Teaching self-regulation in elementary school classrooms

La enseñanza de la autorregulación en aulas de educación primaria

Ensinar autorregulação nas aulas de ensino fundamental

DOI: https://doi.org/10.18861/cied.2021.12.2.3055

Valentina Ronqui
Universidad Católica del Uruguay
Uruguay
valeronqui@gmail.com
ORCID: 0000-0002-8676-1518

María Fernanda Sánchez
Universidad Católica del Uruguay
Uruguay
fernandasanch@gmail.com
ORCID: 0000-0002-4237-0769

Daniel Trías
Universidad Católica del Uruguay
Uruguay
gtrias@ucu.edu.uy
ORCID: 0000-0003-1274-9134

Received: December 14, 2020
Approved: March 15, 2021

How to cite: Ronqui, V., Sánchez, M. F., & Trías, D. (2021). Teaching self-regulation in elementary school classrooms. *Cuadernos de Investigación Educativa, 12*(2). https://doi.org/10.18861/cied.2021.12.2.3055

Abstract

The explicit teaching of self-regulation can contribute to improving text comprehension, although its effective implementation in elementary school classrooms does not seem to be so widespread. The objective of this study is to evaluate the incidence of teaching self-regulation strategies in learning regarding the comprehension of written texts through educational intervention to be implemented in classrooms, to support academic learning by fifth-grade students, from texts in the area of Social Sciences. It is expected to determine the intervention effects also in students diagnosed with dyslexia. Sixty-nine 5th-grade students from a medium-high socioeconomic school in Montevideo participated in the study, 20 of whom were diagnosed with dyslexia. A quasi-experimental study was conducted with pre-post measures and a quasi-control group. The experimental group participated in a classroom intervention led by a teacher, focused on teaching self-regulated learning strategies in reading comprehension of information texts and distributed in twelve sessions of one hour each. Tests of text comprehension, self-regulated learning and reading efficacy were used. An ANCOVA test and non-parametric statistics were used in the different comparisons. Participants in the experimental condition significantly increased their scores in text comprehension and self-regulation. As for the children diagnosed with dyslexia in the experimental group, a significant increase was observed with respect to their self-regulation score. Although classroom intervention benefits the students as a whole, the differential effects of teaching self-regulation are under discussion. The characteristics of the intervention make its implementation feasible in elementary education classrooms when addressing text comprehension and learning.

Keywords: reading comprehension, self-regulated learning, metacognition, strategies, teaching.

Resumen

La enseñanza explícita de la autorregulación puede contribuir al mejoramiento de la comprensión de textos, aunque no parece tan extendida su implementación efectiva en las aulas de educación primaria. El objetivo es evaluar la incidencia de la enseñanza de estrategias de autorregulación del aprendizaje en la comprensión de textos escritos, mediante una intervención educativa implementada en el aula, para apoyar el aprendizaje académico que realizan escolares de quinto año a partir de textos en el área de ciencias sociales. Se espera determinar los efectos de la intervención también en los estudiantes con diagnóstico de dislexia. Participaron 69 escolares de 5.° año de un colegio de nivel socioeconómico medio-alto de Montevideo, y 20 de ellos presentaban diagnóstico de dislexia. Se realizó un estudio cuasi experimental con medidas pre-post y grupo de cuasi-control. El grupo experimental participó de una intervención en el aula a cargo de una maestra, enfocada en la enseñanza de estrategias de aprendizaje autorregulado en la comprensión lectora de textos informativos, y distribuida en doce sesiones de una hora cada una. Se administraron pruebas de comprensión de textos, autorregulación del aprendizaje y eficacia lectora. En las distintas comparaciones se utilizó la prueba ANCOVA así como estadísticos no paramétricos. Los participantes en la condición experimental aumentaron significativamente su puntuación en comprensión de textos y en autorregulación. En los niños con diagnóstico de dislexia del grupo experimental se observó un aumento significativo con respecto a su puntuación en autorregulación. Si bien la intervención en el aula beneficia al conjunto de los estudiantes, se discute sobre los efectos diferenciales de la enseñanza de la autorregulación. Las características de la intervención vuelven factible su implementación en el aula de educación primaria a la hora de abordar la comprensión y el aprendizaje a partir de textos.

Palabras clave: comprensión lectora, aprendizaje autorregulado, metacognición, estrategias, enseñanza.

