

# Self-regulation strategies in foreign language virtual exchanges

COPELIA MATEO-GUILLÉN (CORRESPONDING AUTHOR)

*University of Alicante, Spain*

MARTA DEL POZO-BEAMUD

*University of Castilla-La Mancha, Spain*

MARTA GONZÁLEZ LLORET

*University of Hawaii Manoa, USA*

Received: 27/3/2025 / Accepted: 21/7/2025

DOI: <https://doi.org/10.30827/portalin.viXIII.33328>

ISSN paper edition: 1697-7467, ISSN digital edition: 2695-8244

**ABSTRACT:** Despite the growing popularity of virtual exchanges (VEs) for their potential for collaborative work in all areas of education, not much research exists about their use for the development of self-regulation strategies, which are essential for language learning. To address this gap, this exploratory study investigates which self-regulation strategies higher education students employ when interacting virtually in EFL with peers from another university. The participants of the study consisted of 45 students from two universities in Spain enrolled in content and language integrated learning courses (CLIL) with similar syllabi. Starting from existing criteria for self-regulation previously proposed for face-to-face communication, four weeks of interactions via Zoom were analysed. In addition, pre and post questionnaires were administered to collect qualitative data on students' reflections on the VE and its effect on their learning process. The results of the study illustrate the potential of VEs to support virtual task-oriented content and language learning while boosting the use of self-regulated strategies in oral communication. The data also showed additional types of self-regulation not found in face-to-face interaction which should be considered in future research.

**Keywords:** technology-mediated L2 interactions; self-regulation strategies; Virtual Exchanges; online self-regulated learning; CLIL.

## Estrategias de autorregulación en intercambios virtuales de lenguas extranjeras

**RESUMEN:** A pesar de la creciente popularidad de los intercambios virtuales por su potencial para el trabajo colaborativo en educación, se ha investigado poco sobre su uso en el desarrollo de estrategias de autorregulación, esenciales para aprender lenguas. Con el fin de abordar esta carencia, el presente estudio investiga qué estrategias de autorregulación emplean los estudiantes de educación superior al interactuar virtualmente en inglés como lengua extranjera con compañeros de otra universidad. Los participantes del estudio fueron 45 estudiantes de dos universidades españolas matriculados en cursos de Aprendizaje Integrado de Contenidos y Lengua Extranjera (AICLE) con programas similares. Partiendo de criterios existentes sobre autorregulación propuestos previamente para la comunicación presencial, se analizaron cuatro semanas de interacciones a través de Zoom. Además, se administraron pre

and post cuestionarios para recoger datos cualitativos sobre las reflexiones de los estudiantes respecto al intercambio virtual y su impacto en el proceso de aprendizaje. Los resultados del estudio evidencian el potencial de los intercambios virtuales para apoyar el aprendizaje virtual orientado a tareas tanto de contenido como de lengua, al tiempo que fomentan el uso de estrategias de autorregulación en la comunicación oral. Asimismo, los datos revelaron tipos adicionales de autorregulación no observados en interacciones presenciales, los cuales deberían ser considerados en futuras investigaciones.

**Palabras clave:** interacciones L2 mediadas por tecnología; estrategias de autorregulación; intercambios virtuales; aprendizaje autorregulado en línea; AICLE

## 1. INTRODUCTION

Technological advancements have gone beyond traditional computers and laptops, extending to devices such as tablets and smartphones, which have broken the barriers of time and space, allowing learners to access language learning materials anytime and anywhere (Li, 2022; O'Dowd, 2021a). These advancements have prompted a shift in language learning methodologies that now aim to address global challenges and the need for digitally competent global citizens. This has led to educational programs that support distance and ubiquitous learning, emphasising task-oriented and authentic learning experiences (Derakhshan & Zhang, 2024; O'Dowd, 2021b; Qi & Derakhshan, 2025). Virtual Exchanges (VE) have emerged as one such methodology that enables language learners to collaborate and interact online in the target language, regardless of their geographical location or cultural context (Jabbari & Eslami, 2023; O'Dowd, 2018a). However, the flexibility offered by VEs does not guarantee an effective use of the digital tools; it is essential to integrate well-developed tasks that facilitate collaboration and promote the types of interaction that lead to language learning (third author, 2020).

As defined by Dörnyei (2005), self-regulation refers to “the degree to which individuals are active participants in their own learning” (p.191). It is considered a complex process in which learners must incorporate cognitive, metacognitive, motivational, behavioural, and environmental factors in their learning processes to achieve academic success.

While the question of identifying the most suitable strategies for effective individual learning remains unresolved, the importance of self-regulation as an essential aspect of strategy use is widely recognized. Scholars assume that self-regulation capacity plays an essential part in the learning process when students develop self-regulatory mechanisms (Zheng et al., 2023). Derakhshan and Bai (2025) emphasize the crucial role of self-regulation strategies in language learning, particularly among EFL learners. Their study reveals a strong link between self-regulation techniques and successful language development.

While the existing research on the utilisation of strategies within VEs is not extensive, a limited number of studies have shed light on valuable strategies commonly employed by students participating in this digital educational activity. Previous studies showed that during VEs learners employ modification devices, such as comprehension, confirmation and clarification checks, requests for help, self-corrections, and self-repairs in order to help communication (Beaven & Helm, 2020; Lee, 2016;) and the use of these strategies has a positive impact on students' comprehension and language competence (Chi & Loi, 2020; Hilliker, 2022; Zheng et al., 2023). Moreover, among all strategies, requests for help, clarification checks,

self-correction, and L1 use appear to be the most used strategies amongst undergraduate language students in the United States learning Spanish (Drixler, 2022; Lee, 2002).

