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EDITED BY
Joana R. Casanova,
University of Minho, Portugal

REVIEWED BY
Fredy Eduardo Vasquez Rizo,
Autonomous University of Occident, Colombia
Alejandra Galdames,
San Sebastián University, Chile
Juan Lira,
San Sebastián University, Chile

*CORRESPONDENCE
Jorge Maluenda-Albornoz
✉ jorgemaluenda@udec.cl

†These authors have contributed equally to this work and share first authorship

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Self-regulated learning and engagement through emergency remote teaching in EFL undergraduate students

René Oportus-Torres[1†], Yasmina Contreras-Soto[1†], Cristian Sanhueza-Campos[2†], Jorge Maluenda-Albornoz[3*], Christian Pérez-Villalobos[4] and Angie Quintanilla-Espinoza[1]

[1]Departamento de Idiomas Extranjeros, Facultad de Humanidades y Arte, Universidad de Concepción, Concepción, Chile, [2]Departamento de Teoría, Política y Fundamentos de la Educación, Escuela de Educación, Universidad de Concepción, Los Ángeles, Chile, [3]Departamento de Ingeniería Civil Industrial, Universidad de Concepción, Concepción, Chile, [4]Departamento de Educación Médica, Facultad de Medicina, Universidad de Concepción, Concepción, Chile

Introduction: An important concern of research about self-regulated learning is to determine the most effective methods for its instruction in different educational settings. This also happens in foreign language learning as improving proficiency is challenging for students and self-regulation has proven effective in different educational levels.

Methods: A quasi-experimental study was designed with a treatment and a control group, and pre- and post-test for 70 undergraduate students majoring in English as a foreign language at a Chilean university. A 10-week intervention was conducted to develop self-regulation during emergency remote teaching.

Results: Findings revealed that the intervention, as implemented in the study, was successful in improving self-regulated learning, and in participants' recognizing the practical utility of tools acquired. On the other hand, while the level of engagement remained similar after the intervention, this was seen as a protective effect of the teaching-learning strategy on motivational states.

Discussion: This research underscores the importance of self-regulated learning training in higher education to allow for students' autonomy and agency, as well as connectedness with instructors and peers, especially during the harsh teaching conditions of sanitary confinement.

KEYWORDS

self-regulated learning, engagement, EFL, motivation, emergency remote teaching, competences

1 Introduction

Successful undergraduate students display a diverse set of skills that empowers them to achieve academic goals more efficiently and effectively. Within the framework of self-regulated learning (SRL), these skills include metacognitive strategies such as goal setting, time management, self-monitoring, and planning (Zimmerman, 2013; Cai and Zhao, 2023). Additionally, learners' positive self-efficacy perceptions about their own competence, another component of SRL, helps them become more confident and persistent when undertaking tasks and assignments (Semilarski et al., 2021; Al-Abyadh and Abdel Azeem, 2022). On a different note, academic engagement, a

meta construct involving behavioural, motivational and cognitive aspects, is also believed to affect motivation level and to enhance learning that fosters greater students' dedication (Fredricks et al., 2004). Research has shown that engagement, as an operational construct of motivation, relates positively to academic success (Caruth, 2018; Serrano et al., 2022). By developing these aspects, namely SRL and engagement, students could maximize their learning potential to become more independent and competent (Agranovich et al., 2019; Handoko et al., 2019; Karlen et al., 2020; Cherng-Jyh et al., 2022).

Traditionally, in the Chilean context, undergraduate students generally struggle to deal with their academic workload. They display low autonomy and motivation levels resulting in limited academic engagement and high dropout rates (Díaz-Mujica et al., 2018; Lobos et al., 2021). Students might lack tools such as those inherent to SRL, which would enable them to take control of their learning. Amidst the COVID-19 crisis, these issues seemed to worsen with the enforcement of emergency remote teaching (ERT; Brooks, 2021; Quang et al., 2022; Aydin, 2023). During that period, mounting evidence from learning management system (LMS) platform-generated analytics revealed students' dwindling attendance levels, reduced active participation in virtual classes, and decrease in performance while in online modality.

A way to address these exacerbated problems during ERT conditions might be through deliberate instruction of self-regulation. Teachers could play a major role, as SRL is a trainable skill (Zimmerman and Moylan, 2009). Successful interventions to develop self-regulation have already been implemented in several academic fields, for example, to help children with attention deficit / hyperactivity disorder (ADHD; Reid et al., 2005); in neuroscience studies, when trying to encourage behaviours consistent with being a good group member (Heatherton, 2011); or also at the workplace, when self-regulation is understood as an in-person process that develops over time (Lord et al., 2010). Meanwhile, in the field of L2 [second language, it refers to any language learned after one's native language (L1)] research, several studies have shown the relationship between SRL and linguistic competence (Zhang and Zhang, 2019; Öztürk and Çakıroğlu, 2021; Tomak and Seferoglu, 2021); though it is unclear how to best incorporate elements of SRL into instruction. Previous meta-analyses studies report that research on SRL in English as a Foreign Language (EFL) has been mostly concerned about achievement rather than its development resulting from focused instruction (Chen, 2022; Teng, 2022). It could well be that instructing EFL undergraduate students on SRL could help them build up their own self-regulation toolkit, and thus help them adapt to the adversities of the pandemic, maintain engagement, and succeed academically.