Resumo

O ensino explícito da autorregulação pode contribuir no melhoramento da compreensão textual, embora não pareça extensiva sua efetiva implementação nas aulas de ensino fundamental. O objetivo é avaliar a incidência do ensino de estratégias de autorregulação da aprendizagem na compreensão de textos escritos, por meio de uma intervenção educativa implementada na sala de aula, aos fins de apoiar a aprendizagem acadêmica de alunos da quinta série a partir de textos da área de ciências sociais. Confia-se, também, determinar os efeitos da intervenção em alunos com diagnóstico de dislexia. Participaram 69 estudantes da quinta série de uma escola de nível socioeconômico meio-alto de Montevidéu, dos quais 20 tinham diagnóstico de dislexia. Uma pesquisa quase experimental foi realizada com medidas pré-pós e um grupo quase-controle. O grupo experimental participou de uma intervenção realizada por uma professora na sala de aula, voltada para o ensino de estratégias de aprendizagem autorregulado na compreensão leitora de textos informativos, e distribuída em doze sessões de uma hora cada. Foram aplicados testes de compreensão de textos, autorregulação da aprendizagem e eficiência na leitura. Foram usados o teste ANCOVA e a estatística não paramétrica nas diferentes comparações. Os participantes na condição experimental aumentaram significativamente suas pontuações em compreensão de texto e autorregulação. Nas crianças com diagnóstico de dislexia do grupo experimental, foi observado um aumento significativo no escore de autorregulação. Embora a intervenção em sala de aula beneficie todos os alunos, discute-se sobre os efeitos diferenciais do ensino da autorregulação. As características da intervenção permitem sua implementação em salas de aula do ensino fundamental na abordagem da compreensão e aprendizagem de textos.

Palavras-chave: compreensão leitora, aprendizagem autorregulada, metacognição, estratégias, ensino.

Introduction

The teaching of self-regulated learning is a challenge at different levels of the educational system, as well as for those researching on the subject. The different educational systems around the world seek to promote flexible learning that allows lifelong learning (UNESCO, 2016). In Uruguay, interest in the development of socio-emotional skills and, self-regulation in learning in particular, has also been growing (INEEd, for its acronym in Spanish: National Institute for Educational Evaluation, 2018). The teaching of self-regulation questions effectively the experiences and instructional aids that contribute to its development (Alexander, 2018; Zimmerman, 2013).

From research in educational psychology, self-regulated learning is conceived as a set of psychological processes by which people systemically govern their own thoughts, feelings, and actions to achieve their goals in academic situations (Zeidner & Stoeger, 2019). Self-regulated learning is considered a modulating variable that has an impact on student performance at different levels of the educational system (Dent & Koenka, 2016).

There are different theoretical models accounting for the processes involved in self-regulation and their relationships with each other, of which Zimmerman's Cyclical Phases Model is the most widely used in educational research (Greene, 2018). This model focuses particularly on cognitive and metacognitive issues and conceives self-regulation as a recurring cycle of planning, execution, and self-reflection phases. In each phase, a series of sub-processes such as goal setting, task analysis, self-efficacy, monitoring, process reflection, and self-reactions are deployed (Zimmerman, 2013). On this theoretical basis, the teaching potential for self-regulation has been explored in different domains such as text comprehension, mathematics, and science learning (Panadero, 2017).

Self-regulated learning and text comprehension

The interest in self-regulation strategies and their teaching is linked to one of the skills that occupy the world's educational systems, such as text comprehension. Learning to understand texts is crucial to continue learning and is one of the preferred ways for the education system to access knowledge (Kim, 2015). Understanding and learning from texts imply, for example, the development of self-regulation strategies for cognitive, metacognitive, and affective-motivational factors. In Uruguay, the Aristas 2017 report (INEEd, 2018) concludes that in terms of text comprehension, almost half of the students in the sixth year of primary education fail to generalize complex implicit information or draw conclusions from arguments that involve global reading.

With a focus on self-regulation strategies, it is assumed that monitoring and regulating the reading process has significant effects on text comprehension (Steiner *et al.*, 2020). In fact, the level of mastery of strategies linked to the planning, execution, and evaluation of the reading activity could largely explain the differences between the worst and best readers (Fonseca *et al.*,

2014). Therefore, the development of self-regulation strategies contributes to deeper levels of comprehension and may be even more necessary in virtual contexts (Burin *et al*., 2020).

In order to achieve meaningful handling of a text's content, various processes requiring teaching must be activated (Gaeta, 2015). Accumulated research shows that explicit teaching of self-regulation strategies can contribute positively to learning in different domains and educational levels (de Boer *et al*., 2018; Dignath & Büttner, 2008; Perry *et al*., 2018). To this end, strategy teaching should be explicit: combining cognitive, metacognitive and volitional strategies and adjusting to the needs for the task (Dignath & Büttner, 2008). In particular, the positive effect of strategy teaching is observed in learning to read and write at the elementary school level (Dignath *et al*., 2008; Okkinga *et al*., 2018). Therefore, explicit teaching of self-regulated learning strategies may be an avenue to improve the highly valued ability to comprehend and learn from texts.

In a meta-analysis pooling 52 studies in classroom settings, Okkinga *et al*. (2018) capture the positive effects of strategy teaching. As a result of the interventions, their findings highlight that students between 8 and 14 years of age see increased performance in terms of text comprehension, suggesting the importance of explicit strategy teaching at that stage. Similar benefits are found in students with learning disabilities (Sanders *et al*., 2019; Ritchey *et al*., 2017). In their meta-analysis study, Sanders *et al*. (2019) find that most research on children with learning disabilities is conducted in a more controlled context, and advocate for more studies that consider teacher-delivered instruction in the classroom context.