### 1.1. Self-regulation Strategies for Second Language Learning

Strategies influence an individual's capacity and contribute to their overall success in the learning process (Oxford, 2017), including language learning. In particular, when students use strategies that align with their learning style and the specific language learning task at hand, these strategies become valuable tools for active, purposeful, and self-regulated learning (Ruelens, 2019). Currently, most scholarly work on strategies adopts a psychological perspective on learning that emphasises the individual's engagement in personal processes to help learners become aware of, and engage in, their own learning process. Such engagement plays a crucial role in the efficacy and outcomes of second or foreign language learning (Oxford & Amerstorfer, 2018; Cohen, 2014; Rubin et al., 2023; Zimmerman, 2008). Moreover, previous studies show a correlation between strategy use and foreign language learning (Aubrey & Philpott, 2023; Iraheta, 2024; Wang et al., 2024). Therefore, self-regulation is associated with the acquisition of knowledge, skills, and abilities (Dörnyei, 2005; Zhang et al., 2024). Furthermore, students can benefit from possessing a repertoire of strategies to facilitate lifelong language learning as well as being capable of adapting and developing new strategies to meet their evolving needs, such as paraphrasing, predicting, or borrowing (Martínez-Adrián et al., 2019; Poulisse, 1990; Purdie & Oliver, 1999). The integration of these strategies within language classrooms fosters linguistic output and ensures more successful communicative interactions among students, leading to language learning (O'Dowd et al., 2020; Zhou et al., 2024). These strategies also enable learners to mitigate negative affective factors such as anxiety or stress associated with acquiring a new language (Chen & Sevilla-Pavón, 2023; Szyszka, 2017). Empowering students with the opportunity to cultivate learning strategies and take control of their learning process enables them to establish realistic and attainable objectives while utilising their own cognitive resources and strategies to achieve successful second language acquisition (Hedge, 2000).

One of the most frequently researched learning strategies is self-regulation. Possibly, because self-regulation plays an essential part in the learning process since it involves a conscious process of making decisions in order to improve students' language learning skills (Oxford, 2017). However, L2 self-regulation research has focused mainly on writing, reading and vocabulary learning, while speaking and listening are under-researched areas (Bowen & Thomas, 2022). Recent self-regulation research suggests that the training of self-regulatory skills can improve students' language strategy use (e.g., Sun, 2022), providing further evidence that speaking strategy use and self-regulation may be interrelated.

In the evolving context of digitally mediated education, self-regulation is an essential aspect of online learning because learning environments and contexts require self-involvement, self-motivation, and self-engagement as they have to self-direct their own learning process (Eggers et al., 2024).

## 1.2. Virtual Exchanges for Language Education

VEs, defined by Dooly and Vinagre (2022) as “process of communicating and collaboratively learning with peers from different locations through the use of technology” (p.393) have changed how second/foreign/other language learners (L2) teaching and learning are perceived since they allow students to engage in communication in a freer form (compared to traditional classroom settings) which promotes learners’ autonomy, digital literacy skills, and intercultural competence (Dooly & Sadler, 2019; Gutiérrez & O’Dowd, 2021; Martin, 2023). Furthermore, VEs not only provide a meaningful and authentic context, but they encourage learners to take ownership of their learning process and foster a deeper understanding of different cultures and perspectives (Giralt et al., 2022; Godwin-Jones, 2021; Helm & Beaven, 2020; McCollum, 2020). In addition, VEs offer a highly flexible language teaching methodology, offering synchronous and asynchronous modes of interaction. This flexibility, in turn, facilitates social engagement and serves as a valuable alternative to physical mobility, particularly for individuals facing constraints due to disability and/or economic limitations (Aissaoui, 2022; Dooly & Vinagre, 2021; Miras et al., 2023).

In recent years, there has been a dramatic increase in the popularity of VEs to foster language learning through communication activities among language learners (Cappellini & Combe, 2022; Potolia & Derivry-Plard, 2023), with a large number of applications and platforms dedicated to supporting online communication and collaborative work. A notable example is the European Commission’s Etwinning program (or European School Education Platform App <https://school-education.ec.europa.eu/en>) designed to facilitate collaboration between European schools and universities for educational projects, including for teacher professional development (Gillera et al., 2019). Additional initiatives include UNICollaboration, a cross-disciplinary professional organisation for telecollaboration and virtual exchanges in Higher Education (<https://www.unicollaboration.org>), the International Virtual Exchange Project (<https://iveproject.org/>), the TILA (Telecollaboration for Intercultural Acquisition) project (<http://www.tilaproject.eu/moodle/>), and well-known platforms for K-12 such as Epals (<https://www.epals.com/#/connections>) and Go Pangea (<https://app.gopangea.org/>).

Given the context of the present study, where the participants are future language educators, it is relevant to mention the evolving demands placed upon educators to be critical, knowledgeable, and proficient in the use of technology (Jones, 2023; Loranc et al., 2021). Consequently, integrating VEs into teacher education programs provides practical exposure to a variety of digital tools and online practices. As stated by O’Dowd: “VE will have an important role to play as educators strive to develop active, informed, and responsible citizens who are tolerant of difference and who are actively engaged in political and democratic processes” (O’Dowd, 2018a, p. 21). Thus, VEs represent a valuable pedagogical tool in the professional development of future language teachers.

## 1.3. CLIL and Virtual Exchanges

Content and Language Integrated Learning (CLIL) is an educational approach that integrates the teaching of content with the learning of a second language. CLIL has exhibited notable success among educators, yielding positive outcomes in terms of motivation,

autonomy, linguistic proficiency, intercultural awareness, and critical thinking skills (Coyle et al., 2010; Lopes, 2020; Lorenzo, 2018; Martínez-Agudo, 2019). Within CLIL, VEs have emerged as a suitable pedagogical approach because they enable simultaneous and organic acquisition of both language and subject matter through negotiated interactions among language learners who also need to assume agency in their own learning process (Cañado, 2017; Marsh, 2013). It is important that VEs are properly executed to align with CLIL goals such as the incorporation of multiple focal points, the use of multimodality, and active learning. In addition, VEs need to include elements such as language authenticity, communication, multiculturalism, multilingualism, and internalisation, which play pivotal roles in both CLIL and VEs (Dooley & Vinagre 2022; O'Dowd, 2018b;). Even when research on VEs is abundant, there are few reports on the use of self-regulation strategies, and especially in CLIL contexts.