This research paper outlines the implementation of an intracurricular pedagogical intervention which attempts to improve SRL and engagement levels in EFL undergraduate students during ERT. We hypothesize that self-regulation and engagement levels will increase after its application. This study is expected to provide educators with valuable insights into the effects of purposeful instruction and implementation of SRL in the EFL classroom.

2 Literature review

2.1 Self-regulated learning

Zimmerman (2000a, p.14) defines SRL as "self-generated thoughts, feelings, and behaviours that are oriented to attaining goals." Within this conceptualization, mechanisms and stages of SRL are described as a cyclical model which distinguishes three phases: forethought, performance and self-reflection, each comprising clear processes that self-regulated learners undertake to successfully complete academic tasks. At the forethought phase, individuals will perform influential operations, such as setting goals and planning strategic actions, which precede the efforts to act, and whose aim is to get the stage ready for action. During the performance phase, students will actively execute tasks in a controlled environment, creating conditions to remain focused and engaged while also monitoring progress; these include strategies at specifically addressing the task: self-instruction, imagery use, time management, environmental structuring, help seeking, interest incentives, among others. The phases of self-reflection refer to the learners' responses to the task experience itself, as they judge the effectiveness of their learning process, and explore factors that might explain their outcomes (Zimmerman, 2000a,b; Zimmerman and Moylan, 2009).

Another important attribute associated to academic achievement and found to interact with SRL, is self-efficacy. This is posed to be a crucial factor in academic achievement, involving dynamic and integrated processes, and which utilize skills and capabilities to effectively navigate and interact with the environment in order to achieve objectives (Bandura, 1982). This construct is identified as students' sense of agency referring to the beliefs in their own capacity or power to learn under self-regulated conditions. In other words, efficacious learning is not just about having certain abilities, but also about the mindset and application of those abilities, which makes a difference in their success (Zimmerman, 2000b). For example, when learners engage in independent study or practice, or when they set clear objectives that they feel capable of attaining (Zimmerman et al., 2017). Bandura (1995) underscores the impact of self-efficacy on shaping goals which individuals set for themselves, the level of effort exerted, perseverance in challenging situations, and resilience to setbacks. High self-efficacy appears to correlate positively with increased effort and persistence, leading to improved performance and outcomes (Lee et al., 2020).

Moreover, it is suggested that self-efficacy and SRL are closely intertwined concepts exerting a reciprocal and mutually reinforcing relationship (Chen, 2022), that is, when students have a strong sense of self-efficacy, they are more likely to engage in SRL strategies. This proactive approach to learning allows students to take charge of their own education and perceive themselves as more capable, thus, increasing the effectiveness of SRL strategies (Zimmerman, 2002).

The synergistic relationship between SRL and self-efficacy presents opportunities to devise instructional approaches that support learning processes. By fostering a strong sense of self-efficacy and teaching effective SRL strategies, instructors can help students take control of their learning and maximize their academic capabilities (Lee et al., 2020). This suggests that SRL involves a social aspect and nature, enabling participating agents (teachers, parents, coaches, peers, among others) to instruct and model SRL strategies, helping learners develop greater self-efficacy and become more competent (Zimmerman, 2002; Ewijk et al., 2015).

2.2 Engagement

Another variable to consider when analysing university students' performance is engagement, which is understood as a high

motivational state that manifests itself in student behaviour (Maluenda-Albornoz et al., 2022): engaged individuals show an interest in educational activities, make an effort and dedicate time to learning (Fredricks and McColskey, 2012).

Engagement positively relates to favourable educational indicators, such as achievement (Pineda-Báez et al., 2014; Gómez et al., 2015), social integration with peers/teachers, and students' involvement in the classroom (Maluenda-Albornoz et al., 2020a, 2021). On the other hand, engagement also shows a negative relation with burnout in academic contexts (Schaufeli et al., 2002a,b), exhaustion (Salanova et al., 2009) and university dropout (Chang et al., 2014; Díaz-Mujica et al., 2018; Maluenda-Albornoz et al., 2021, 2022). This concept is also considered a dynamic variable since it is susceptible to modification through effective designed interventions within the university context. (Maluenda-Albornoz et al., 2022).

More particularly, and for the purposes of the present study, engagement is defined as the range of expressions of motivation for study, across three primary dimensions (Fredricks et al., 2019). The behavioural dimension encompasses the actions taken by students who are eager to learn. The cognitive dimension involves the set of thoughts, beliefs, and perceptions regarding the significance of academic tasks and effort required; whereas the emotional dimension encompasses the feelings and attitudes students have towards learning (Antúnez et al., 2017). During the ERT period, evidence suggests that the fully virtual instruction modality adversely affected students' motivation and participation (Oyedotun, 2020; Zaccoletti et al., 2020) as well as their engagement (Pasion et al., 2020; Daniels et al., 2021). Therefore, it also became crucial to assess the impact of intervention strategies on engagement, so as to understand their effect on motivation and mitigate their negative impact under the conditions of the pandemic.

