active and experiential learning (Divya & Mirza, 2024) might help students lower their "affective filter" (Creely & Blannin, 2025), making them more open to communicating and engaging in class dialogues without the pressure or fear of making mistakes, thereby developing greater confidence and autonomy and strengthening their belief in their own potential and abilities (Karataş et al., 2024). In this way, when using chatbots and AI-based tools, errors can be perceived as valuable learning opportunities, enabling learners to consolidate language patterns more effectively by reflecting on their mistakes, imitating the chatbot, and recasting their own output (Polakova & Klimova, 2024).

Moving on to the impact of these technologies on learners' Willingness to Communicate (WTC) (Belda-Medina & Calvo-Ferrer, 2022), which encompasses students' readiness, attitude, and motivation to communicate in the target language, GenAI may contribute to fostering a more supportive and encouraging learning environment. Overall, GenAI can foster students' active learning, which is "any learning activity in which students actively participate or interact with the learning process, rather than passively receiving information" (Aluko et al., 2026, p. 5), by providing targeted support and stimuli. Through these student-centred and meaningful learning experiences, children can develop a greater sense of control over their learning (Tai & Chen, 2024; Zhou, 2025), increasing their participation and engagement in class (AlTwijri & Alghizzi, 2024).

Another advantage these systems offer learners is the personalisation of learning experiences and information, according to their abilities (Divya & Mirza, 2024), as these systems can analyse learning patterns and adjust content to students' cognitive needs and levels, providing taylored materials and activities that are within their grasp or slightly beyond their individual capabilities (Aluko et al., 2026). In other words, GenAI can create multi-level activities that may fall within or slightly beyond students' Zone of Proximal Development (ZPD), which refers to the distance between what learners can do independently and what they can achieve with guidance or support from a teacher, peer, or a more experienced person (Altares-López et al., 2024), ultimately functioning

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as a mediator in the learning process (Liu et al., 2025). This might help students, on the one hand, to identify their language difficulties or areas for improvement and, on the other hand, to gain greater control and self-awareness of their learning process (Creely & Blannin, 2025).

Yet, the potential of these cutting-edge technologies goes far beyond individual development, fostering inclusion and diversity in the EFL classroom by providing learners with additional support through adapted or extended instruction, while promoting learner autonomy and selfregulation (Aluko et al., 2026; Creely & Blannin, 2025). Thus, unlike traditional teaching approaches, where students often have to adapt to predefined tasks, chatbots can generate activities based on learners' profiles, levels, interests, and abilities within seconds, potentially contributing to more equitable access to quality education for all students (Fathi et al., 2024).

Likewise, given their friendly and supportive attitude, chatbots can provide emotional support to learners by reducing their anxiety when speaking English (Altares-López et al., 2024). Practising with a chatbot may help students gain conversational experience in a safe, low-pressure environment, creating a "bubble" in which they can experiment with language without the fear of making mistakes or the pressure of being assessed (Aluko et al., 2026). This "safe learning space" can be particularly useful at early stages, as it encourages students to take risks, experiment with language, and persist, allowing them to take greater control of their learning process (Ferk Savec & Jedrinović, 2025). Thus, AI-mediated learning contexts can help students overcome different personal and affective learning barriers, including a lack of motivation (Karataş et al., 2024), stress (Tai & Chen, 2024), lack of confidence (Dennis, 2024), and frustration (Grájeda et al., 2023), which might negatively affect students' motivation and willingness to communicate (WTC) in English.

1.2 Global Issues Awareness and the SDGs

Alongside GenAI and technology, the SDGs can also play a key role in providing students with a more global and informed perspective on different social and global issues affecting our modern society. Therefore, it is important to include them in the EFL curriculum to maximise students' learning in response to the 21st century demands (Uğraş et al., 2024).

Since the process of acquiring a language involves cultivating thoughts, attitudes, and behaviours (Yu et al., 2024), the English classroom can be understood as an open space for global reflection, intercultural dialogue, and personal growth, where the integration of the SDGs may contribute to the development of open-minded, committed, and socially responsible individuals (Zlateva et al., 2023). With this, AI-driven innovation may also foster equality and digital literacy in a comprehensive and contextualised way (Ferk Savec & Jedrinović, 2025).

GenAI can reflect multicultural diversity through exposure to different languages (Dai & Hua, 2025), providing access to a wide

range of sources, accents, and voices, which reinforces students' awareness of linguistic and cultural diversity (Bautista Saucedo & Guzmán Olguín, 2025). This can support the development of open-minded and respectful attitudes towards linguistic and cultural diversity (Dennis, 2024; Fathi et al., 2024). Similarly, chatbots' inherent communicative nature may support students' critical reflection on different global issues, including social, economic, and environmental challenges, as well as other sustainability-related topics, in a transversal way (Bauer et al., 2025).

On the other hand, the creative potential these tools possess can also provide a valuable opportunity to expand students' knowledge and understanding of the world around them (Aluko et al., 2026; Yeh, 2025), fostering 21st-century skills (soft-skills) such as communication, critical thinking, and problem-solving (Jiménez-García et al., 2025), which are fundamental for students to become better prepared to meet future demands. This supports the idea that GenAI can become an ally for social good, since it "benefits humanity, respects international norms and standards, and is oriented toward peace and sustainable development" (Flores-Vivar & García-Peñalvo, 2023, p. 39). Hence, AI-based generative models can support learners' development not only cognitively and academically, but also as responsible citizens, enabling them to achieve their full potential as human beings (Ferk Savec & Jedrinović, 2025), ultimately contributing to the creation of a "one world" for all (Sarwari et al., 2024).

Finally, these systems can also nurture students' cultural understanding, raising their awareness of diverse cultures and enabling them to interact with confidence in multicultural contexts through the development of their Intercultural Communicative Competence (ICC) (AlTwijri & Alghizzi, 2024). In this way, GenAI can potentially contribute to the democratisation of education (JiménezGarcía et al., 2025), making it more open, equitable, and accessible to all learners, following Sustainable Development Goal 4 (SDG 4) (Flores-Vivar & García-Peñalvo, 2023).

1.3 Limitations of GenAI

Nonetheless, despite its ability to produce human-like outputs, one of the main issues associated with GenAI technologies is that it may reproduce stereotypes and cultural biases embedded in its datasets (Creely & Blannin, 2025). This may raise concerns regarding interculturality, social stereotypes, prejudice, and inequality, potentially limiting the construction of students' personal identities (Dai & Hua, 2025). Similarly, the output generated by GenAI can reflect existing discriminatory social patterns embedded in our society, given that "Generative AI models can reinforce stereotypes by consistently generating content that aligns with those stereotypes, making it more challenging to combat prejudice and discrimination" (Divya & Mirza, 2024, p. 11), what might jeopardise freedom and democracy (Bond et al., 2024).