## 2. THE PRESENT STUDY

Considering the existing body of knowledge and the paucity of research exploring the specific self-regulatory strategies employed by students within a VE environment, the present exploratory study examines the extent to which students engage in self-regulation during VEs, as well as the types of self-regulating techniques employed by students. In addition, given that the study was conducted in a CLIL course, it also investigates the impact of the VE on content acquisition. The primary objective of this study is therefore to answer the following research questions:

RQ1: What specific strategies do students employ while engaged in VEs to negotiate content in the L2 within a CLIL context?

RQ2: To what extent do VEs facilitate content learning within a CLIL framework?

RQ3: What are learners' perceptions and perspectives regarding the use of VEs in a CLIL course?

### 2.1 Participants and Context of the Study

The participants in this study consisted of university students enrolled in a bachelor's degree in primary education, ranging in age from 18 to 25 years old, who were enrolled in a course titled "Content and Language Integrated Learning" (CLIL) at the University of Alicante and the University Castilla La Mancha, two public universities in Spain. The students at both institutions shared the same L1 (Spanish) and L2 (English), and some students were trilingual (L1s Valencian and Spanish, and L2 English). A total of 45 students were enrolled in the course. Participants were required to have a minimum English proficiency level of B2 (Common European Framework of Reference, CEFR), as a prerequisite for enrolling in the course.

The VE project lasted four weeks, and it was conducted during class time as part of the course curriculum. Students were instructed to collaborate using English as the primary language of interaction. Throughout the course, students from both universities were tasked with: 1) selecting a topic from the United Nations' World Bank's 2023 for *Sustainable Development Goals (SDGs) and Agenda 2030* (<https://datatopics.worldbank.org/sdgatlas/>), 2)

conducting research, and 3) designing their own CLIL materials for primary school students based on a provided template aligned with CLIL principles. For the VE, the participants were divided into nine groups, each comprising five students from both universities. A total of 36 interactions by 45 students were produced, with each group focusing on an SDG topic (see Table 1).

**Table 1.** *Participants and topic selection*

GROUP	INSTITUTION	TOPIC
G1	3 from UA & 2 from UCLM	Clean water and sanitation
G2	2 from UA & 3 from UCLM	Life below water
G3	2 from UA & 3 from UCLM	Gender equality
G4	3 from UA & 2 from UCLM	Sustainable cities and communities
G5	3 from UA & 2 from UCLM	Life below water
G6	2 from UA & 3 from UCLM	Sustainable cities and communities
G7	3 from UA & 2 from UCLM	Affordable and clean energy
G8	3 from UA & 2 from UCLM	Sustainable cities and communities
G9	3 from UA & 2 from UCLM	Life below water

**2.2. The VE Project**

At the start of the VE project, each CLIL teacher (first and second authors of this study) initiated the topic by introducing the 17th SDGs and the *Agenda 2030* to their respective students. This introductory phase consisted of a PowerPoint presentation, as well as the use of the official UN presentation video and website. Afterwards, the teachers organised a series of four synchronous meetings conducted via the videoconferencing platform Zoom. These meetings took place within the physical classroom setting, using Zoom’s breakout rooms to enable students from both universities to collaborate virtually in groups to design their CLIL activities.

In session 1, the groups selected a topic from the provided SDG PowerPoint and discussed its integration with the content outlined in the official Spanish curriculum of primary education. They determined their teaching objectives, content, and assessment criteria, documenting their decisions in a template provided by the teacher. Moving on to session 2, the groups read and discussed the CLIL framework and developed the overall content of their unit in relation to the chosen SDGs. They outlined the cognitive procedures and thinking skills required to engage with the content while identifying the L2+ communication patterns, vocabulary, and language structures necessary for oral interaction. Cultural considerations related to the topic were also documented. In session 3, the groups planned their CLIL lesson plans. The students provided specific information on content, cognition, communication, and cultural issues (i.e., the CLIL framework). Additionally, they brainstormed possible activities incorporating the various teaching methods that CLIL encompasses. Lastly, during session 4, the groups designed three main activities to address the selected SDG topic, providing accompanying materials and resources, and documenting both in the CLIL template. Students also created extension activities to promote on-task behaviour and reinforce skills and com-

petencies. Finally, the groups developed an assessment rubric in a student-friendly format suitable for primary education.

### 2.3. Instruments and Data Collection

Prior to the commencement of the data collection, the students provided their informed consent to participate in the research which had received evaluation and approval from the Ethics Committee of the University of [anonymized] (Ref. number). Students participated voluntarily in the study and consent to use the recordings to analyse self-regulation strategies only for research purposes. The study was carried out in accordance with the ethical standards required for research involving human participants, adhering to the fundamental principles of the Helsinki Declaration and the host university's code of good research practice.

The primary objective of this study was to examine the types of self-regulating strategies employed by students during the process of content negotiation within a VE context. To address the first research question (i.e., RQ1: What specific strategies do students employ while engaging in VEs to negotiate content in the L2 within a CLIL context?), the group interactions of students participating in the VE were analysed.

To capture the interactions and dynamics of the four VE sessions, the Zoom break-out rooms were recorded and uploaded to a Google shared drive by the students. The data was transcribed by the first and second author and anonymized by assigning a number to each student. The data comprised a total of 36 videos with an average duration of approximately 2 hours each. These videos captured the collaborative discussions and interactions of the 9 groups of students across the 4 sessions of the VE. The recorded interactions were analysed to identify a preliminary set of strategies derived from the existing literature and compiled by Martínez-Adrián et al. (2019). These strategies were: guessing, miming, morphological creativity, predicting, paraphrasing, borrowing, calque, foreignizing, avoidance, appeal for assistance, and dictionary use. To ensure clarity and consistency, an iterative approach to qualitative data analysis was employed (Tracy, 2018). The researchers jointly analysed several interactions, discussed any conflicting data, and further refined the categories. During this process, several additional categories emerged that were incorporated to the analysis: code-switching, translation for others, self-repair, providing assistance, asking for reinforcement, asking for clarification, comprehension check, peer correction, multimodality or the use of other technologies (e.g., screen sharing, smartphone use) and artefacts (e.g., dictionary use, textbook use), technology check, and audio check. A total of 23 strategies were analyzed, including 11 previously known strategies and 12 newly emerging ones.