In the present study, we anticipate an impact not only on students' SRL, but also more indirectly, on engagement, resulting from a change in the teaching method. The new strategy would allow participants to satisfy basic psychological needs: (1) when students share their performance and receive feedback in a protected environment, *relatedness* is being satisfied; (2) when students can practice, and can prove their own ability to produce language, *competence* is being satisfied; and (3) when they choose their own ways to produce language and show their achievements, *autonomy* is being satisfied.

To direct the actions of the study, the research will be guided by the following research questions:

(1) To what extent does self-regulation increase after the implementation of an intracurricular intervention aiming at SRL development?
(2) To what extent does engagement increase after the implementation of an intracurricular intervention aiming at SRL development?

3 Method

3.1 Design

A quantitative quasi-experimental design was conducted involving both an experimental and a control group, each subjected to pre- and post-tests. The pre and post-test evaluation included the use of an *ad hoc* questionnaire made up of the instruments described in the materials section.

3.2 Participants

The target population was defined by intentional sampling. This included 70 undergraduate students from English majoring programs at a Chilean university. The intervention group was comprised of 54 pedagogy students, organized into 3 sections, while the control group consisted of 16 students from a translation program. From a linguistic competence point of view, all students exhibited an intermediate English level minimum, B1+ or above, according to the Common European Framework of References for Languages (CEFR; Council of Europe, 2020). All students were in their second year of university studies, having completed the prerequisite courses, which was considered to be an indicator of a relatively similar linguistic attainment level in the L2. This intentional sampling ensured a homogeneous group in terms of their language proficiency. Additionally, demographic variables showed that 22.6% of participants were men, 72.6% women, and 4.8% did not indicate sex, while their ages ranged between 19 and 27 ($x = 20.1$; $SD = 1.52$; Table 1).

TABLE 1 Intervention and control groups.

Group	Program	Section No.	No. of students
Intervention Group	English Pedagogy	1	20
		2	21
		3	13
Control Group	Translation	1	16

3.3 Materials

An *ad hoc* questionnaire was developed based on two main components, engagement and self-regulated learning. Engagement was measured by using the University Student Engagement Inventory (USEI). Self-regulated learning was measured by using a combination of the SRL Practices Scale and the Self-Efficacy for SRL Questionnaire. The combination of both scales produced a compound measure as an indicator for SRL levels. The reason for this combination was to include different indicators (items) in the same measure that consider a wider perspective on the cognitive and behavioural components of SRL to gain a better understanding of this variable.

These original scales show good psychometric properties which have been tested on university students. Below are their key features:

1 The University Student Engagement Scale is made up of 15 items with a 7-level Likert scale response format (1 = never, 7 = always), distributed in three subfactors: interest (5 items), effort (5 items), and participation (5 items). It was created by Maroco et al. (2016) and adapted to Chilean university students by Maluenda-Albornoz et al. (2020b). In the Chilean university version, the fit indices showed satisfactory performance of the bifactorial model [$\chi^2 = 210.276$, $p < 0.001$; RMSEA = 0.047 (95% IC, 0.040–0.055, CFI = 0.967, TLI = 0.954)] as well as reliability ($\alpha = 0.841$; $\omega = 0.843$) and criterion validity.

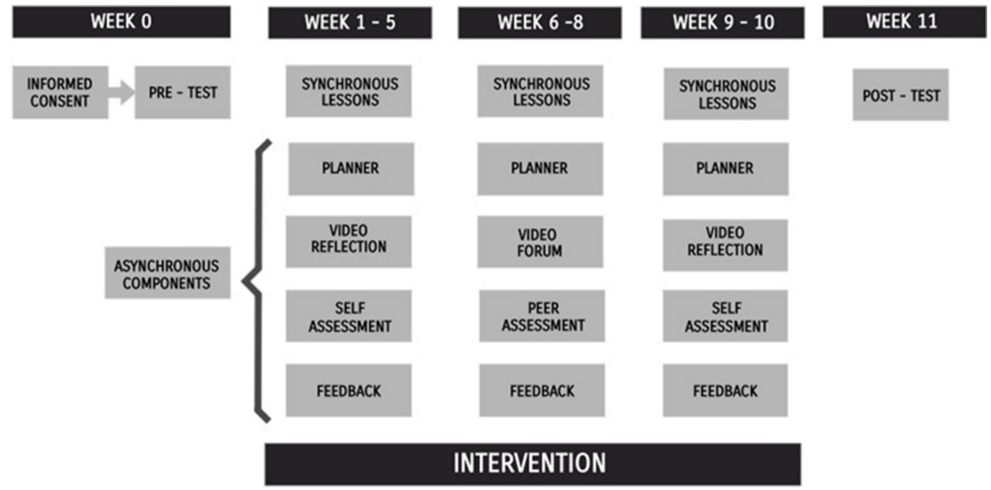

FIGURE 1
Intervention stages and components.