Self-regulation strategies in the classroom

On the one hand, although there are positive effects from the explicit teaching of self-regulation in text comprehension, its effective implementation in classrooms does not seem to be as widespread (Moos & Ringdal, 2012). Teachers consider dedicating time to work on text comprehension, although explicit teaching strategies hardly appear when analyzing classroom activity (Ness, 2016). When addressing text comprehension activities in the classroom, simple participation schemes are generally repeated: text questions (Sánchez-Miguel, 2016), which do not include the explicit teaching of strategies. Along the same line, the low explicitness of metacognitive strategies by teachers is noted in the review of 17 observational studies in classroom contexts (Dignath & Veenman, 2020). Among elementary school teachers, the design of environments to stimulate self-regulation is present but very little time is devoted to teaching strategies explicitly (Dignath & Büttner, 2018).

On the other hand, in Uruguay teachers demand resources and strategies to support students at different reading levels in their classrooms (Machado, 2019). At the same time, there is a low probability that students use strategies linked to monitoring, comprehension and the use of personal resources in complex tasks (INEEd, 2018). It should be considered that self-regulated learning does not develop spontaneously but requires direct instruction, training, and practice (Vandevelde *et al*., 2016).

Looking for possible and effective interventions

Returning to the meta-analysis conducted by Okkinga *et al*. (2018), of the strategies taught, defining reading goals had the greatest impact on text comprehension. Also, thinking aloud during reading and making one's cognitive processes explicit seem to be useful practices to improve strategic ability.

In their meta-analysis, Ripoll and Aguado (2014) collected 39 studies showing that teaching reading comprehension strategies combined with metacognitive approaches produce significant improvements in reading comprehension. The activities linked to self-regulated learning are the activation of prior knowledge, schemas, and knowledge about textual structure, as well as monitoring of one's own comprehension through the use of graphic organizers, self-monitoring, self-questioning, and the use of summarizing as an evaluation strategy.

Ritchey *et al*. (2017) conducted an intervention with 46 5th graders with text comprehension difficulties. They explicitly taught six strategies to small groups outside the regular classroom: to make predictions based on titles and images, to connect with prior knowledge, to repair if comprehension fails, to ask themselves questions, to explain in their own words, and to assess whether they can answer the questions that were asked. They found a significant difference favoring the experimental group in the knowledge and use of comprehension strategies and in text comprehension.

Rogiers *et al*. (2020a) implemented a program of the explicit teaching of strategies for learning through reading in the real classroom context with freshman high school students. Participating teachers were to provide strategies, teach them explicitly, provide opportunities to practice them, and gradually decrease their guidance. The strategies taught were divided into three phases:

- Before (scanning the text, viewing titles and images trying to determine what is the topic of the text, asking themselves about their previous knowledge, and setting goals).

- During (doing a global reading, highlighting the main ideas, asking questions, paraphrasing the content of the text, summarizing, rereading, and linking with previous knowledge, monitoring progress, deciding to change strategy if necessary, and staying on task).

- After reading (ask themselves what they learned about the topic, what they have done well, what they can improve on, and what they could do differently next time).

At the end of the intervention, the students in the experimental group were able to implement a broader and more integrated set of strategies.

Among the previous interventions in the Spanish language is the study by Fonseca *et al*. (2019) with Argentine schoolchildren, in which strategies for monitoring and controlling text comprehension were incorporated into classroom work.

When considering the precedents as a whole, it seems relevant to continue proposing and evaluating classroom interventions based on the explicit teaching of self-regulation strategies for text comprehension involving teachers and assuming classroom constraints.

A further noteworthy issue is to consider the benefits of such interventions for students diagnosed with dyslexia. Ultimately, the idea is to advance knowledge that allows all students to achieve quality learning (Alexander, 2018).

Purpose of the study

The general purpose of the study is to evaluate the incidence of teaching self-regulated learning strategies for the comprehension of written texts through an educational intervention in the classrooms to support the academic learning of 5th-grade students from Social Science texts. Specifically, we expect to determine the effects of the intervention on students diagnosed with dyslexia.

Students who participate in the intervention focused on teaching self-regulation in text comprehension are expected to increase their reading comprehension levels and increase their self-regulation skills (Okkinga *et al*., 2018). Similarly, students diagnosed with dyslexia are expected to increase their levels of text comprehension and self-regulated learning (Sanders *et al*., 2019).

Methodology

Participants

The sample consisted of 69 5th-grade elementary school students from a private institution of medium-high socioeconomic level, in Montevideo, Uruguay (see Table 1). 60.9% were boys and 39.1% were girls, between 10 and 11 years of age. Twenty of the participants (29%) had been diagnosed with dyslexia, 14 of them in the experimental condition and six in the control group.

The school was selected for convenience, given the potential for intervention that it offered and the fact that it was the workplace of one of this article's authors. Two of the class groups were randomly assigned to the experimental condition, while the remaining class group was considered the control group. They attended at least 80% of the intervention sessions.