Such concerns are further intensified by the fact that many of these technologies are predominantly developed in economically dominant countries and by companies that shape, market, and curate information according to their own institutional, commercial, and ideological interests, often reinforcing forms of linguistic gatekeeping through the prioritisation of English-language content over other languages and cultural perspectives (Bautista Saucedo & Guzmán Olguín, 2025). In other words, access to content and data is limited to what the algorithms have been previously trained on, resulting in limited interaction (Belda-Medina & Calvo-Ferrer, 2022), misleading responses (Bauer et al., 2025), hallucinations (Moorhouse, 2024), and vague feedback (GodwinJones, 2023). At

the same time, the absence of face-to-face interaction when using this technology can lead to student disengagement, frustration, and poor academic performance (Yeh, 2025).

Thus, interaction with GenAI can be a rather complex and demanding task, requiring learners to possess advanced cognitive and language skills (Tai & Chen, 2024). Apart from domain-specific knowledge and skills when using these tools, such as digital competency (Altares-López et al., 2024) students also need to develop AI literacy in order to learn how to peacefully coexist with GenAI and new technologies, becoming critical and committed citizens who make ethical and responsible use of these tools (García-Peñalvo et al., 2024; Jiménez-García et al., 2025). Supporting this idea, one participant of a study conducted by Altares-López et al. (2024) said, "Even though the AI generates everything for you, you are the one who thinks about what you want the AI to do" (p. 13). In this way, successful human-machine collaboration may require learners to lead AI systems, taking on the role of active agents and supervising them rather than fully relying on them (Bond et al., 2024). However to achieve this, learners have to be taught how to use AI ethically first (Yu et al., 2024), to avoid potential biases, authenticity concerns, surveillance and intellectual property issues among many others, as "Generative AI's versatility can be both a boon and a bane, as it opens the door to a wide array of potential misuses by malicious actors" (Divya & Mirza, 2024, p. 11). Ultimately, from a sustainability perspective, the effective implementation of the Sustainable Development Goals (SDGs) in schools may require greater investment in educational technology infrastructure and institutional support (Bauer et al., 2025; Uğraş et al., 2024), which can also represent a constraint.

Therefore, although previous research has explored the potential and multimodality of GenAI to support English learning, its broader educational implications remain rather underexplored. In particular, limited attention has been paid to how interaction with GenAI may influence affective factors, such as motivation, confidence, speaking anxiety, and frustration, which play a key role in learners' language development. Similarly, the need to integrate SDGs into GenAI-mediated EFL activities to enhance students' awareness of global challenges and foster responsible citizenship also remains insufficiently investigated.

Building on this, the present study reports the second phase of a broader exploratory investigation into the use of GenAI for developing oral skills in EFL among children. It examines the perceptions of 42 sixth-grade primary school students regarding how GenAI-mediated speaking activities may contribute to their affective development and awareness of global issues.

2. Methodology

This study employed an exploratory-descriptive research design (Creswell, 2023) to examine students' perspectives on the use of GenAI and to address the identified gaps.

2.1 Research objectives

This study aims to achieve the following objectives:

- To examine the extent to which GenAI-mediated, sustainability-based activities can increase students' awareness and understanding of the SDGs in the EFL classroom.
- To explore the effect of GenAI on learners' personal and affective factors including motivation, confidence, anxiety and creativity.

2.2 Research questions

Moreover, the following research questions (RQs) have been established:

- RQ1. How do GenAI-mediated and sustainability-oriented activities shape students' awareness and understanding of the SDGs and global issues in the EFL classroom?
- RQ2. How does GenAI-mediated spoken interaction influence students' affective experiences and personal engagement in English learning contexts?

2.3 Participants

Participants in this study involved 42 sixth-grade students, aged 11–12, from Spain. The sample consisted of two groups of students from the same school, all of whom had an overall A1 level of English. Among these participants, 20 were boys and 22 were girls. In general terms, in accordance with the guidelines established by the Spanish Educational Law (LOMLOE) and the educational decree of the Valencian Community, the students spoke at least three languages: Spanish, Valencian, and English. However, although most students were local, a minority were of Muslim and Eastern European origin and spoke other languages, reflecting the multicultural background of the school.

2.4 Instruments

To evaluate the impact of the teaching intervention and gain a comprehensive understanding of students' learning experiences, multiple instruments were employed at different stages of the study. This multidimensional approach enabled the collection of both quantitative and qualitative data, allowing for triangulation to enhance the validity, reliability, and depth of the potential findings (Creswell, 2023).

Given that the participants were basic English users with an overall A1 level, all questionnaires and interviews were conducted in Spanish to ensure comprehension and to allow participants to express their perceptions accurately and in greater depth, minimising potential language-related constraints. The instruments followed an inter-rater reliability process by a panel of 12 experts in the field from different universities. The expert review process ensured content validity by confirming that the items were appropriate, clear, and aligned with the study objectives. However, due to the exploratory nature of the research and the small sample size (N = 42), construct validity could not be established through psychometric analyses such as factor analysis. Thus, the findings extracted should be interpreted as exploratory indicators of students' perceptions rather than definitive measures of the underlying constructs. Future studies with larger samples should further validate the instrument through construct validity analyses.

All instruments were validated in Spanish, as they were administered in this language to students to avoid potential confusion.

All instruments were validated in Spanish, as they were administered in this language to students to avoid potential confusion. However, the questionnaires and interview transcripts were translated by the author for publication layout.

The first instrument used was the Self-Evaluation Questionnaire, which was designed following the proposal by Alcantud-Díaz et al. (2025) and administered after the intervention. Although the original questionnaire contained 18 Likert-scale items, only 7 items

Table 1.
Renumbered Self-evaluation questionnaire items

C. Activities and SDGs					
1. Now I know the Sustainable Development Goals (SDGs) better.	1	2	3	4	5
2. I can talk about the SDGs in English more easily than before.	1	2	3	4	5
3. I believe that the topics covered in the activities can be useful for my future.	1	2	3	4	5
D. General Experience					
4. I am able to communicate in English with colleagues and with other people.	1	2	3	4	5
5. I'm not ashamed to make mistakes when speaking English with the chatbot.	1	2	3	4	5
6. I am more motivated to participate in class after having used the chatbot.	1	2	3	4	5
7. I will continue to use chatbots to practice and improve my English in the future.	1	2	3	4	5

Source: Own

were selected for analysis (Q12–Q18), as they aligned best with the study objectives, focusing on SDG awareness and affective factors (see Table 1). The remaining items were used in another study.

The second instrument consisted of semi-structured interviews conducted after the chatbot intervention to gain deeper insights into participants' perceptions of the learning experience and their personal experiences with GenAI-assisted instruction. Only three items (Q4–Q6) from the original six interview questions were renumbered and analysed in this study (see Figure 1). This gave participants the freedom to reflect on their experiences, share personal insights, and discuss concerns or challenges that may not have been anticipated by the researchers, offering a more nuanced understanding of students' perceptions of GenAI.