2 The Self-Regulated Learning Practices Scale assesses the level of self-regulation on university students in the teaching-learning process. This instrument is made up of 11 items with a 7-level Likert scale response format (1 = never, 7 = always) and was adapted for Chilean university students showing adequate psychometric properties for a one-factor model (Vergara-Morales et al., 2019).
3 The Self-Efficacy Questionnaire for self-regulation measures the degree of self-efficacy at being self-regulated in university contexts. This instrument consists of 9 items with a 7-level Likert scale response format (1 = Never; 7 = Always). The instrument was adapted for Chilean university students showing adequate psychometric properties for a one-factor model (Sáez et al., 2017)

3.4 Procedure

The instruments were administered to the intervention and control groups during one academic semester, before and after the intracurricular intervention was implemented, which took place between March 23th and June 30th. An informed consent was obtained from students according to the ethical protocols for working with human beings. Students who did not agree to participate were withdrawn from the study without any type of associated consequence.

3.5 Intervention

Integrated into the syllabus, the pedagogical intervention was planned and implemented with the aim of increasing primarily SRL, and more indirectly, engagement levels in EFL undergraduate students. This took the form of an intracurricular intervention that lasted for 10 weeks. It was aligned with the learning outcomes of a language course which is integral to the curriculum of the English Pedagogy program.

The learning outcome expected to benefit directly from this intervention focused on improving speaking skills at B2 level (CEFR), with a focus on asynchronous communication via the aural/oral and visual channels which virtual technology allowed. The digital tool Flip was employed, serving as the oral medium through which learners developed SRL strategies. This intervention was administered in the teaching modality of ERT resulting from the Covid-19 pandemic. Linguistic contents and objectives (grammar, vocabulary, linguistic functions, etc.) were maintained, though topics were replaced for SRL themes and awareness-raising activities, such as, setting goals, using a planner, creating beneficial study habits, diminishing bad habits, sleep health, procrastinating, managing time and tasks effectively, among others.

The SRL-aiming lessons were imparted synchronously through the default institutional platforms Canvas, Teams and Genially, as well as asynchronously, on the video-recording platform Flip. SRL elements were explicitly taught in real time, and off-line with instructional self-made videos prepared by professors, which included tasks requiring students to cognitively grasp, apply, incorporate and consolidate SRL concepts and strategies.

The teaching approach systematically integrated tasks and active methodologies, as those shown in Figure 1: (1) use of a planner in which students were able to schedule and organize daily and weekly academic work, (2) students' submissions of weekly video recordings whose aim was to engage them into reflection on their progress and usefulness of SRL tools, (3) video forum participation where students analysed and assessed their classmates' SRL declared progress with the use of rubrics, (4) positive and corrective feedback given by the professor and teaching assistants which supported and guided learners in the development of SRL, and (5) weekly self-assessment on Google forms, so that students could monitor specific SRL strategies and progress.

The intervention was carefully designed so that the three SRL-comprising phases were addressed; namely, forethought, performance, and self-reflection, where learners were not only expected to learn about what SRL was, but also to engage in

self-planned study scenarios. For instance, during the first phase they set goals for the course, reflected on strategies necessary to prepare for the different tasks, such as planning and scheduling study time. In a second stage they carried out the tasks while also being made aware of the relevance of the use and application of strategies and techniques, for example, planner use, the Pomodoro technique (Cahyaningrum and Indriani, 2023), distractor avoidance and reduction of procrastination time (e.g., time spent on social media), habit creation (adequate amount of sleeping time), etc. At this stage, awareness was also raised about how to apply SRL-related elements while attending synchronous classes, thus, they were required to attend, take notes, ask questions, make comments, and turn on their camera, among other activities. Additionally, they were asked to keep a record of those, which helped them estimate their progress regarding expected use of those actions. Finally, the last SRL-phase involved the production of their oral reflections video-recorded on Flip, and their self-assessment, instances that also served as an opportunity for participants to socialize and exchange ideas.

Similarly, researchers also ensured that students were offered a safe social context that supported them throughout the intervention. In this sense, interaction was key in promoting healthy relationships with teachers and peers. In addition, weekly positive feedback from their instructors, assistant and classmates, helped them build confidence and a timely sense of progress and achievement, leading to competence. Finally, the fact that students were using tools of their choice (see paragraph above) to organize time and tasks, chose strategies and techniques that were most appealing to their personality, and recorded self-made videos where they openly expressed their thoughts, emotions and ways in which they were becoming more competent, self-regulated learners, provided opportunities to become more autonomous (Furrer and Skinner, 2003; Chiu, 2021). The entire methodological design aimed to foster a supportive and motivating environment, which would arguably increase engagement.

Students in the control group participated in their compulsory EFL language course, which had the same level and the same learning outcome related to speaking skills development as the course for the intervention group. Lessons shared the same linguistic contents as in the intervention group, but themes and activities did not incorporate any elements, such as the digital tool Flip or active methodologies aimed at SRL development, as those implemented in the intervention group. Lessons for the control group were delivered by one of the researchers who was also teaching an intervention group under the ERT modality during the sanitary crisis, in the same academic period as the intervention group.