The subsequent analysis involved individual examination of the remaining data by the first two authors, followed by collaborative discussions of those cases that had been coded differently. Any disagreements or differing opinions were addressed and resolved through discussion with the third author until reaching a 100% consensus. A second analysis was conducted to review and modify the findings accordingly. The researchers quantified the occurrences of each strategy, and the results are presented in a quantitative manner in the Results section.

In order to answer research question 2 (to what extent do VEs facilitate content learning within the CLIL framework?), anonymous pre- and post-questionnaires containing both



close-ended and open-ended questions were administered to the students. The purpose of the pre- questionnaire was to gauge the students' level of familiarity and interest in the subject of SDGs and *Agenda 2030* and compare it with the results of their final projects. In addition, a post-questionnaire was administered to determine whether the students' interest in the topic of the SDGs and *Agenda 2030* persisted.

To investigate Research Question 3, which focuses on the learners' perceptions and perspectives regarding the use of VEs in the CLIL course, anonymous pre- and post-questionnaires were administered. These questionnaires aimed to assess the participants' level of familiarity with VEs and gather their opinions on its effectiveness as a tool for content teaching. After engaging in the VE experience, the students were surveyed again to capture their level of satisfaction with the VEs, their opinions on their usefulness for knowledge discussion, and their views on VEs as a tool for their future language teaching.

## 2.4 Data Analysis

For the treatment of the data, we performed quantitative descriptive and inferential statistical analyses, with non-parametric contrast tests, according to the possibilities and needs. Previously, we performed normality analyses of the data (Kolmogorov-Smirnov test), which demonstrated the existence of a relationship between some of the variables analysed. However, given their greater analytical possibilities, the Pearson's chi-square test, specifically the chi-square goodness of fit test, was applied, to determine whether the frequency distribution of the variables analysed was different from our expectations and the relationship between some variables. In this sense, numerous studies have demonstrated their greater robustness to the normality assumption (rejection of a null hypothesis) and have highlighted the possibility of using non-parametric tests as a powerful alternative in the analysis (Ramírez & Polack, 2020). This non-parametric test was chosen because of its usefulness and robustness in non-normal distributed data, as is the case with the current data, according to a Kolmogorov-Smirnov test for a sample ( $p < 0.05$ ). The chi-square goodness-of-fit test was used as a statistical hypothesis test to determine whether students make use of the strategies in an equitable way. To find this out, the total percentages of use of each strategy were collected, then the expected or equitable percentage of 7.69% was calculated. We then calculated the square of the difference between the expected number of uses of each strategy and finally added the last figures to calculate our test statistic: Chi-squared = 88.22. The risk of drawing an incorrect conclusion from the sample observations was set, and the significance level,  $\alpha$ , was set at 0.05. The chi-squared value was found from our significance level of 28.3. Comparing the value of our test statistic (88.22) with the chi-squared value (28.3). As  $88.22 > 28.3$  we reject the null hypothesis that all students use the strategies equally.

## 3. RESULTS

### 3.1 Strategies in VEs

During the 4 weeks of collaboration in the VE, a total of 444 strategies appeared in the data. The most frequent strategies amongst the participants from the ones proposed by



Martínez-Adrián et al. (2019) were *appeal for assistance* (68) followed by the use of *calques* (27), *miming* (16), *morpho creativity* (14), and *paraphrasing* (11). It was interesting that some strategies were seldom used: *avoidance* (3), *artifact use* (dictionary) (7), and *peer correction* (6), and one strategy, *guessing*, was never used.

In addition to the categories proposed by Martínez-Adrián et al. (2019), several other categories emerged in the first analysis of the data. These strategies related directly to VEs and their number of instances were: *L1 use* (75), *providing assistance* (68), *translation for others* (27), *self-correction (self-repair)* (19), *asking for reinforcement* (7), *asking for clarification* (12), *comprehension check* (19), *others correction (peer correction)* (6), *artefact use (multimodality)* (12), *artefact use* (e.g., chat use) (3), *non-tech artefact use* (e.g., piece of paper) (6), and *technology check (audio check)* (26). In each of these data sets, some of the items/strategies evaluated obtained mean scores of 8.33, 7.56 and others 0.75, 0.38. This can be seen in Table 2. This table shows the inferential estimation of the data, with the mean values and their confidence intervals. The new categories of strategies that emerged are also presented in table 2.

**Table 2.** *New Self-regulation Strategies Found Related to VEs usage data*

CATEGORY	%	MEAN	SD
L1 use	21.74%	8.33	7.58
Providing assistance	19.71%	7.56	5.22
Self-correction (self-repair)	7.54%	2.89	2.93
Technology check (audio check)	7.54%	2.89	2.93
Comprehension check	5.51%	2.11	2.47
Translation for others	3.48%	1.33	1.93
Asking for clarification	3.48%	1.33	1.50
Artefact use (multimodality)	3.48%	1.33	2.17
Non-tech artefact use (e.g., piece of paper...)	3.19%	1.38	1.76
Asking for reinforcement	2.03%	0.78	1.64
Other initiated correction (peer correction)	1.74%	0.75	1.16
Artefact use (e.g., chat use)	0.87%	0.38	0.74

It is important to note that there was a large variability in the number of strategies used by the different groups. A total of 444 strategies were produced but while group 3 produced a total of 111 strategies (25 % of the total), group 9 produced only 10 in total (2.2%). In Group 3, the group that produced the most strategies, the most used strategy was L1 use (22 instances) followed by *appeal for assistance* (17) and *providing assistance* (17). On the other hand, group 9 produced the least number of strategies: *appeals for assistance* (3), *providing assistance* (3), *self-corrections* (1), and *asking for reinforcement* (1). The categorization and most used strategies per group are displayed in Table 3.