Table 1
Sample distribution by gender

	Girls	Boys	Total
Experimental Group	19 (27.5%)	27 (39.1%)	46 (66.6%)
Control Group	8 (11.6%)	15 (27.3%)	23 (38.9%)
Total	27 (39.1%)	42 (60.9%)	69 (100%)

Design

This is an applied research study that considers the constraints of the classroom (number of students, curricular decisions, time of the school year). A quasi-experimental study of pre-post design, with a quasi-control group (Shadish *et al*., 2002) is presented. The independent variable considered is the teaching of self-regulated learning strategies, which was varied in two conditions (experimental and control). The dependent variables are text comprehension and self-regulated learning while reading efficacy is considered as a covariate.

Instruments

A text comprehension questionnaire was conducted to assess reading comprehension. There were 16 multiple-choice questions based on the reading of an expository text (Balbi *et al*., 2009; Ramos & Cuetos, 2003). Only one of the four options was correct. The correct answer is credited with one point, for a maximum of 16 points. These questions required comprehension assignments on the base text at a local and global level, as well as the elaboration of the situational model. The reliability of the test, analyzed through Cronbach's alpha, was .73 (Balbi *et al*., 2009). It has been given to Uruguayan schoolchildren for research purposes (Ronqui, 2017; Trías, 2017).

We used the cognition management scale from the ARATEX-R test (Núñez *et al*., 2015) to assess self-regulation learning strategies implied in text comprehension. It gathers strategies contemplated in Pintrich's (2004) self-regulation model. It is particularly focused on the evaluation of the monitoring and supervision conducted during the reading task for comprehension purposes and allows the adjustment of the reading activity proper. This component is particularly relevant in the text comprehension activity. It is a self-report questionnaire to which participants must respond by thinking about what they do when reading texts for the purpose of learning. It consists of four Likert-type items: for example: "To understand a text well I try to link the new information it provides me with what I already know about the topic". Its reliability was estimated by Cronbach's alpha with a .76 value in the study sample. To be used with Uruguayan schoolchildren, two experienced teachers and three classroom teachers were consulted beforehand, who considered that the items were clearly written and their comprehension would be accessible to the students. Furthermore, a pilot study was previously carried out to evaluate the students' adjustment to the instructions, their response options, and the quality of the items.

The TECLE test, which has been adapted, validated, and rated for Uruguayan schoolchildren (Cuadro *et al*., 2009), was used to evaluate reading efficacy by considering accuracy and speed. It is considered a speed test that must be solved in 5 minutes. The direct score is the number of correct answers from 64 items containing a headline sentence and four response options.

Intervention

The intervention's main objective is to teach self-regulated learning strategies when dealing with social science texts in a classroom context. Zimmerman's (2000) Cyclical Phases Model is used to identify learning self-regulation strategies and Sánchez-Miguel's (2016) contributions to the teaching of reading comprehension strategies.

We worked with twelve selected texts in the subject of Social Sciences which follow the school program guidelines and are considered pertinent to the course by the teachers. As the intervention progresses, the complexity of the texts increases, considering their length, the presence of images, and descriptive tables.

In each classroom session, the teacher presents and models a series of self-regulated learning strategies relevant to text comprehension. Then, shared workspaces are offered where students can rehearse the strategies and receive feedback on their activity. And finally, the students are provided with time for autonomous work. Prior to reading, when the text and the assignment are presented, strategies from the planning phase are addressed: activating previous knowledge, establishing objectives, defining expected results, analyzing the assignment, and envisioning a plan of action. In the execution phase during the reading, monitoring is especially addressed by means of questions as criteria for supervising action and presenting alternatives in case of potential difficulties. This phase is followed by feedback from the teacher. In the evaluation phase, at the end of the reading, the focus is on reporting the process and the actions carried out during the reading. Each session ends with a production activity in which each student replies to the guiding questions: development of short answers, elaboration of a summary, and creation of diagrams and conceptual maps.

Procedure

The teacher responsible for implementation began planning the intervention together with the other authors of this paper. Based on this planning, a pilot study was conducted with a group of 5th-grade students from the previous cohort. The assessment instruments were piloted and the variability of the measures was particularly monitored. Three intervention sessions were tested, serving as training for the intervention implementer. Examples of how to present and model self-regulation strategies were identified, as well as possible ways to provide feedback.

Before (T1) and after (T2) the intervention, the dependent variables were assessed through the collective administration of the text comprehension questionnaire and the cognitive management scale. The TECLE test was collectively administered at T1, being considered a covariate. The available school information was collected to identify children diagnosed with dyslexia, considering the reports of specialized technicians certifying it.

After the T1 assessment, the two class groups assigned to the experimental condition participated in 12 intervention sessions. The sessions were conducted by

one of the authors of the present study and involved one hour of classroom work, in two weekly sessions. This intervention was conducted for six weeks, during the second half of the year. Attendance records were taken, planning documents were collected and each work session was audiotaped for later transcription. The first three sessions were supervised from the records of the teacher responsible for implementing the intervention.

Concurrently, the control group worked in the classroom with the same texts following a structure of direct participation (Sánchez-Miguel, 2016) in which the text was presented and questions were asked about it. Once the T2 assessment was conducted, the control group received the same experimental treatment.

During the intervention, the three teachers of the summoned class groups were asked to continue working in their classrooms as planned. In the end, additional details of the objectives and characteristics of the intervention were shared with the teachers.