Figure 1.
Individual interview questions

1.	Are you able to communicate better in English now?
2.	Do you think you have learned more about the SDGs thanks to the activities? What have you learned?
3.	What is your opinion towards chatbots and AI in English class?

Source: Own

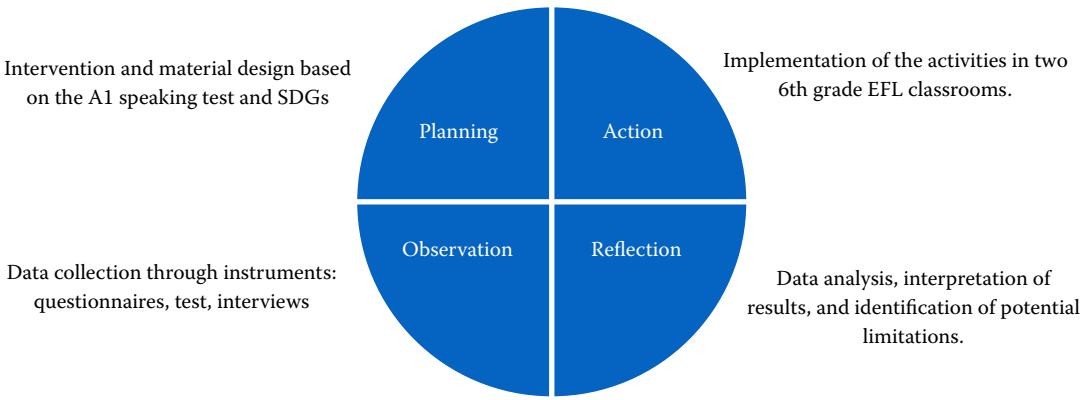
2.5 Instructional Intervention Procedure

The following procedure was implemented during the intervention, allowing for a progressive development of the study based on its nature and objectives. Following Zuber-Skerritt's (1996) model, this study involved four phases: planning, action, observation, and reflection, which are central to action research in education (See Figure 2).

Overall, the whole study lasted approximately eight months. During this period, all necessary legal and ethical procedures for working with children in Spain were rigorously followed. The actual classroom intervention was intended to last two weeks; yet it was extended to four to five weeks to accommodate the English subject curriculum and students' timetables.

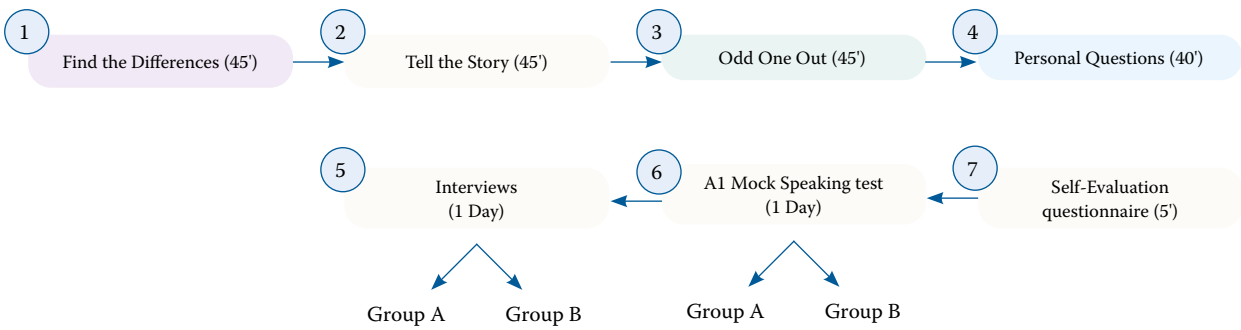
Participants completed four sessions, of 40 to 45 minutes, which included a set of activities (from controlled to free practice) covering one part of the A1 Cambridge Speaking test. However, due to the large number of students, it was not possible to complete the speaking mock test and interviews within a single 45-minute session; thus, two additional

Figure 2.
Study phases



Source: Own

Figure 3. Intervention parts



Source: Own

days were allocated per class for their administration, as shown in Figure 3.

Questionnaires and interviews were conducted in Spanish for clarity, while the speaking mock test, which examined students' oral skills development, was conducted in English following Cambridge standards to ensure validity and reduce bias. Furthermore, the main tool used in class was ChatGPT; whereas Gemini was used by the researcher to generate materials.

Based on the sample profile (11-12-year-old children), no pre-test was administered, as, on the one hand, participants had no prior knowledge of the exam format and, on the other hand, following the Spanish Education Law (LOMLOE), teaching practices must foster a competency-based, learner-centred approach that prioritises learning over marking; therefore, an initial test could have affected engagement and limited baseline validity. All students were supported and supervised by the researcher and the main teacher throughout the intervention. Active methodologies, including Content and Language Integrated Learning (CLIL) and cooperative learning (whole class, small groups, pairs, and individual work), were implemented to promote participation and collaboration. Also, the ethical use of ChatGPT and tablets was promoted throughout the intervention.

Finally, the speaking mock test was conducted and evaluated under the teacher's supervision to ensure reliability in accordance with Cambridge Assessment guidelines at A1 level. The test was recorded, however, it was not double marked, as both the main teacher and the researcher agreed on the marks.

2.6 Data Analysis

Collected data were analysed using different methods: quantitative data were analysed through descriptive statistics using R, while qualitative data were examined through thematic content analysis following Mayring's (2014) criteria and QCAmap.

Descriptive statistics were used to explore the 7 Likert-scale items to identify patterns in students' behaviours and attitudes after the intervention through numerical analysis. First, means, medians, standard deviations, and frequency distributions for each score (1-5) were calculated (Dörnyei, 2007) using R. Moreover, internal consistency reliability was assessed using Cronbach's Alpha to examine the consistency of responses across questionnaire items. However, given the exploratory nature of the study and the limited sample size, this analysis was considered only an indicator of response consistency and not evidence of construct validity.

Thematic content analysis (Creswell, 2023) was carried out with the semi-structured interview recording transcripts, following Mayring's (2014) criteria. This process allowed the researcher to identify emerging main themes and subthemes, providing a deeper understanding of students' feelings and perceptions of the impact of GenAI. Subsequently, QCAmap allowed the visual representation of the extracted data.

Triangulation through a mixed-methods approach (Creswell, 2023) was used to integrate data from the questionnaire and interviews. This provided a broader understanding of the data and enabled the identification of consistencies and discrepancies in participants' responses, thereby supporting a more comprehensive evaluation of the outcomes and strengthening the credibility and interpretive depth of the study.

Since a single researcher coded all collected data, ambiguous responses were resolved through repeated review and consistent application of the coding scheme, which was developed inductively from categories and subcategories emerging from participants' responses (see Section 4). This process helped ensure consistency throughout the analysis. Furthermore, exclusion criteria were established to enhance the validity and reliability of the dataset, excluding vague, irrelevant, or incoherent responses that did not actually answer the interview question.