TABLE 2 Descriptive statistics for SRL.

Self-regulated learning	Group	*n*	Mean	SE	Coefficient of variation
Pre-test	Control	16	95.875	5.118	0.214
	Intervention	54	101.450	2.010	0.171
Post-test	Control	16	92.875	6.094	0.262
	Intervention	54	105.001	2.300	0.134

3.6 Data analysis

To carry out the analysis, a Factorial Repeated Measures ANOVA was used (with an F test), after evaluating compliance with the assumptions associated with this test (Normality and Homoscedasticity test's). Subsequently, Bonferroni post-hoc test was used to identify significant effects in the specific comparisons.

4 Results

Descriptive statistics showed a small decrease in SRL for the second measurement for the control group, while for the intervention group, an increase in the post-intervention score was observed (Table 2).

Assumptions for Factorial Repeated Measures ANOVA were tested. Results showed non-compliance of normality assumptions. However, skewness and kurtosis were measured, and its results showed compliance with literature standards (each value was lower than ± [2]). For this reason, the research team relied on the robustness reported by ANOVA test in literature standards. Levene's test was also tested and showed compliance with homoscedasticity requirements (SRL pre-test group, $p = 0.247$; SRL post-test group, $p = 0.067$; Engagement pre-test group, $p = 0.896$; Engagement post-test group, $p = 0.145$).

Regarding SRL, analysis of intra- and inter-subject effects showed statistically significant differences in measurements before and after, and between groups (Tables 3, 4).

The analysis of the post-hoc comparisons regarding SRL showed statistically significant differences between the pre-test in the control group and post-test in the intervention group with a higher score in the post-test of the intervention group.

Also, statistically significant differences between the pre-test of the intervention group and post-test were found with a higher score in the post-test. Finally, statistically significant differences between the post-test of the control group and the post-test of the intervention group were observed with a higher score for the intervention group (Table 5). A clearer perspective is observed in Figure 2.

In relation to engagement, descriptive statistics showed a small decrease in the second measurement for the control group, while for the intervention group an increase in the post-intervention score was observed (Table 6).

TABLE 3 Intra-subject effects for SRL.

Cases	Sum of squares	df	Mean square	*F*	*p*	η^2	η^2_p
Self-regulated learning	209.761	1	209.761	1.558	0.206	0.004	0.020
Self-regulated learning group	885.189	1	885.189	6.577	0.014	0.014	0.076
Residuals	11053.257	68	131.656				

Analysis of intra- and inter-subject effects showed statistically significant differences in measurements of engagement before and after, and between groups (Table 7; Table 8).

The analysis of the post-hoc comparisons of engagement levels showed statistically significant differences between the pre and post-test in the control group, with a lower score in the post-test. Also, statistically significant differences between the pre-test in the intervention group and post-test in the control group were detected with a lower score in the post-test of the control group. Finally, the analysis showed statistically significant differences between the post-test in the control group and the post-test in the intervention group with higher scores for the intervention group (Table 9). A clearer perspective is observed in Figure 3.

5 Discussion

The complex circumstances of ERT, together with general students' profiles in Chilean higher education, forced the search for effective strategies aiming at equipping students with a repertoire of elements and skills that they could employ to become more autonomous, competent and satisfied with their learning, and to feel connected with instructors and peers during times of social distancing. Specifically, in the present study, the participants, from Chilean EFL majors, had shown a decline in motivation during the first year of ERT in 2020. Based on attendance records and online analytics, which revealed limited participation in both synchronous and asynchronous activities, it had become evident that they lacked metacognitive strategies to effectively self-regulate their learning in 2021. The following discussion attempts to address the research questions that motivated the implementation of this study.

5.1 To what extent does self-regulation increase after the implementation of an intracurricular intervention aiming at SRL development?

The problem above was analysed and tackled within the framework of psychological models of engagement and self-regulation (Zimmerman, 2000b; Zimmerman et al., 2017). These models propose that enhancing those aspects could benefit students' overall autonomy, competence and relatedness. This study gives an account of the application of a curriculum-integrated pedagogical intervention to empower learners with essential SRL competencies, as found in similar studies (Fredricks et al., 2019). These competencies could help learners to efficiently manage academic work to potentially

TABLE 4 Between-subject effects for SRL.

Cases	Sum of squares	df	Mean square	*F*	*p*	η^2	η^2_p
Group	4700.594	1	4640.321	7.746	0.008	0.075	0.090
Residuals	49123.757	68	589.165				

TABLE 5 Post-hoc comparisons - group SRL.

		Mean difference	SE	*t*	Cohen's d	p_{bonf}
Control, Pre-test	Intervention, Pre-test	−7.638	5.243	−1.431	−0.401	0.928
	Control, Post-test	2.998	4.030	0.721	0.155	1.000
	Intervention, Post-test	−16.322	5.332	−3.075	−0.842	0.013*
Intervention, Pre-test	Control, Post-test	10.633	5.323	1.996	0.555	0.289
	Intervention, Post-test	−8.691	1.982	−4.355	−0.441	<0.001***
Control, Post-test	Intervention, Post-test	−19.301	5.302	−3.600	−0.998	0.004**

*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

TABLE 6 Descriptive statistics for engagement.