The study was authorized by the school's administration and the participants' families.

Implementation fidelity

There are several criteria to consider when analyzing the fidelity of the implementation, such as the theoretical bases, the documents presenting the intervention, its effective duration and frequency, its quality, the intervention model, the critical components, or the participants' responses (Century *et al*., 2010; de Leeuw *et al*., 2020).

The teacher pre-planned the classroom intervention, tested it in the pilot study, and based on this made the adjustments she understood to be most appropriate. The 12 planned sessions were developed, addressing the contents and activities previously defined in the classroom context. The participants attended at least 80% of the sessions and carried out their individual activities.

Regarding the presence of the intervention's critical components, based on the transcription of 6 of the 12 sessions, an external observer analyzed and categorized the teacher's statements (Nuñez, 2020). In these sessions, we identified the presence of messages corresponding to different phases of the self-regulation cyclical model (planning, execution, and evaluation). The planning phase was the most prevalent, with more than 40% of the categorized statements. Activation of prior knowledge, development of an action plan, and task analysis prevailed. The execution and evaluation phase varied between 20% and 30% of the statements categorized in the different sessions. The statements aimed at reviewing and revising were the most common in the execution phase. In the evaluation phase, statements related to the process were the most frequent. Analysis of the teaching activity during the intervention confirmed the presence of critical components of the intervention designed according to Zimmerman's Cyclical Phases Model (2000).

Data analysis

The SPSS Version 22 statistical package was used to obtain descriptive statistics. To check the normality of the variables, the Kolmogorov-Smirnov test was performed, with the Lilliefors significance correction. We used ANOVA to compare self-regulation means and ANCOVA for text comprehension means, considering reading efficacy as a covariate. To estimate the effect size, partial eta squared (η^2); was calculated; considering small $\eta^2 = .01$, medium $\eta^2 = .06$, and large $\eta^2 = .14$ (Daily, Mann, Kristjansson, Smith & Zullig, 2019). Nonparametric statistics were used to analyze data from participants diagnosed with dyslexia given their small number: Wilcoxon signed-rank test and the Mann-Whitney test. We calculated r as an effect size estimator in the nonparametric tests (Tomczak & Tomczak, 2014). The significance level considered was $p < .05$.

Results

First, descriptive statistics were calculated for the measures from text comprehension, self-regulated learning, and reading efficacy (see Table 2). To check the normality of the variables, the Kolmogorov-Smirnov test was performed, with the Lilliefors significance correction. The CT-T2 variables showed normal distribution, with $D(69) = .10$, $p = .17$; GC-T1, with $D(69) = .10$, $p = .17$; GC-T2, with $D(69) = .09$, $p = .20$, and TEC-T1, with $D(69) = .09$, $p = .20$. The CT-T1 variable is not distributed normally, with $D(69) = .18$, $p < .001$.

The effect of the intervention on self-regulation strategies was then evaluated by means of ANOVA, comparing the control and experimental groups at both times (T1 and T2). In this self-regulation measure, we observed an interaction effect ($F_{(1,67)} = 9.22$, $p < .00$, $\eta^2 = .12$). The intervention incidence is meaningful and is reflected in the self-regulation strategies linked to cognitive management.

A repeated measures ANCOVA test was used, this time considering the Text Comprehension (TC) measure as the dependent variable, the time of evaluation (T1 and T2), the condition (experimental and control) as independent variables, and the initially evaluated reading efficacy as a covariate. The reading efficacy covariate was meaningful ($F_{(1,66)} = 5.98$, $p = .02$, $\eta^2 = .08$). Interaction effects were also significant ($F_{(1,66)} = 17.90$, $p < .00$, $\eta^2 = .21$). The impact of the intervention was significant and was reflected in a higher score for the experimental group in text comprehension at T2, considering reading efficacy scores.

Table 2

Descriptive statistics on Text Comprehension, Self-Regulation and Reading Efficacy

		Text Comprehension		Self-Regulation		Reading Efficacy
		TC[1]-T1	TC-T2	CM[2]-T1	CM-T2	TEC[3]-T1
Total (n = 69)	M	9.23	10.78	2.89	3.70	31.32
	SD	2.68	2.69	0.84	0.79	10.61
	Min	3.00	4.00	1.00	2.00	12.00
	Max	14.00	16.00	4.25	5.00	56.00
Exptl. (n = 46)	M	8.80	11.15	2.79	3.92	30.74
	SD	2.76	2.78	0.77	0.77	10.96
	Min	3.00	6.00	1.50	2.25	12.00
	Max	14.00	16.00	4.25	5.00	56.00
Exptl.-D[4] (n = 14)	M	8.00	9.79	2.64	4.07	21.64
	SD	3.04	2.94	0.86	0.74	5.51
	Min	3.00	6.00	1.50	2.50	12.00
	Max	13.00	16.00	3.75	5.00	31.00
Control (n = 23)	M	10.09	10.04	2.87	3.25	32.48
	SD	2.33	2.40	0.97	0.64	10.01
	Min	5.00	4.00	1.00	2.00	15.00
	Max	13.00	12.00	4.25	4.25	52.00
Control-D [5] (n = 6)	M	9.67	8.17	2.38	2.67	23.17
	SD	2.58	3.06	1.13	.52	9.00
	Min	6.00	4.00	1.00	2.00	15.00
	Max	13.00	12.00	4.25	3.25	39.00

Note. [1] Text comprehension questionnaire. [2] Cognitive management scale. [3] TECLE: Reading Efficacy Test. [4] Children diagnosed with dyslexia in the experimental condition. [5] Children diagnosed with dyslexia in the control condition.