2.7 Ethical Considerations

This study rigorously followed all the legal and ethical requirements for conducting educational research with minors in Spain. Families were informed about the aims of the project and provided signed consent for the video and audio recordings, as well as for data analysis. Participation was entirely voluntary, and the confidentiality and anonymity of both the participants and the collected data were ensured and used only for the specified purposes.

Since a single researcher coded all collected data, ambiguous responses were resolved through repeated review and consistent application of the coding scheme

3. Results and Discussion

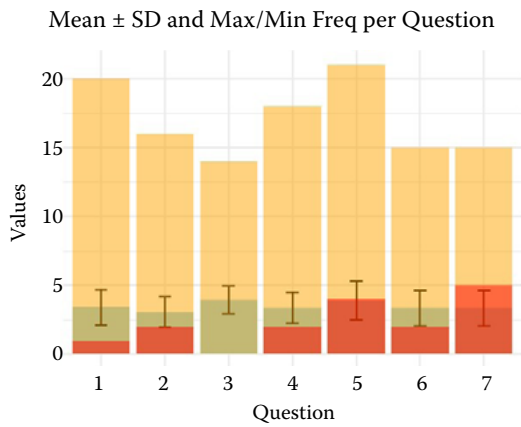
3.1 Results

In first place, the results from the seven questions selected for this study were analysed quantitatively using descriptive statistics (mean, standard deviation, frequency distributions, maximum and minimum values). The following results were obtained in R (see Table 2).

In Figure 4 below, the results are illustrated using a colour-coded system: mean (blue), standard deviation (line), maximum frequency (yellow), and minimum frequency (red).

Different tendencies were observed across Q1 to Q3 regarding SDG awareness. Q1, which aimed to determine the degree of acquisition and knowledge of the SDGs, showed an increase in students' understanding of the SDGs, with a mean of 3.40. This suggests a positive tendency. However, the relatively high standard deviation (SD = 1.27) indicates variability among students, meaning that not all participants showed comparable levels of perceived benefit from the intervention. On the other hand, Q2, which explored learners' ability to speak about SDGs in English, scored slightly lower (M = 3.05, SD = 1.10). This shows that, although several participants reported gaining content knowledge and increased awareness of global issues, many still indicated limited linguistic confidence when discussing these topics. This may reflect the added challenge of integrating content knowledge with foreign language production. Lastly, the perception of future utility and relevance of SDG topics, Q3, yielded the highest mean score (M = 3.95) and the lowest standard deviation (SD = 1.01). This might indicate that most students recognised

Figure 4.
Descriptive statistics results using R



Source: Own

Table 2.
Descriptive statistics from the questionnaire results

Question	Mean	Sd	Cat_max	Cat_min	Max_freq	Min_freq
1	3,4	1,27	4	2	20	1
2	3,05	1,1	3	1	16	2
3	3,95	1,01	5	1	14	0
4	3,36	1,12	3	1	18	2
5	3,88	1,4	5	1	21	4
6	3,33	1,28	3	2	15	2
7	3,33	1,3	4	1	15	5

Source: Own

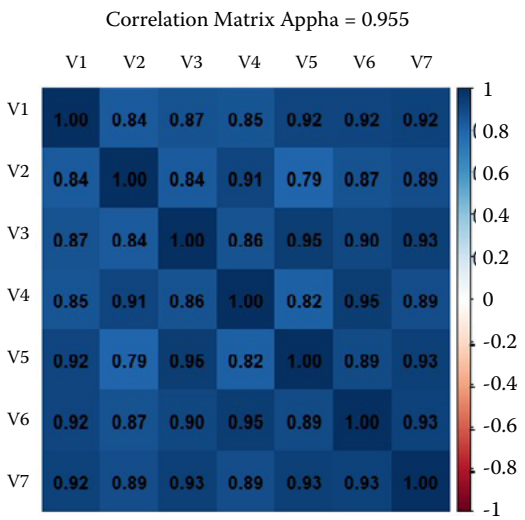
and valued the importance of the SDGs for their future. Notably, this item recorded a minimum frequency of 0, what highlights that no student strongly disagreed with the usefulness of the topics.

Moving on to students perceived ability to communicate in English with others, Q4, the results show a moderate score (M = 3.36, SD = 1.12). This can suggest that participants perceived improvement in their communicative competence, although further practice may still be needed. Expanding these findings, Q5, measured students perceived reduction of anxiety or shyness when interacting with the chatbot. Specifically, this item scored high (M = 3.88) compared to perceived communicative ability. This contrast suggests that chatbot interaction may have reduced learners' anxiety about making mistakes, fostering a supportive learning environment that encouraged risktaking and learning from errors. However, the high standard deviation (SD = 1.40) may suggest variability among participants, reflecting differences in their attitudes. On the other hand, Q6 explored motivation and measured students' willingness to participate in class and showed a moderate increase (M = 3.33, SD = 1.28), indicating that the use of chatbots may have had a positive motivational influence. Finally, Q7, examined students' intention to continue using chatbots in the future and obtained a mean score of (M= 3.27), which reflects a positive but cautious attitude toward AI. In global terms, students appear open to using chatbots as learning tools, although they may not yet perceive them as essential, which is also reflected in the qualitative analysis.

The following correlation matrix (see Figure 5 below) shows strong positive relationships among all items (r = 0.79–0.95), indicating an elevated level of coherence between variables. Cronbach's Alpha (α = 0.955) shows a goof internal consistency. However, some very high correlations (r > 0.90) may suggest a certain degree of item redundancy and limited dimensional distinction between some variables. For instance, the correlations between variables V3(Q3) and V5(Q5) (r = 0.95) and between V4(Q4) and V6(Q6) (r = 0.95) indicate that these items may partially overlap, despite being designed to assess complementary rather than identical aspects. Therefore, while the results support the reliability of the instrument, they may also reflect a high degree of homogeneity among items, which should be interpreted cautiously in relation to construct validity.