Engagement	Group	*N*	Mean	SD	SE	Coefficient of variation
Pre-test	Control	16	79.188	10.778	2.694	0.136
	Intervention	54	82.290	11.347	1.3766	0.128
Post-test	Control	16	69.125	10.210	2.553	0.148
	Intervention	54	80.431	15.932	1.920	0.181

TABLE 7 Intra-subject effect for engagement.

Cases	Sum of squares	df	Mean square	*F*	*p*	η^2	η^2_p
Engagement	919.475	1	919.399	9.816	0.004	0.030	0.107
Engagement group	436.475	1	436.475	4.681	0.029	0.013	0.054
Residuals	7641.733	68	93.192				

foster their motivation by sustaining engagement and SRL levels, as suggested by Reid et al. (2005), Caruth (2018), and Aydin (2023), among others.

Results revealed that SRL increased significantly for the intervention group in the post-test compared to the pre-test in the same group and the post-test in the control group, with SRL levels in the control group even diminishing slightly in the post-test. This finding could be reflecting that the intervention efforts influenced the development of higher levels of SRL compared with their initial state, or with the control group, suggesting that a systematic and well-oriented teaching design focused on SRL, such as the intervention implemented in this study, can enhance SRL performance, and also promote students' permanent work in the designed tools. This is consistent with findings presented by Chen (2022) where interventions had similar instructional effects on students of different age groups and education levels, being duration and intensity of intervention significant factors that influenced the effectiveness of SRL interventions in the L2 context, especially for strategy use and self-efficacy.

An explanation for these results might relate to the systematic and comprehensive approach employed to deliver SRL components during the intervention. As closely as possible, its structure and sequencing followed the 3-stage cycle within the framework of Zimmerman (2000a,b), where the phases of forethought, performance and self-reflection are logically distinguished. This design seemed to favour the attainment of the findings above. Its cyclical nature seemed adequate to apply and organize the treatment in the case of specific tasks within lessons, as well as with the bigger linguistic aim of ensuring more practice and exposure time to the L2, and which would in turn enhance improvement of the students' speaking skill.

Firstly, students were expected to focus on its key elements by examining, through deep reflection, the likely benefits that adequate aspects of conduct, cognition and affect might bring to the fulfilment of academic goals, as similarly reported by Abello-Riquelme et al. (2022), and Cherng-Jyh et al. (2022). Secondly, the coverage of those elements incorporated students' performing actions whose aim was to apply them to their own conditions and preferences of learning (Zhang and Zhang, 2019; Öztürk and Çakıroğlu, 2021). These centred around forethought, performance and self-reflection phases of the SRL cycle (Zimmerman, 2000a,b), which included the application of concepts aimed at academic success, such as planning short and long-term goals, ways of creating good habits and getting rid of detrimental ones, the neurobiological mechanism of procrastination, effective management of time and tasks, sleeping time, environment restructuring and reduction of distractors, identification of specific task-oriented strategies assigning achievement to one's own actions, among others (Zimmerman, 2013; Zimmerman et al., 2017). Thirdly, an important part of the intervention was carried out through video recordings on the online platform Flip, which, together with being a vehicle to convey content and strengthening English oral skills (Öztürk and Çakıroğlu, 2021), became a virtual space for interpersonal relationships and interaction under the safe environment of academic material, as also evidenced in studies by Cherng-Jyh et al. (2022), Maluenda-Albornoz et al. (2022), and Contreras et al. (2023).

According to the above, the intervention fostered SRL awareness, the application of SRL strategies in their discipline under ERT, and oral interaction with peers through video exchange. Consequently, oral practice, which arguably contributes to the development of speaking skills, was assured in terms of time and dedication from participants —an aspect that had been negatively affected the previous cohort because of COVID-19. In this way, the intervention mimicked normal classroom conditions of face-to-face communication, including the receptive skill of listening and the productive skill of speaking.

TABLE 8 Between-subject effects for engagement.

Cases	Sum of squares	df	Mean square	F	p	η^2	η^2_p
Group	1347.158	1	1347.131	5.179	0.027	0.044	0.058
Residuals	21297.336	68	259.732				

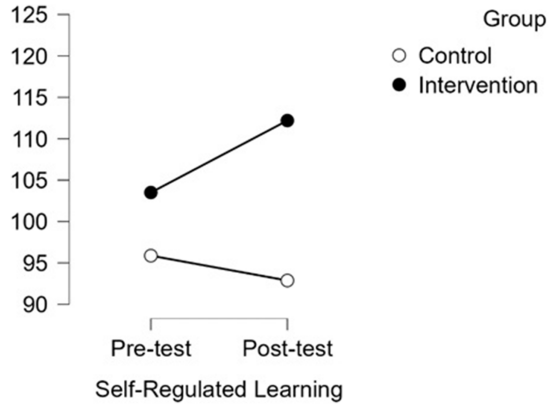

FIGURE 2
Interaction effect between groups and pre-post-test for SRL.