Considering just the participants diagnosed with dyslexia in both conditions, we made comparisons using nonparametric statistics. Each group's evolution was compared in relation to itself in the dependent variables using the Wilcoxon signed-rank test. When considering text comprehension, children diagnosed with dyslexia from the experimental group increased their scores at T2 (*Mdn* = 9.50), although their variation with respect to T1 (*Mdn* = 7.50) was not significant, z = -1.70, p = .09, r = -.32. The slight decrease in the control group at T2 (*Mdn* = 9.00) with respect to T1 (*Mdn* = 9.50) was also not significant, z = -1.19, p = .24, r = -.34. Regarding self-regulation, participants diagnosed with dyslexia in the experimental condition significantly increased their cognitive management score at T2 (*Mdn* = 4.13) relative to T1 (*Mdn* = 2.75), z = -3.18, p < .01, r = -.60. No significant changes were observed in the self-regulation of children with dyslexia within the control group at T2 (*Mdn* = 2.63) with respect to T1 (*Mdn* = 2.38), z = -.84, p = .40, r = -.24.

At the end of the intervention (T2), participants diagnosed with dyslexia in the experimental group (*Mdn* = 4.13) scored significantly higher in cognitive management than their peers in the control group (*Mdn* = 2.63), when compared using the Mann-Whitney test, $U = 6.50$, $z = -2.94$, $p < .01$, $r = -.46$.

Conclusions and discussion

First, it is noteworthy that intervention based on the explicit teaching of self-regulated learning strategies has a positive impact on both text comprehension and self-regulation. This result aligns with the available evidence that self-regulation strategies can be taught explicitly and that it contributes positively to the learning of text comprehension (Dignath & Büttner, 2008; Okkinga *et al*., 2018). This is a relevant relationship if we intend to advance educational interventions that improve students' performances in text comprehension (INEEd, 2018).

Likewise, the effect on text comprehension is to be expected and is observed in informative texts in the subject of social sciences that are commonly studied at this school level. These improved performances when understanding texts go beyond this targeted intervention and represent a tool to continue learning from texts, which is key to the educational system (Kim, 2015). It does not mean that all students solve text comprehension tasks brilliantly, of course, but they have more strategies to cope with them and improve their performance.

In this case, the effect of the intervention in text comprehension is significant when controlling the levels of reading efficacy. The ability to decode accurately and fluently is related to the benefit of the intervention, given the relationship between the variables (Balbi *et al*., 2009). The control of reading efficacy matters insofar as the groups have not been randomly selected, and the quasi-control group is not necessarily equivalent. Therefore, having measured reading efficacy, the effect of the intervention on text comprehension is sustained.

Along the same lines, a positive effect of the intervention was observed with respect to self-regulated learning. After having participated in the intervention, students affirm that they are more aware of cognitive management strategies closely related to text comprehension, such as relating ideas during reading, detecting central ideas, and linking them or relating previous ideas to the new information being read. These are strategies closely related to the task of text comprehension, which enable monitoring guidance, contribute to the control of the activity, and evaluate it in a way that allows for further learning. These strategies are present in the implemented intervention approach. In any case, this significant increase in self-regulation scores may reflect greater student awareness and thus more chances for self-regulation, or the acquisition of declarative knowledge allowing them to say what to do but not necessarily do it. The convergence with the text comprehension score suggests that it reflects a different way of engaging and self-regulating text comprehension activities.

Secondly, it should be noted that these effects were observed from an intervention conducted in a classroom context, assuming the dynamics of the school environment (content, purposes, number of students, forms of interaction, distractions, etc.) and no longer in a more controlled context such as a lab.

The explicitness of self-regulation strategies enriches the structure of direct participation that is usually found in class with text comprehension activities (Sánchez-Miguel, 2016). This is a relevant aspect of this research since it is based on the premise that the teaching of self-regulation is not yet widespread in classrooms (Dignath & Veenman, 2020; Ness, 2016).

Evidence of intervention fidelity solidifies the results and allows for a better characterization of the intervention (de Leeuw *et al*., 2020). In this case, conducting the intervention implied an in-service training opportunity for the teacher: access to theory and research on the subject, filtering these contents from her classroom experience, selecting the strategies to be addressed, and finally applying this approach in her classroom dynamics. Presumably, explicitly proposing self-regulation strategies in class implies developing the teacher's own self-regulation (Kramarski, 2018). The selection of several strategies based on Zimmerman's (2013) Cyclical Phases Model enriches teaching and at the same time allows for adjusting to an activity as complex as text comprehension. Although the implemented intervention focuses on self-regulation strategies, the climate that this requires and the instances of metacognitive reflection that go beyond the strategies for both students and teachers cannot be overlooked.