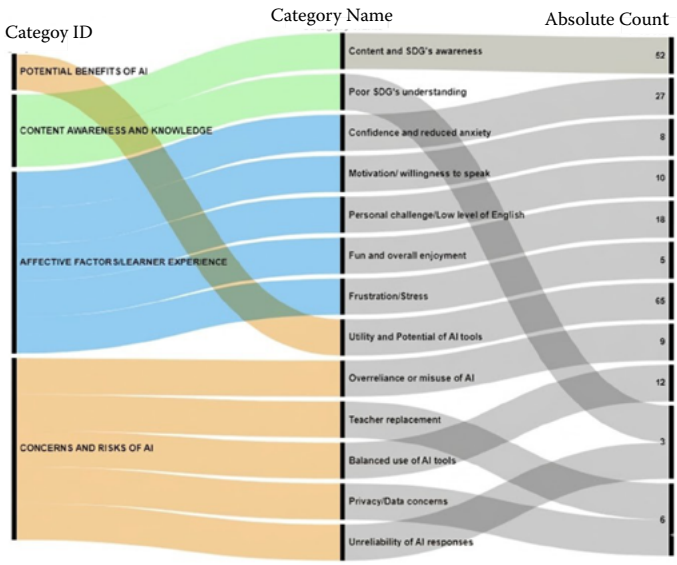
Additionally, the heatmap in Figure 5 illustrates a consistent correlation pattern among the seven questionnaire items. Each box represents the correlation between variables in the dataset, while the dark blue areas indicate strong relationships between items. The dark blue areas indicate strong relationships between variables. Thus, the predominance of this colour evidences a high level of internal consistency and overall homogeneity across the dataset, although this uniformity may also indicate potential overlap between certain items.

Figure 5.
Cronbach Alpha test results



Source: Own

Figure 6.
Qualitative data interpretation in Raw graphs



Source: Own

Nonetheless, since this was a small-scale exploratory study, it allowed the researcher to pilot key components of the study, including the questionnaire, activities, and the data collection procedures. Thus, future iterations of the study could refine the questionnaire items to improve discriminant validity.

In second place, qualitative data extracted from the interviews were analysed inductively through thematic coding analysis (Creswell, 2023) and categorised into four main emerging categories: (1) *Content Awareness and Knowledge,* (2) *Affective Factors/Learner Experience,* (3) *Potential Benefits of AI,* and (4) *Concerns and Risks of AI.* These were further organised into smaller subcategories, as shown in Table 3 and Figure 6 below, where all categories are depicted in represented in different colours.

Table 3.
Qualitative data results in QCAmap

Category ID	Category Name	Abs. Count	% of SUM	N of Docs	% of Docs
Content awareness and knowledge		55	6	40	**100**
RQ1-1	Content and SDG's awareness	52	6	39	97
RQ1-2	Poor SDG's understanding	3	0	2	5
Affective factors/ learner experience		68	8	30	75
RQ2-1	Confidence and reduced anxiety	27	3	20	50
RQ2-2	Motivation/ willingness to speak	8	0	8	20
RQ2-3	Personal challenge/Low level of English	10	1	9	22
RQ2-4	Fun and overall enjoyment	18	2	14	35
RQ2-5	Frustration/Stress	5	0	5	12
Potential benefits of AI		65	8	34	85
RQ2-6	Utility and Potential of AI tools	65	8	34	85
Concerns and risks of AI		36	4	20	50
RQ2-7	Overreliance or misuse of AI	9	1	7	17
RQ2-8	Teacher replacement	6	0	6	15
RQ2-9	Balanced use of AI tools	12	1	9	22
RQ2-10	Privacy/Data concerns	6	0	5	12
RQ2-11	Unreliability of AI responses	3	0	3	7
	TOTAL	**224**			

Source: Own

Content Awareness and Knowledge

While *content and SDG's awareness* (52 mentions) received several mentions, a small proportion of participants mentioned *poor SDG's understanding* (3 mentions). Considering the target participants of this study, findings may suggest that students had a better understanding of the content after participating in the study.

Overall, the responses collected indicated that 39 out of 42 participants perceived an improvement in their awareness of the SDGs, suggesting increased familiarity with SDG-related concepts after interacting with the chatbot: "*I've learned what they are and what they mean.*" (Participant 1). Indeed, some participants highlighted their limited familiarity with the SDGs prior to engaging with GenAI-supported activities, reflecting their perceptions of greater understanding and confidence when discussing these topics: "*Before, I practically didn't know what the SDGs were... And now I know how to talk about them.*" (Participant 17) and "*Now it makes perfect sense, and I know what they are.*" (Participant 34).

A small number of participants also reflected a shift from shallow to deeper understanding of the SDGs, arguing that "*Before... they were little squares with images... But now I understand them much better.*" (Participant 40) or "*The SDGs are missions for 2030 that have to be fulfilled*" (Participant 14). Following this, other comments referred to the activities carried out during the intervention: "*It's like we've put them into practice, not just seen them"* (Participant 33) "*We have seen the SDGs reflected in all the activities*" (Participant 4). These may have helped students to better understand global issues in a more contextualised and practical way.

In addition, several participants outlined developing greater awareness of environmental issues and the human footprint, "*I have learned that you have to recycle and that you must not pollute.*" (Participant 22) or "*Our actions affect the environment*" (Participant 31). Specific or more complex global issues, such as diversity and pollution, were also highlighted by some participants, reflecting their awareness and engagement with other topics: "*I have learned that diversity is super important and that it is present everywhere*" (Participant 16), "*Also, if the problem of the Pacific garbage islands (Great Pacific Garbage Bag) is not solved, we will end up in a terrible situation*" (Participant 14). Thus, participants indicated gaining insights on SDGs and global issues, increasing their awareness of their importance.

Nonetheless, within this exploratory pilot study, some participants also perceived a need for additional practice to accommodate and consolidate their understanding of the new content: *"It's still not entirely clear to me"* (Participant 32) and *"I haven't delved very deep..."* (Participant 38), emphasizing the need for further practice: *"You have to practice more"* (Participant 29). This suggested that among all the positive comments, a minority of students also reported only partial or limited understanding of the topics addressed in the study.

Affective Factors / Learner Experience

The most salient subcategory was *confidence and reduced anxiety* (27 mentions), followed by *fun and overall enjoyment* (18 mentions). In contrast, *motivation/willingness to speak* (8 mentions) and *personal challenge/low level of English* (10 mentions), appeared less frequently *frustration/stress* (5 mentions), highlighted participants insights on perceived learning barriers. Results indicated that despite participants often associated chatbot interactions with enjoyment and engagement

in the learning process, some students also reported frustration and cognitive overload.

Most participants expressed greater confidence and willingness to speak in English when working with the chatbot. For instance, one commented: "*The chatbot has encouraged me and helped me when it comes to speaking.*" (Participant 38), while another shared, "*I feel more energized to speak and that's hard.*" (Participant 35). Indeed, one participant expressed a desire to continue practicing English with the chatbot: "*Now I want to continue practicing…*" (Participant 37). However, several participants identified language proficiency as a learning barrier, suggesting a relationship between perceived personal difficulties and their ability to communicate effectively: "*I have had a hard time speaking English.*" (Participant 34), "*I couldn't get the words that I wanted to say.*" (Participant 33), and "*Sometimes he does everything in very English way, so it's difficult.*" (Participant 35). These comments might indicate that, despite the overall positive attitudes towards speaking practice, some learners still experienced challenges related to vocabulary, language production, and comprehension when working with GenAI.