TABLE 9 Post-hoc comparisons: group engagement.

		Mean difference	SE	t	Cohen's d	p_{bonf}
Control, Pre-test	Intervention, Pre-test	−3.111	3.689	−0.839	−0.237	1.000
	Control, Post-test	10.067	3.411	2.949	0.761	0.025*
	Intervention, Post-test	−1.259	3.682	−0.344	−0.096	1.000
Intervention, Pre-test	Control, Post-test	13.155	3.690	3.565	0.989	0.003**
	Intervention, Post-test	1.855	1.652	1.116	0.141	1.000
Control, Post-test	Intervention, Post-test	−11.331	3.642	−3.059	−0.859	0.013*

*$p < 0.05$; **$p < 0.01$.

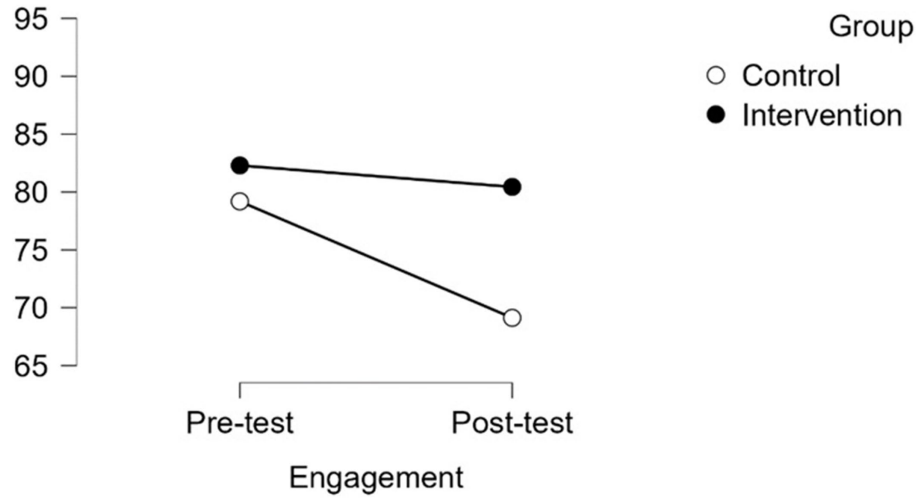

FIGURE 3
Interaction effect between groups and pre-post-test for engagement.

5.2 To what extent does engagement increase after the implementation of an intracurricular intervention aiming at SRL development?

Regarding engagement level, results showed a significant decrease in the control group, with it going down over the course of the academic term. While, on the other hand, even though the intervention group also decreased their engagement in the post-test compared to the pre-test, they did so only slightly since that difference was not significant (Fredricks and McColskey, 2012). These findings would be reflective of the intervention not being effective to improve engagement level, however, it could also be seemingly acting as a protective factor on motivation during the harsh conditions of ERT (Avila and Genio, 2020; Quang et al., 2022).

These results on engagement appear to be quite valuable. Though the pedagogical strategy was designed to improve SRL, the team of researchers also expected a motivational effect coming from the active-participative learning experiences involved in it; plus, the features associated to technology, which would raise enthusiasm and create connectedness among students, as found by Baber (2022) and Li et al. (2022). For this reason, even when the strategy failed to improve engagement, it succeeded in maintaining consistent motivational levels throughout the academic term (Avila et al., 2021). Since this decrease was modest, it might be argued that the pedagogical intervention served the said purpose, too. This becomes more apparent when we observe the dramatic decline in engagement level in the control group, as revealed in the post-test.

In addition, the intervention seemed to have a positive impact on attendance, actual class participation, and amount of asynchronous work effectively carried out by students, based on online analytics and monitored work by professors. These engagement indicators might be considered as evidence of behavioural change and might suggest a positive effect on motivation as well. These findings are in line with those reported in similar studies (Qutishat et al., 2022). The researchers could also experience firsthand learners' willingness to engage actively in lessons and tasks, as well as their positive evaluation towards the overall experience. In the same vein, self-assessment and content analysis of their entries from video submissions revealed that several elements from the intervention were positively perceived by learners, such as, the utility of a planner for effective time management, the significance of receiving timely positive and corrective feedback as a motivating factor to make progress and attain objectives, and the use of the oral medium as a vehicle to collectively reflect and strengthen SRL, while developing English speaking skills (Contreras et al., 2023).

It seems that the students' participation in a well-organized intervention, embedded in the course syllabus contents, was crucial to encourage them to take control of their learning and assume agency over their academic duties, which, in itself, was motivating for them. From the researchers' perspective, the intervention consisted of a series of activities that added varying degrees of complexity, demanding students to engage in elaboration at various levels. This could have had a negative effect on their motivation, however, this was not the case, as engagement was maintained throughout the course. Thus, the results suggest that this might be evidence of the protective effects of a well-designed and systematic teaching-learning strategy on students' motivational states, as the one applied in the study.