**Table 3.** *Categorisation of most used strategies per group of students*

GROUP	MOST USED STRATEGIES AND NUMBER OF INSTANCES	% OF TOTAL STRATEGIES	
1	L1 use (14), *appeal for assistance (6), providing assistance (6)	45	10%
2	L1 use (7), appeal for assistance (5), providing assistance (5) and asking for reinforcement (5)	48	11%
3	L1 use (22), appeal for assistance (17) and providing assistance (17)	111	25%
4	Appeal for assistance (4), providing assistance (4), L1 use (3)	18	4%
5	Appeal for assistance (11), providing assistance (11), L1 use (9) and *predicting (9)	90	20.2%
6	*I use (16), appeal for assistance (14), providing assistance (14)	68	15.3%
7	Comprehension check (3), appeal for assistance (2), providing assistance (2)	11	2.4%
8	Self-correction (self-repair) (8), appeal for assistance (6), providing assistance (6), *artifact use (dictionary) (6)	43	9.5%
9	Appeal for assistance (3), providing assistance (3) and self-correction (self-repair) (1) and asking for reinforcement (1)	10	2.2%

3.2. Learning through VEs

At the beginning of the course, students were surveyed about their knowledge of the *Agenda 2030* and SDGs topic. The pre-questionnaires showed that only 11.4% of the students had heard about the *Agenda 2030* and 20,5% knew about the SDGs. The vast majority of students surveyed (56.8% at the University of Alicante and 54.5% at the University of Castilla La Mancha) had never heard about the topic.

To answer Research Question 2, the content (about CLIL methodology and SDGs topic) learned by the participants was quantitatively measured by a grade assigned by their teacher on the didactic unit they created, at the end of the four weeks, according to an evaluation rubric. The students’ grades clearly reflect learning. The results of both courses were very similar and therefore, the average of both classes is presented in table 4.

**Table 4.** *Final grades percentages calculated from the assessment of all students’ CLIL units*

GRADES	% OF STUDENTS
A (100- 90%)	12%
B (80-70%)	68%
C (60-50%)	16%
Withdrew	4%

In addition to their project grades, students’ answers on the post-questionnaire revealed a willingness to learn more about the SDGs and education for sustainability topics. Furthermore, 46.6% agreed and 53.3% strongly agreed that the content had been interesting for them and considered it relevant for their future positions as primary teachers. Finally, according to the post-questionnaire, learners were satisfied with the knowledge acquired during the VEs (36.7% agreed and 60% strongly agreed that they had acquired new knowledge).

### 3.3. Student Perceptions of VE

Research question 3 aimed at discovering the learner's perspective on the use of VEs as a tool for L2+ and content learning. When students were surveyed before starting the course about their degree of familiarisation with VEs, 43.2% of the students had heard about VEs, 27.3% weren't sure about what VEs were, and 11.4% had never heard about VEs. After the VE experience, the results of the post questionnaire showed that 53.3% of the students agreed and 36.7% strongly agreed that VEs were a good tool for content learning. Moreover, 60% of students agreed and 33.3% strongly agreed on the potential of VEs as a tool for language teaching in their future practice. The results also show that the students from both institutions agreed in most of their comments and pointed out that the experience "helped them develop their communicative skills" [Student 7, Student 15, Student 40], "extended their teaching skills" [Student 20, Student 32] and "gave them a platform to connect to others for their professional future as teachers" [Student 3, Student 10]. In special, students appreciated to have learned new technologies and acquired digital skills as well as a model of teaching that they could integrate in their future practice.

## 4. DISCUSSION

In agreement with previous studies that show that language learners use different types of self-regulating strategies when engaging in face-to-face interaction (Oxford & Amerstorfer, 2018; Martínez-Adrián et al. 2019; Poullisse, 1990; Purdie & Oliver, 1999), this study shows that in VEs students self-regulate using different strategies to guarantee effective communication and content learning. Given the nature of VEs, in addition to more established strategies such as paraphrasing, predicting, or borrowing, students employed strategies that were appropriate for the medium and supported learning, such as audio checks, comprehension, confirmation and clarification checks, requests for help, self-corrections, and self-repairs. Although these strategies are also present in face-to-face communication, in the VEs, they were frequently used to guarantee effective communication, and to be engaged in the activities they were performing. Audio checks helped students stay connected and actively participate, reducing the frustration that resulted from technical problems. By verifying sound quality, students minimized disruptions and kept focused on the task. Comprehension checks allowed students to measure their understanding of the content, which helped them identify gaps in knowledge and take action for improvement. With confirmation and clarification check strategies, learners consolidated their learning and reduced misunderstandings. This was crucial for successful interaction in the VE where non-verbal cues are less salient. Students often requested and received help from their classmates. Actively looking for help fosters a sense of community and boosts cooperation, which may lead to a more successful interaction and increased confidence. Self-correction and self-repair strategies were clear indicators of student's language and content awareness. Additionally, these two strategies are crucial in VEs since immediate feedback does not always occur and also help students take responsibility for their own performance.

Other strategies that emerged were the result of the collaborative nature of the VE environment as well as the task at hand (i.e., the development of a content unit for young

children), such as asking and providing assistance or asking for clarification. Students often requested assistance or clarification to resolve doubts and gain different perspectives, which in turn enriched their learning process. By assisting their peers, students also reinforced their own knowledge and developed effective communication skills. It is worth mentioning that the data included a high number of occurrences of L1 use. This is a common finding in interactional studies (Drixler, 2022; Lee, 2002), and it is still a strong focus of debate. From exclusivist views of L2 use, which propose that L1 detracts from L2 use, to views that argue that the L1 can facilitate engagement and L2 learning by reducing anxiety, promoting task completion, and helping learners self-regulate in interaction (De Guerrero, 2018). Also, in VEs, the use of the L1 can help reduce anxiety and facilitate engagement when they lack all the vocabulary necessary to participate fully in discussions. In our data, students seem to be using the L1 sometimes to help them understand the content, move the task along, or sometimes because of their low proficiency level. Although in the present research, we did not investigate the role and functions that L1 played in the learning process, we intend to do this in the near future.

In line with studies that propose the use of self-regulation strategies are essential in VE contexts for the study of both language and content (e.g. Aubrey & Philpott, 2023; O'Dowd, 2018a; Wang et al., 2024; Zheng et al., 2023) this study shows that VEs can be beneficial for content learning and are an excellent tool to be integrated into the CLIL subject curriculum. Not only did the students perceive it as useful for their future practice as language teachers, but the assessment of their final projects showed that, indeed, learners had mastered the course content. The results of the study confirm previous research (Cañado, 2017; Iraheta, 2024; Dooly & Vinagre, 2022; O'Dowd, 2018b) showing that students' perceptions regarding the use of VEs in the classroom are highly favourable as they considered VEs a way to improve their digital, communicative and future teaching skills when carried out in a proper way.