Many participants expressed positive feelings and enjoyment toward the activities and the chatbot interaction, describing the experience as enjoyable: "*It has been fun.*" (Participant 29), "*I have had a great time!*" (Participant 18). Participants also expressed interest in engaging in similar activities in the future, as reflected in the comment: "*I wish we could do more activities like this*" (Participant 29). On the other hand, although less frequently, some students also reported feeling overwhelmed during their interactions with the chatbot, *"It overwhelmed me, and in the end, it was frustrating"* (Participant 16) and *"It's a bit selfish (ChatGPT)... He doesn't stop talking... and of course, I lost the thread (of the conversation)"* (Participant



17). These findings might suggest that, while chatbot interactions were generally associated with enjoyment and engagement in the learning process, they could also be associated with negative experiences for some students, leading to frustration and cognitive overload. However, further research with larger samples is needed to explore these potential effects in greater detail.

Potential Benefits of AI

Utility and Potential of AI Tools (65 mentions) received the highest number of references, showing that GenAI and chatbots were generally perceived as useful and versatile educational tools by students. Participants highlighted the potential of AIs to support speaking, particularly in areas such as pronunciation, fluency, understanding, and confidence. One participant said: *"Because they (chatbots) help you with pronunciation, fluency, and confidence."* (Participant 13), while another commented, *"They can help you with pronunciation, speaking, writing..."* (Participant 28). These responses suggested that, within this exploratory study, participants globally perceived AI tools as scaffolding resources that could support the development of different language skills.

Many students valued this supportive role and described GenAI tools as resembling a teacher

or personal tutor, as reflected in the comments: *"They help you like a teacher"* (Participant 2), *"He reminds me of a teacher"* (Participant 40), and *"It can serve as just another teacher"* (Participant 31). Beyond language skills development, students also appreciated the chatbot for providing feedback, explanations, and personalised guidance: *"It always gives you feedback and helps you"* (Participant 6) and *"If you don't know an exercise, you can ask him what it means and he will explain it to you"* (Participant 25). These responses might reflect participants' positive perceptions towards the chatbot's ability to provide personalised guidance and individualised support.

At the same time, the motivational impact GenAI had on participants, was also mentioned, describing it as fun, multimodal, and engaging: *"It can open up the range of possibilities to do a lot of fun things"* (Participant 21), *"I think that in this way, classes would be more varied, entertaining, and motivating."* (Participant 5), and *"They (chatbots) are quite good because they help you to learn some English."* (Participant 36). Indeed, several participants further expressed an intention to continue using these tools in the future, reflecting their perceived value as learning resources *"I am sure I will continue to use it in the future"* (Participant 16) and *"I aim to continue using the chatbot at home, as I think it can help me to improve my level"* (Participant 13). Overall, these findings might indicate that, within this group of learners, GenAI tools were perceived as practical and applicable beyond the classroom, reflecting generally positive attitudes towards their integration into language learning contexts.

Concerns and Risks of AI

Concerns and risks towards the use of GenAI were mentioned among participants too. Different issues were also reported including *balanced use of AI tools* (12 mentions), *overreliance or misuse of AI* (6 mentions) and *teacher replacement* (6 mentions). Less frequent concerns mention *privacy/data concerns* (6 mentions) and *unreliability of AI responses* (3 mentions). This showed that participants were also aware of the potential issues underlying the use of GenAI.

Most students emphasised the importance of adopting a *balanced use of AI tools* (12 mentions), calling for moderate and responsible use. For example, one student stated: *"I see them more as an activity for once every two weeks, to reinforce what we have already seen (class content)"* (Participant 22), while another noted that AI could not replace human communication: *"I wouldn't use them in every class because you also have to practice communicating with people"* (Participant 14). Going a step further, some participants highlighted the need to adopt a more ethical and conscious use of these tools: *"It's okay but up to a certain limit, and ethically"* (Participant 19), while another remarked, *"I think there must be a balance"* (Participant 14). This might indicate that, despite recognising its possibilities, some participants also acknowledged the importance of maintaining a balance.

Concerns about *overreliance or misuse of AI* (6 mentions) were also expressed, highliting that using GenAI in "pilot mode" could lead to overdependence or reduced engagement with learning tasks:

Varios participantes expresaron su intención de seguir utilizando estas herramientas en el futuro, lo que refleja el valor que les atribuyen como recursos de aprendizaje:

"Some students start using it to do homework, and end up using it for everything... I think that's too much" (Participant 36), outlining that replacing students' own responsibilities with GenAI, such as doing homework, could reduce cognitive capacities, as reflected in the comment: "*In the end you don't work, and AI is the one who works instead*" (Participant 36). Other comments raised questions about the reliability of the information provided by Generative AI tools: "*You believe on it because you think that everything it tells you is right, and it can actually give you wrong information*" (Participant 4). This reflected participants' awareness that AI-generated responses may not always be accurate or reliable, acknowledging both sides of AI, as seen in: *"AI has advantages and disadvantages"* (Participant 29).

Moreover, students referred to the role of the teacher and expressed their opinions on GenAI as a potential *teacher replacement* (6 mentions). Although some participants suggested that AI could adopt certain teaching roles: *"In other words, they can take on the role of a teacher"* (Participant 21), most viewed AI as a complement rather than a replacement for teachers, with comments such as: *"I don't think it can replace the teacher, but it can help her"* (Participant 21), *"The chatbot says things that sound artificial... They are not like a teacher, who would tell me that thing in many different ways"* (Participant 27). These comments suggested that participants continued to value the role of human teachers, particularly in relation to human interaction and the teacher-student bond.

Students referred to the role of the teacher and expressed their opinions on GenAI as a potential teacher replacement

Other less frequently mentioned concerns included *privacy and data concerns* (6 mentions), as well as the *unreliability of AI-generated responses* (3 mentions). Some students noted that AI could make mistakes: *"It can make mistakes"* (Participant 37), which might reflect their awareness of the quality of AI-generated output, while others commented on the over-humanisation of these systems, pointing at the risks of over-sharing personal information with them: *"The bad part is that he could be simulating a person without being one and so, he could take advantage of you"* (Participant 14). On the other hand, some participants also expressed mixed feelings regarding personal data collection and storage by these systems, outlining that these practices could pose potential risks: *"Working in English with them is good, but if we tell them too many things, the robots learn too much and keep the information to themselves"* (Participant 10), *"I don't like it very much because you can create a fake account and you don't really know who is behind it."* (Participant 7), and *"You have to be careful, because if you tell them something personal, it could be shared on a website without you noticing."* (Participant 5). Overall, these findings highlight participants' concerns about privacy and the handling of personal information when using AI tools.

Additionally, the human-like features of GenAI were perceived as a double-edged sword and were not perceived as either human-like or natural in their interaction: *"That 'B-side' is the fact that it's not a real person, even though it has a lot of human-like features, like interaction"* (Participant 14). Such findings suggest that participants in this pilot study generally adopted a critical and balanced approach to GenAI, yet further research with larger samples would be needed to explore whether these perceptions extend to other groups.