Thirdly, the intervention was conducted in the classroom with mixed groups where children with different characteristics and profiles coexist, including students diagnosed with dyslexia. These students' inclusion is a permanent challenge for educational efforts and at the same time, a task demanded by previous research (Sanders *et al*., 2019). When considering its effects just on the children diagnosed with dyslexia participating in the intervention, we observe an increase in their self-regulation scores, i.e., greater awareness of their cognitive management processes and perhaps greater use of these strategies. This increase provides greater chances of on-task control which, if maintained, may contribute to their future academic performance. However, their text comprehension scores are not statistically significant. In order to achieve a significant text comprehension effect in these children diagnosed with dyslexia, some strategies that would allow them to face possible reading difficulties, problems related to vocabulary, fatigue, and the affective issues that reading can generate, should be considered more carefully. Enriching the intervention by considering some of these elements could be beneficial for the students as a whole. Likewise, the intensity of the intervention could be increased by adding some sessions or short homework assignments.

One of the limitations of this study is the small sample size, particularly affecting the comparison of children diagnosed with dyslexia. At the same time, having a dyslexia diagnosis does not describe the situation of the participants or the state of their reading processes at the time of the study. The inclusion of these children is considered a contribution. As progress is being made in educational inclusion, the knowledge of the effects of different educational interventions and their requirements should be further explored.

Although the use of instruments is adjusted for the purposes and scope of the research, the evaluation of complex processes such as text comprehension and self-regulated learning is another of the limits that should be noted. When assessing text comprehension there is a lack of consensus and some difficulties, given the multiplicity of processes that comprise it (Calet *et al*., 2019). It is outlined

that the assessment of self-regulation is one of the most important research challenges in this field (Panadero *et al*., 2015). Particularly, when using self-reports, elementary school students may have difficulties in generalizing what their typical way of coping with the task is and may be positively biased. Therefore, future interventions could triangulate self-regulation measures obtained from self-reports with other assessment tools such as Think Aloud Analysis and activity traces (Heirweg *et al.*, 2019; Rogiers *et al*., 2020b). Future research should consider an assessment by trying to take into account the complexity of the processes involved in text comprehension self-regulation, the methodological requirements of good measures, and the educational uses of good measures. Surely the combination of quantitative and qualitative approaches will be welcome to meet this challenge.

One of the challenges to be addressed in future studies derives from the possibilities and demands faced by students when learning with multiple texts and digital mediation. Reading texts in a digital context demands greater self-regulation from students (Burin *et al*., 2020), so sustaining the activity through educational action becomes highly relevant.

Undoubtedly, one of the main challenges for the future is to increase the involvement of teachers in self-regulation research. This will allow for the building of more relevant and useful knowledge for the educational task in the promotion of learning and development processes. At the same time, it will permit extending the benefits of teaching self-regulated learning to classroom activities.

This intervention shows that implementing self-regulated learning strategies focused on reading comprehension is beneficial for students as a whole and can be conducted in ways that are compatible with the dynamics, demands, and needs of classroom work. It constitutes a possible way to advance quality education, which enables lifelong learning and encompasses all students.

Notes:

Final approval of the article:
Mag. Verónica Zorrilla de San Martín, editor in charge of the journal.

Authorship contribution:
All authors participated equally in the stages of research design, data collection, processing, analysis and drafting of the text.

References

ALEXANDER, P. A. (2018). Looking down the Road: Future Directions for Research on Depth and Regulation of Strategic Processing. *British Journal of Educational Psychology*, (88), 152-166. https://doi.org/10.1111/bjep.12204

BALBI, A., CUADRO, A., & TRÍAS, D. (2009). Comprensión lectora y reconocimiento de palabras. *Ciencias Psicológicas*, *3*(2), 153-160.

BURIN, D. I., GONZÁLEZ, F. M., BARREYRO, J. P., & INJOQUE-RICLE, I. (2020). Metacognitive Regulation Contributes to Digital Text Comprehension

in E-learning. *Metacognition and Learning*, *15*(3), 391-410. https://doi.org/10.1007/s11409-020-09226-8

CALET, N., LÓPEZ-REYES, R., & JIMÉNEZ-FERNÁNDEZ, G. (2019). Do Reading Comprehension Assessment Tests Result in the same Reading Profile? A Study of Spanish Primary School Children. *Journal of Research in Reading, 43*(1), 98-115. https://doi.org/10.1111/1467-9817.12292

CENTURY, J., RUDNICK, M., & FREEMAN, C. (2010). A Framework for Measuring Fidelity of Implementation: A Foundation for Shared Language and Accumulation of Knowledge. *American Journal of Evaluation*, *31*(2), 199-218. https://doi.org/10.1177/1098214010366173

CUADRO, A., COSTA, D., TRÍAS, D., & PONCE DE LEÓN, P. (2009). *Manual técnico del test de eficacia lectora (TECLE)*. Prensa Médica Latinoamericana.