## 5. CONCLUSION

The results of this study show that students self-regulate in VEs using different strategies to guarantee effective communication and content learning. VEs present a capacity for flexibility in terms of time, allowing students to interact more freely than in traditional classrooms, which encourages greater independence, improves digital literacy, and enhances intercultural awareness (Dooly & Vinagre, 2022; Gutiérrez & O'Dowd, 2021). VEs also allow access to multiple digital resources and offer the possibility to reach a deeper understanding, while in face-to-face communication, key aspects such as immediacy and non-verbal communication are present. The lack of non-verbal communication in digital media can often lead to misunderstandings, so learners make more use of certain strategies to ensure that their message is correctly understood (Zhou et al., 2024). Group dynamics also differ in virtual and face-to-face environments. Students must use collaborative tools such as sharing documents or screens, which require specific strategies to coordinate efforts and maintain group cohesion. Overall, the inherent differences between virtual and face-to-face communication require the use of specific strategies to ensure effective interaction and meaningful content learning (Chi & Loi, 2020; Hilliker, 2022; Zheng et al., 2023). Results have shown that Virtual Learning Environments (VLEs) are a good tool for implementing strategies to

facilitate content learning. The use of self-regulation strategies helps students engage and interact with the content, reflect on it, discuss it with others and put it into practice in a VLE.

### 5.1. Limitations

Although one of the well-known benefits of VEs is the possibility to work remotely with peers at different institutions on a common project, the technology has generated some challenges. The VEs' sessions of this study were carried out in the students' normal classrooms, using their own devices, and the background noise was loud, which made it difficult for students to hear each other and for the researchers to analyse some of the recordings of the interactions. We can also consider the lack of immediate feedback as a limitation, as in virtual environments students may receive fewer corrections about their use of the language. Some researchers suggest that having access to a technology centre optimises the VE experience, and possibly the learning, and minimises frustration and anxiety (Drixler, 2022; Klimanova & Vinocurova, 2021; Rubin & Wit, 2023). Another limitation is related to the number of virtual exchange sessions as it was conditioned by the short time dedicated to the practical part of this intensive course, which lasted only four weeks.

To conclude, we believe that the incorporation of VEs as a learning tool offers the opportunity to study how students self-regulate when interacting in an L2 with peers in other institutions. VEs also offer students the possibility to improve their oral skills by putting into practice self-regulation strategies in a more flexible, dynamic, and practical context (Cañado, 2017; Martínez-Agudo, 2019). However, not all VEs are equally effective for language or content learning. For VEs to be effective, they need to be designed following a sound methodology, considering that students who take a more active role in the language and content class are aware of their own learning process, so they can learn more effectively.

### 5.2. Future lines of research

It is important to remind the reader that in this study, learners did not receive any previous training in self-regulation strategies. The idea was to see whether learners could develop self-regulation strategies on their own. The data showed that although multiple strategies were employed, learners tended to repeat the use of the same strategies in their interventions. As some studies in strategies suggest, language learning occurs in a more effective way when it is complemented with the teaching of concrete strategies which aim to guide learners towards the goal of self-management (Cohen, 2014; Oxford, 2017; Oxford & Amerstorfer, 2018; Rubin & Wit, 2023; Wang et al., 2024; Zheng et al., 2023). However, for this first study, we wanted to descriptively explore what learners do on their own, without any intervention. In a follow-up study (in preparation), we are looking at whether an intervention can make a difference in the amount and type of strategies that learners use. Specifically, we aim to examine whether prior training in self-regulation strategies influences the types of strategies employed by students in their subsequent interactions.

## 6. REFERENCES

- Aissaoui, N. (2022). The digital divide: a literature review and some directions for future research in light of COVID-19. *Global Knowledge, Memory and Communication*, 71(8/9), 686–708. <https://doi.org/10.1108/GKMC-06-2020-0075>
- Aubrey, S., & Philpott, A. (2023). Second language task engagement in face-to-face and synchronous video-based computer-mediated communication modes: Performances and perceptions. *System*, 115, 1–12. <https://doi.org/10.1016/j.system.2023.103069>.
- Bowen, N. E. J. A., & Thomas, N. (2022). Self-Regulated Learning and Knowledge Blindness: Bringing Language into View. *Applied Linguistics*, 43(6), 1207–1216.
- Cappellini, M., & Combe, C. (2022). Multiple online environments as complex systems: Toward an orchestration of environments. *Language Learning & Technology*, 26(1), 1–20. <https://hdl.handle.net/10125/73497>
- Beaven B. & Helm H. (2020). *Designing and implementing virtual exchange: a collection of case studies*. Research-Publishing.net.
- Cañado, M. L. P. (2017). Stopping the “pendulum effect” in CLIL research: Finding the balance between Pollyanna and Scrooge. *Applied Linguistics Review*, 8(1), 79-99.
- Chen, H. I., & Sevilla-Pavón, A. (2023). Negotiation of meaning via virtual exchange in immersive virtual reality environments. *Language Learning & Technology*, 27(2), 118–154. <https://hdl.handle.net/10125/73506>
- Chi, P. K. & Loi, N. V. (2020). Online learning negotiation: Native speaker versus nonnative speaker teachers and Vietnamese EFL learners. *Language Learning & Technology*, 24(3), 120–135. <http://hdl.handle.net/10125/44743>
- Cohen A. D. (2014). *Strategies in learning and using a second language*. Routledge/Taylor & Francis.
- Coyle D., Hood P., & Marsh D. (2010). *Content and language integrated learning*. Cambridge University Press.
- De Guerrero, M. C. (2018). Going covert: Inner and private speech in language learning. *Language Teaching*, 51(1), 1-35. <https://doi.org/10.1017/S0261444817000295>
- Derakhshan, A., Bai, B. (2025). Postgraduate Chinese EFL learners’ emotional vulnerability displays and regulation strategies. *System*, 129(103605), 1–15. <https://doi.org/10.1016/j.system.2025.103605>
- Derakhshan, A., & Zhang, L. J. (2024). Applications of psycho-emotional traits in technology-based language education (TBLE): An introduction to the special issue. *The Asia-Pacific Education Researcher*, 33, 741–745. <https://doi.org/10.1007/s40299-024-00881-y>
- Dooly M. & Sadler R. (2019). If you don’t improve what’s the point?” investigating the impact of a “flipped” online exchange in teacher education. *ReCALL*, 32(1), 4–24. <https://doi.org/10.1017/S0958344019000107>
- Dooly, M., & Vinagre, M. (2022). Research into practice: Virtual exchange in language teaching and learning. *Language Teaching*, 55(3), 1–15. <https://doi.org/10.1017/S0261444821000069>
- Dörnyei, Z. (2005). *The Psychology of the Language Learner: Individual Differences in Second Language Acquisition*. Lawrence Erlbaum Associates.
- Drixler, N. (2022). Features of online second language interactional competence in a German - Israeli virtual exchange. *TESOL in Context*, 30(2), 65–95. <https://search.informit.org/doi/10.3316/informit.771958331197882>