3.2 Discussion

RQ1. How do GenAI-mediated and sustainability-oriented activities shape students' awareness and understanding of the SDGs and global issues in the EFL classroom?

Findings from this exploratory, perception-based study suggest that sustainability-oriented activities supported by ChatGPT were perceived as facilitating exposure to SDG-related concepts through contextualised and meaningful learning experiences (Uğraş et al., 2024). Participants generally reported acquiring greater familiarity with sustainability-related concepts and a more nuanced understanding of global issues after completing the intervention, which may be associated with GenAI's targeted and personalised learning opportunities (Divya & Mirza, 2024).

Thus, the open and interactive nature of these tools can bridge language learning with broader social, environmental, and ethical dimensions, potentially providing learners with greater insights into the diverse global issues affecting our modern society while raising their awareness (Dai & Hua, 2025). GenAI-mediated interaction was generally perceived as an enriching learning opportunity among this study participants, which enabled them to explore and reflect on SDGrelated content through meaningful and adapted learning experiences. As a result of this, students may have developed a deeper understanding of the SDGs, global issues, and their potential impact on their own lives as reported by some participants in the interviews. These findings are consistent with Bauer et al. (2025), who argue that sustainability-based EFL activities mediated by GenAI may promote language development while encouraging students to reflect on global issues, potentially supporting the reconstruction and refinement of their existing knowledge structures.

ChatGPT's ability to provide immediate feedback and scaffolding supported students' broader and first-hand exploration of other SDG-related concepts (Flores-Vivar & García-Peñalvo, 2023), encouraging them to reflect on their meaning and social relevance beyond the immediate classroom context (Zlateva et al., 2023). Such interactions may have encouraged learners to engage with these issues in a more active and critical way while cultivating 21st century skills (JiménezGarcía et al., 2025). This interpretation is supported by the quantitative findings, in which most participants acknowledged the value of learning about the SDGs, and was further reinforced by students' comments in the individual interviews, indicating a perceived increase in awareness, although further research is needed to examine these perceptions in greater depth.

Nevertheless, as observed in the quantitative analysis from Q1, Q2, and Q3, students' responses varied, with a small number of participants demonstrating only partial understanding of SDGrelated issues (Bond et al., 2024). This was further explored in the interviews, where some participants indicated a need for additional practice to consolidate their understanding and develop a stronger foundation on these global goals. Therefore, these findings might suggest that the effective integration of SDG-oriented activities supported by GenAI requires sustained pedagogical support, adequate educational resources, and the development of students' critical and digital literacy skills to maximise their learning potential and ensure an ethical and responsible use of these technologies (Fathi et al., 2024; Saúde et al., 2024).

RQ 2. How does AI-mediated spoken interaction influence students' affective experiences and personal engagement in English learning contexts?

Most participants in this study generally perceived the GenAI-mediated learning

experience as quite engaging, reporting a slight increase in motivation, confidence, reduced anxiety, and greater enjoyment, all of which are key factors for effective communication in English (AlTwijri & Alghizzi, 2024; Zhou, 2025). However, no relevant gains in perceptions were observed with regard to perceived improvements in communicative competence, which might reflect the short-term nature of the intervention in this exploratory study and the need for students to engage in more sustained practice over a longer period.

GenAI-mediated interactions can support the creation of low-stakes learning environments (Ferk Savec & Jedrinović, 2025), which can enhance students' oral communication by lowering their "affective filter" and fostering a safe learning space that reduces speaking anxiety (Altares-López et al., 2024). Indeed, this was observed in the quantitative analysis results from Q5 and later in the interviews, which outlined learners' perceptions of increased confidence and autonomy after working with the chatbot (Fathi et al., 2024).

Through the creation of a safe and welcoming learning environment, GenAI may encourage students to engage with language and experiment, potentially supporting their Willingness to Communicate (WTC) (Belda-Medina & Calvo-Ferrer, 2022). This was seen in results from Q6 and students' comments from the interviews, which globally perceived AI-interaction as a motivator and fostering students' participation in class. Overall, GenAI-mediated interactions can facilitate a more constructive and experiential learning process, which may encourage reflection on language use rather than relying solely on corrective feedback, thereby supporting active learning (Polakova & Klimova, 2024).



However, participants showed differing opinions with regard to chatbot interaction. While some participants reported positive affective outcomes such as enjoyment, increased willingness to communicate, and a desire to continue practicing English with these tools, other learners experienced frustration, stress, and feelings of being overwhelmed (Grájeda et al., 2023), which may be related to linguistic challenges, difficulties navigating the interaction, or other individual factors. This suggests that learners' experiences with GenAI may vary depending on personal factors, including linguistic confidence, familiarity with technology, and individual learning needs (Altares-López et al., 2024). This variability was also observed in the quantitative analysis of Q4 and Q5, where not all participants reported comparable levels of perceived benefit from the intervention.

Despite this technology's capacity to generate personalised content (Aluko et al., 2026), provide immediate feedback, scaffolding, and simulate authentic communicative situations in a "humanlike" form (Dennis, 2024; Fathi et al., 2024; Tai & Chen, 2024), it also involves certain limitations, including information bias, misinformation, and incoherences (Grájeda et al., 2023). Following this, student' reflections pointed to the importance of preserving the pedagogical, emotional, and ethical dimensions of human instruction in AI-enhanced learning environments. Indeed, many reinforced the role of

teachers, outlining that rather than replacing them, GenAI should be integrated alongside teacher guidance, with educators supporting students in navigating, questioning, and critically evaluating AI-generated information (Shikun et al., 2024).

In line with this, the need for balanced and ethical use of AI emerged as a major theme, with learners emphasizing that AI should complement, not replace, traditional instruction (Bautista Saucedo & Guzmán Olguín, 2025). Participants in this study expressed concerns that excessive reliance on GenAI, particularly for completing homework, could reduce opportunities for independent engagement with learning tasks and reflection on their own learning processes (Altares-López et al., 2024). Other concerns regarding privacy, data security, and reliability were also identified (Bauer et al., 2025; Divya & Mirza, 2024), although these were perceived as less prominent, reflecting participants' awareness of AI's potential risks. All in all, these findings align with prior literature on the importance of developing digital literacy among future generations (Akpınar et al., 2025), providing them with foundational knowledge on how to interact with these machines ethically, critically, and responsibly (Creely & Blannin, 2025).

4. Conclusions

This paper reports the second phase of a larger research project on GenAI in EFL learning among a group of 42 sixth-grade primary students at the A1 level. While the first phase explored the potential impact of GenAI on oral skills, this phase broadens the scope by focusing on two complementary dimensions: affective factors awareness of the SDGs, in order to examine how GenAI may contribute to these. This exploratory, perception-based study had an overall duration of eight months, with a 4–5-week classroom intervention during which students had to complete a series of GenAI-mediated activities based on the Cambridge A1 Speaking Test tasks incorporating elements of the SDGs.