6 Conclusion

The challenging circumstances faced by undergraduate students in the context of ERT emphasized the need for effective strategies to enhance their autonomy, competence, and satisfaction with learning, as well as their sense of connection with instructors and peers. The curriculum-integrated intervention designed by the researchers effectively armed students with essential SRL competencies, which was reflected not only in the quantitative results of increased SRL levels, but also in learners' positive disposition towards academic work. This assertion comes from learners' active participation, attendance, completion of tasks and their own overall positive appraisal of the experience expressed through self-assessment and video reflections (Contreras et al., 2023).

It can be concluded that purposeful systematic training on SRL, such as the intervention framework presented in this study, results in positive outcomes in university students' academic life, and serves as crucial foundation to foster self-discipline and self-efficacy. EFL learners who are taught SRL strategies develop skills and acquire tools that are likely to enhance their performance and empower them to face complex challenges, to adapt to unusually demanding learning environments and to cultivate commitment to self-directed learning.

By examining the aspects above, this research attempts to contribute to the understanding of the impact of SRL instruction in higher education within a specific framework aimed at an EFL undergraduate level within the setting of confinement during the COVID-19 crisis.

6.1 Implications and limitations

Despite the limited number of participants, this research offers several insights about SFL instruction that can be applied to Chilean higher education. The chief aspect that stands out is the necessity for carefully planned methodologies that incorporate the development of SRL metacognitive skills as a foundational ground, particularly when students require an array of resources for autonomous work in the absence of traditional in-person instruction. Promoting SRL is a valuable teaching endeavour, as self-regulated learners are likely to apply these strategies across courses, enabling them to develop essential SRL tools to succeed academically and progress in contexts that demand initiative and continuous improvement in their learning path.

EFL learners could greatly benefit from this instructional approach since systematic practice in L2 requires the deployment of SRL-related strategies and skills for students to become competent language users. The communicative nature of language courses in EFL settings, where speaking skills represent the most visible aspect of proficiency (McDonough and Shaw, 2003), is a natural fit for the application of SRL features as explored in this study. With this model, SRL strategies and speaking competence became intertwined and mutually beneficial, as students could develop their ability to self-regulate their learning while simultaneously improving their speaking proficiency and, in turn, maintaining motivation and willingness to learn. This may be seen as a synergistic process where SRL instruction and the enhancement of speaking skills would mutually reinforce each other. Thus, EFL approaches could greatly benefit from this symbiotic relationship in course design where SRL becomes a backbone for language practice and acquisition.

Active methodologies and technological tools may have played a crucial role in gathering high participation and involvement in the study. Particularly, task completion and the promotion of metacognitive skills, such as progress monitoring and video-based self-reflection are noteworthy practices to make sense of learning experiences, and then take action (Li and Peng, 2018). In addition, when reflection is carried out in oral mode, immediately after students have been presented with new information, as was done in this intervention (Tochon, 2013; Cowan, 2019). For instructors, reflections expressed by learners may offer an eye-opening experience as students' insights on pedagogical matters not only foster a closer bond, but also serves as a stimulus for improving teaching practices.

One element that appeared somewhat redundant in the intervention design was the inclusion of open-ended questions in the weekly self-assessments, as some responses gathered through this instrument closely duplicated reflections submitted in the weekly videos. Overloading students with non-essential tasks could be discouraging and may hinder systematic record keeping. Additionally, collecting excessive data without the capacity to process it effectively can become an overwhelming activity for professors. Together with this, the repetitive nature of some tasks over a 10-week period may have resulted in reduced enthusiasm among students, which may help explain the maintenance in engagement level, rather than an increase. Also, when planning similar interventions is important to consider the idiosyncratic nature of students' engagement and self-regulation. Each learner may have different motivations and initial competencies which will influence their disposition towards the task interventions. Also, as this study was done in a ERT context, future endeavours should aim to replicate this design in face-to-face contexts.

Finally, regarding measurement, this research used a combined measure of two scales: the Self-Regulated Learning Practices Scale and the Self-Efficacy Questionnaire for self-regulation, without precedent. The reason for this combination was to include different indicators (items) in the same measure, considering both cognitive and behavioural components to obtain a better understanding of this variable. This implies a limitation because the new measure was not psychometrically tested before its use. Consequently, the analysis of the results must account for this limitation.

Data availability statement

The original contributions presented in the study are publicly available. This data can be found here: https://doi.org/10.6084/m9.figshare.26300194.v1.

Ethics statement

The studies involving humans were approved by Ethics, Bioethics and Biosafety committee, University of Concepción. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

RO-T: Conceptualization, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. YC-S: Conceptualization, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. CS-C: Conceptualization, Formal Analysis, Investigation, Methodology, Project administration, Supervision, Visualization,

Writing – original draft, Writing – review & editing. JM-A: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. CP-V: Formal Analysis, Funding acquisition, Investigation, Methodology, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing. AQ-E: Formal Analysis, Investigation, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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