- Education, Audiovisual and Culture Executive Agency. (2019). *eTwinning in an era of change: Impact on teachers' practice, skills, and professional development opportunities, as reported by eTwinners: full report 2019*. Publications Office. <https://data.europa.eu/doi/10.2797/052072>
- Eggers, J. H., Oostdam, R., Voogt, J., & Zijlstra, B. J. H. (2024). The Use of Self-regulation Strategies and Interactional Methods in Blended Learning Environments: A Survey Among Teachers and Students in Higher Education. *Technology, Knowledge and Learning*, 1, 1–24. <https://doi.org/10.1007/s10758-024-09786-7>
- Giralt, M., Betts, A., Pittarello, S., & Stefanelli, C. (2022). Scenarios for the integration of virtual exchange in higher education. *Journal of International Students*, 12(S3), 116–134. <https://doi.org/10.32674/jis.v12iS3.4629>
- Godwin-Jones, R. (2021). Evolving technologies for language learning. *Language Learning & Technology*, 25(3), 6–26. <http://hdl.handle.net/10125/73443>
- González-Lloret, M. (2020). Collaborative tasks for online language teaching. *Foreign Language Annals*, 53(2), 260–269. <https://doi.org/10.1111/flan.12466>
- Gutiérrez, B. & O'Dowd, R. (2021) *Virtual exchange: connecting language learners in online intercultural collaborative learning*. Research-Publishing.net.
- Hedge, T. (2000). *Teaching and learning in the language classroom*. Oxford University Press.
- Helm, F. & Beaven, A. (2020). *Designing and implementing virtual exchange. A collection of case studies*. Researchpublishing.net. <https://doi.org/10.14705/rpnet.2020.45.9782490057726>
- Hilliker, S. (2022). *Second language teaching and learning through virtual exchange*. Mouton de Gruyter. <https://doi.org/10.1515/9783110727364>
- Iraheta, A. C. (2024). Learning with a purpose: Acquisition of compliments and compliment responses by beginning learners of Spanish in synchronous online exchanges. *System*, 123(103291), 1–11. <https://doi.org/10.1016/j.system.2024.103291>
- Jabbari, N., & Eslami, Z. R. (2023). Negotiations for meaning in the context of a massively multiplayer online role-playing game. *Language Learning & Technology*, 27(1), 1–28. <http://hdl.handle.net/10125/73517>
- Jones L. (2023). The Routledge handbook of second language acquisition and technology. *Calico Journal*, 40(2), 257–261. <https://doi.org/10.1558/cj.25738>
- Klimanova, L., & Vinokurova, V. (2021). Service-provider virtual exchange as a viable alternative to face-to-face speaking practice: Data from second-and third-year Russian learners. *Russian Language Journal*, 71(2), 121–156.
- Lee, L. (2002). Synchronous online exchanges: A study of modification devices on non-native discourse. *System*, 30(3), 275–288. [https://doi.org/10.1016/S0346-251X\(02\)00015-5](https://doi.org/10.1016/S0346-251X(02)00015-5)
- Lee, C. (2016). Multilingual resources and practices in digital communication. In A. Georgakopoulou & T. Spiloti (Eds.), *The Routledge handbook of language and digital communication* (pp.18–132). Routledge.
- Li, S. (2022). Book review on second language teaching and learning through virtual exchange. *Journal of China Computer-Assisted Language Learning*, 2(2), 343–350. <https://doi.org/10.1515/jccall-2022-0031>
- Lopes A. (2020). Linking content and language-integrated learning (clil) and task-based language teaching (tblt) in an effective way: a methodological proposal. *Onomázein: Revista de Lingüística Filología y Traducción de la Pontificia Universidad Católica de Chile*, 6, 5–22.