In this study, both quantitative and qualitative data were collected. The questionnaire responses were analysed using descriptive statistics. These findings were further explored through semistructured interviews, in which students were asked to respond to three questions, offering a more comprehensive understanding of their perceptions. The interviews were categorised inductively into four main groups: (1) *Content Awareness and Knowledge*, (2) *Affective Factors/Learner Experience*, (3) *Potential Benefits of AI*, and (4) *Concerns and Risks of AI*. All this data provided a descriptive account of students' experiences and perceptions within this specific educational context. Nonetheless, further studies are required to examine whether these findings can be replicated in other educational contexts and to enable meaningful comparisons across settings.

Findings suggest that GenAI-mediated, sustainability-oriented activities were perceived to support students' awareness of the SDGs in an interactive and meaningful way, promoting critical reflection. ChatGPT was reported to offer insights into different global issues, functioning as a personalised learning tool that participants perceived as helping them acquire knowledge of these issues beyond superficial recognition. However, not all students demonstrated the same level of understanding of these topics. Some limitations of GenAI were also outlined by participants, including inaccuracies and biased outputs, reinforcing the importance of human judgment and critical thinking when using such tools.

Regarding affective experiences, GenAI-mediated interaction was perceived by many participants as a potential key element contributing to positive learning experiences when speaking in English, including increased confidence, reduced anxiety, enjoyment, and motivation. Although no relevant gains in English communication were perceived, possibly due to the limited duration of the intervention, students' perceptions suggest that ChatGPT may have supported their participation, Willingness to Communicate (WTC), and autonomy through personalised, engaging, and interactive tasks, potentially contributing to a reduction in learners' affective filter. Nevertheless, some learners experienced frustration, stress, or cognitive overload, suggesting that the effective use of these tools requires appropriate training and support, as using GenAI effectively involves multiple competencies, including digital literacy and communicative skills.

Additionally, GenAI's human-like form was perceived as a supportive tutor-like tool, offering feedback, scaffolding, and opportunities for practice and reflection in a meaningful and interactive way. Participants considered these features beneficial for language learning, as they encouraged self-reflection and autonomous learning. Nonetheless, some participants in this study emphasised the importance of the teacher's role as a guide and mediator, reinforcing their continued value, particularly in GenAI-mediated learning contexts. Lastly, other concerns also arised, regarding overreliance, ethical use, privacy, and the reliability of AI, reflecting participants' critical awareness of its limitations and the challenges associated with its use in educational contexts. These findings indicate that future generations will potentially require multiple skills, among which digital literacy particularly stands out as essential for successfully navigating and coping with the increasing demands of the 21st century.

Other concerns also arised, regarding overreliance, ethical use, privacy, and the reliability of AI, reflecting participants' critical awareness of its limitations and the challenges associated with its use in educational contexts.

All in all, the results extracted in this study provide tentative evidence that, within the scope of this study, many participants perceived GenAI as a useful complementary pedagogical tool in the EFL classroom. Its integration was perceived as having the potential to support students' development as ethical and engaged global citizens while promoting digital literacy, critical thinking, and responsible AI competencies. However, given the exploratory nature of the study, these findings should not be interpreted as demonstrating definitive educational effects. Rather, they offer insights into learners' experiences of integrating GenAI into language learning and SDG awareness. Accordingly, further research with larger and more diverse samples, longitudinal designs, and inferential analyses is needed to examine the generalisability of these findings and explore the potential relationships between GenAI, affective factors, and global issues awareness in EFL.

4.1 Limitations

Several limitations should be acknowledged. First, the study was conducted on a relatively small scale, with a limited number of participants (N=42) from the same school and educational context, which may affect the generalizability of the findings across other

learner populations, countries, or proficiency levels. Second, the short duration of the intervention, which lasted less than a month, allowed observation only of immediate affective responses, leaving long-term retention and skill transfer unexplored. Moreover, the findings were based primarily on participants' self-reported perceptions, providing a descriptive account of their experiences rather than evidence of causal educational effects. Additionally, although the questionnaire underwent expert review to ensure content validity, further evidence of construct validity could not be obtained due to the limited sample size constraints. Future research should therefore replicate this study with larger samples and employ additional validation procedures to strengthen the psychometric properties of the instrument. Finally, technical and legal constraints should also be acknowledged: learners could not use the tablets independently, and interactions with the chatbot always required adult supervision, as children were not permitted to use digital devices freely. Consequently, all students had to carry out the activities within the same space. These factors may have limited the fluidity and naturalness of the GenAI-mediated practice, as students had relatively limited opportunities for one-to-one interaction with ChatGPT.

4.2 Future research

GenAI-mediated interventions in EFL teaching and learning should be investigated further to determine their impact on multiple dimensions of student learning. Longer interventions (e.g., a semester or full academic year) would allow for the assessment of sustained linguistic and affective gains. Research on hybrid models, including one-to-one interactions with chatbots or home practice, could provide valuable insights into actual individual skill transfer and the improvement of English language proficiency. Additionally, expanding the intervention to larger samples, different countries, and various proficiency levels would help determine its broader applicability and effectiveness.

Funding

This work is funded by the Conselleria de Educación, Cultura, Universidades y Empleo of the Generalitat Valenciana (Spain) as part of the R&D&i project *"Artificial Intelligence in Language Learning and Teacher Education"* (CIGE/2023/166) for the years 2024 and 2025.

Acknowledgment

This work is part of the R&D&i project "Artificial Intelligence in Language Learning and Teacher Education" (CIGE/2023/166), funded by the Conselleria de Educación, Cultura, Universidades y Empleo of the Generalitat Valenciana (Spain) for the years 2024 and 2025.

Conflict of interests

The author declares no conflict of interest. This paper adheres to ethical standards and has not been previously published. There are no conflicts of interest related to the study.

Ethical implications

This study was not submitted to an ethics committee; however, all ethical principles governing research involving underage participants were strictly followed. The instruments used in this pilot project were reviewed by a panel of 14 experts from various universities and institutions to ensure feasibility and content validity. Minor improvements were implemented based on their feedback prior to data collection. Parental

consent was obtained for all participants, and confidentiality and anonymity were maintained throughout the study.

Authors' contribution

As the sole author, the researcher fulfilled all authorship criteria and was responsible for the study design, methodology development, data collection and analysis, as well as drafting, reviewing, and approving the final version of the manuscript for publication.

Declaration of generative AI-assisted technologies in the writing process

The author used Grammarly to improve grammar, accuracy, and fluency. The author subsequently reviewed and edited the content and takes full responsibility for the final version of the publication.

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