- Loranc, B., Hilliker, S. M., & Lenkaitis, C. A. (2021). Virtual exchanges in language teacher education: Facilitating reflection on teaching practice through the use of video. *TESOL Journal*, 12(2), e580. <https://doi.org/10.1002/tesj.580>
- Lorenzo, N. (2018). An innovative, competency-based international CLIL project: Are you brave enough? *CLIL Journal of Innovation and Research in Plurilingual and Pluricultural Education*, 1(1), 29–36. <https://doi.org/10.5565/rev/clil.5>
- Martin, I. A. (2023). Motivation in computer-assisted pronunciation training: Online and face-to-face environments. *Language Learning & Technology*, 27(1), 1–21. <https://hdl.handle.net/10125/73526>
- Martínez Agudo, J (2019). Which instructional programme (EFL or CLIL) results in better oral communicative competence? Updated empirical evidence from a monolingual context. *Linguistics and Education* 51(1), 69– 78. <https://doi.org/10.1016/j.linged.2019.04.008>
- Martínez-Adrián M. Gallardo-del-Puerto F. & Basterrechea M. (2019). On self-reported use of communication strategies by CLIL learners in primary education. *Language Teaching Research* 23(1) 39–57. <https://doi.org/10.1177/1362168817722054>
- Marsh D. (2013). *The CLIL trajectory: Educational innovation for the 21st century igeneration*. Servicio de Publicaciones Universidad de Córdoba.
- McCollum, B. M. (2020). Online collaborative learning in STEM. In J. Mintzes & M. Walter (Eds.) *Active learning in college science* (pp. 621–637). Springer. [https://doi.org/10.1007/978-3-030-33600-4\\_38](https://doi.org/10.1007/978-3-030-33600-4_38)
- Miras, S., Ruiz-Bañuls, M., Gómez-Trigueros, I., & Mateo-Guillen, C. (2023). Implications of the digital divide: A systematic review of its impact in the educational field. *Journal of Technology and Science Education*, 13(3), 936–950. doi:<https://doi.org/10.3926/jotse.2249>
- O'Dowd, R. (2018a). From telecollaboration to virtual exchange: State-of-the-art and the role of UNICollaboration in moving forward. *Journal of Virtual Exchange*, 1, 1–23. <https://doi.org/10.14705/rpnet.2018.jve.1>
- O'Dowd, R. (2018b). Innovations and challenges in using online communication technologies in CLIL. *Theory into Practice*, 57(3), 232–240. <https://doi.org/10.1080/00405841.2018.1484039>
- O'Dowd, R. (2021a). Virtual exchange: moving forward into the next decade. *Computer Assisted Language Learning* 34(1), 1–17. <https://doi.org/10.1080/09588221.2021.1902201>
- O'Dowd R. (2021b). What do students learn in virtual exchange? A qualitative content analysis of learning outcomes across multiple exchanges. *International Journal of Educational Research* 109(1) <https://doi.org/10.1016/j.ijer.2021.101804>
- O'Dowd R. Sauro S. & Spector-Cohen E. (2020). The role of pedagogical mentoring in virtual exchange. *Tesol Quarterly: A Journal for Teachers of English to Speakers of Other Languages and of Standard English as a Second Dialect* 54 (1), 146–172.
- Oxford. R. (2017). *Teaching and researching language learning strategies: Self-regulation in context* (2nd ed.). Routledge.
- Oxford, R. L., & Amerstofer, C. M. (Eds.). (2018). *Language learning strategies and individual learner characteristics: situating strategy use in diverse contexts*. bloomsbury academic. <https://doi.org/10.5040/9781350005075>
- Poulisse, N. (1990). *The use of compensatory strategies by Dutch learners of English*. Mouton de Gruyter.
- Potolia A. & Derivry-Plard M. (2023). *Virtual exchange for intercultural language learning and teaching: fostering communication for the digital age*. Routledge. <https://doi.org/10.4324/9781003024620>

- Purdie, N. & Oliver, R. (1999). Language learning strategies used by bilingual school-aged children. *System*, 27(3), 375-388. [https://doi.org/10.1016/S0346-251X\(99\)00032-9](https://doi.org/10.1016/S0346-251X(99)00032-9)
- Qi, S., & Derakhshan, A. (2025). Technology-based collaborative learning: EFL learners' social regulation and modifications in their academic emotions and academic performance. *Education and Information Technologies : The Official Journal of the IFIP Technical Committee on Education*, 30(7), 8611–8636. <https://doi.org/10.1007/s10639-024-13167-z>
- Ramírez, A., & Polack, A. M. (2020). Estadística inferencial. Elección de una prueba estadística no paramétrica en investigación científica. *Horizonte de la Ciencia*, 10(19), 191-208. <https://doi.org/10.26490/uncp.horizonteciencia.2020.19.597>
- Rubin J., Guth S., & Wit H. de. (2023). *The guide to coil virtual exchange: Implementing growing and sustaining collaborative online international learning*. Routledge. <https://doi.org/10.4324/9781003447832>
- Ruelens. (2019). Measuring language learner autonomy in higher education: The self-efficacy questionnaire of language learning strategies. In G. Mouton (Ed.). *Language Learning in Higher Education* 9(2), 371–393. <https://doi.org/10.1515/cercles-2019-0020>
- Sun, P. P. (2022). Strategic self-regulation for speaking English as a foreign language: scale development and validation. *TESOL Quarterly*, 1369–1383. <https://doi.org/10.1002/tesq.3132>
- Szyska, M. (2017). *Pronunciation Learning Strategies and Language Anxiety*. Springer International. <https://doi.org/10.1007/978-3-319-50642-5>
- Tracy, S. J. (2018). A Phronetic Iterative Approach to Data Analysis in Qualitative Research. *Journal of Qualitative Research*, 19(2), 61–76. <https://doi.org/10.22284/QR.2018.19.2.61>
- Vinagre, M. (2016). Developing key competences for life-long learning through virtual collaboration: Teaching ICT in English as a medium of instruction. In C. Wang & L. Winstead (Eds.). *Handbook of research on foreign language education in the digital age* (pp. 170–187). IGI Global. 10.4018/978-1-5225-0177-0.ch008
- Wang, J., Zhou, H., Chen, S., Tong, H., & Yang, Y. (2024). How teachers support secondary school students to become self-regulated learners in technology-enhanced language learning. *System*, 123, 103313. <https://doi.org/10.1016/j.system.2024.103313>
- Zhang, W., Liu, B., & Wilson, A. J. (2023). Examining Chinese EFL learners' online self-regulated learning: A mixed-methods approach, *System*, 123(103277), 1–16. <https://doi.org/10.1016/j.system.2024.103277>
- Zhou, S., Xu, J. & Thomas, N. (2024). L2 listening in a digital era: developing and validating the mobile-assisted self-regulated listening strategy questionnaire (msrls-q). *System*, 123,(103310)1–12. <https://doi.org/10.1016/j.system.2024.103310>
- Zheng, C., Liang, J.C., Chai, C. S., Chen, X., & Liu, H. (2023). Comparing high school students' online self-regulation and engagement in English language learning, *System*, 115(20230), 1–15. <https://doi.org/10.1016/j.system.2023.103037>
- Zimmerman, B. J. (2008). Goal setting: A key proactive source of academic self-regulation. In D. H. Schunk & B. J. Zimmerman (Eds.). *Motivation and self-regulated learning. Theory, research and applications*. (pp. 267–295). Lawrence Erlbaum Associates.