DAILY, S. M., MANN, M. J., KRISTJANSSON, A. L., SMITH, M. L., & ZULLIG, K. J. (2019). School Climate and Academic Achievement in Middle and High School Students Students. *Journal of School Health*, *89*(3), 173-180. https://doi.org/10.1111/josh.12726_

DE BOER, H., DONKER, A. S., KOSTONS, D. D. N. M., & VAN DER WERF, G. P. C. (2018). Long-term Effects of Metacognitive Strategy Instruction on Student Academic Performance: A Meta-analysis. *Educational Research Review*, *24*, 98-115. https://doi.org/10.1016/j.edurev.2018.03.002

DE LEEUW, R. R., DE BOER, A. A., & MINNAERT, A. E. M. G. (2020). The Proof of the Intervention Is in the Implementation; A Systematic Review about Implementation Fidelity of Classroom-Based Interventions Facilitating Social Participation of Students with Social-Emotional Problems or Behavioural Difficulties. *International Journal of Educational Research Open*, *1*, 100002. https://doi.org/10.1016/j.ijedro.2020.100002

DENT, A. L., & KOENKA, A. C. (2016). The Relation Between Self-Regulated Learning and Academic Achievement across Childhood and Adolescence: A Meta-Analysis. *Educational Psychology Review*, *28*(3), 425-474. https://doi.org/10.1007/s10648-015-9320-8

DIGNATH, C., BUETTNER, G., & LANGFELDT, H. P. (2008). How can primary school students learn self-regulated learning strategies most effectively?: A Meta-analysis on Self-regulation Training Programmes. *Educational Research Review*, *3*(2), 101-129. https://doi.org/10.1016/j.edurev.2008.02.003

DIGNATH, C., & BÜTTNER, G. (2008). Components of Fostering Self-regulated Learning among Students. A Meta-analysis on Intervention Studies at Primary and Secondary School Level. *Metacognition and Learning, 3*(3), 231-264. https://doi.org/10.1007/s11409-008-9029-x

DIGNATH, C., & BÜTTNER, G. (2018). Teachers' Direct and Indirect Promotion of Self-Regulated Learning in Primary and Secondary School Mathematics Classes – Insights from Video-Based Classroom Observations and Teacher Interviews. *Metacognition and Learning*, 13(2), 127-157. https://doi.org/10.1007/s11409-018-9181-x

DIGNATH, C., & VEENMAN, M. V. J. (2020). The Role of Direct Strategy Instruction and Indirect Activation of Self-Regulated Learning - Evidence from

Classroom Observation Studies. *Educational Psychology Review, 33*(2), 489-533. https://doi.org/10.1007/s10648-020-09534-0

FONSECA, L., MIGLIARDO, G., SIMIAN, M., & OLMOS, R. (2019). Estrategias para mejorar la comprensión lectora: impacto de un programa de intervención en español. *Psicología Educativa*, *25*(2), 91-99. https://doi.org/10.5093/psed2019a1

FONSECA, L., PUJALS, M., LASALA, E., LAGOMARSINO, I., MIGLIARDO, G., ALDREY, A., BUONSANTI, L., & BARREIRO, J. P. (2014). Desarrollo de habilidades de comprensión lectora en niños de escuelas de distintos sectores socioeconómicos. *Revista Neuropsicología Latinoamericana*, *6*(1), 41-50.

GAETA, M. L. (2015). Aspectos personales que favorecen la autorregulación del aprendizaje en la comprensión de textos académicos en estudiantes universitarios. *Revista de Docencia Universitaria*, *13*(2), 17-35. https://doi.org/10.4995/redu.2015.5436

GREENE, J. A. (2018). *Self-regulation in education*. Routledge. https://doi.org/10.4324/9781315537450

HEIRWEG, S., DE SMUL, M., DEVOS, G., & VAN KEER, H. (2019). Profiling upper Primary School Students' Self-Regulated Learning Through Self-Report Questionnaires and Think-Aloud Protocol Analysis. *Learning and Individual Differences*, *70*, 155-168. https://doi.org/10.1016/j.lindif.2019.02.001

INEED (2018). *Marco de habilidades socioemocionales en sexto de educación primaria*. https://www.ineed.edu.uy/images/Aristas/Publicaciones/Marcos/Aristas-Marco-HabilidadesSocioemocionales-Primaria.pdf

KIM, Y. S. (2015). Language and Cognitive Predictors of Text Comprehension: Evidence from Multivariate Analysis. *Child Development*, *86*(1), 128-144. https://doi.org/10.1111/cdev.12293

KRAMARSKI, B. (2018). Teachers as Agents in Promoting Students' SRL and Performance. Applications for Teachers' Dual-role Training Program. In D. H. Schunk & J. A. Greene (Eds.), *Handbook of self-regulation of learning and performance* (2nd ed., 223-239). Routledge. https://doi.org/10.4324/9781315697048-15

MACHADO, P. (2019). Necesidades técnico-pedagógicas para la enseñanza de la lectura: voces de maestros noveles. *RELAPAE*, *10*(6), 22-37.

MOOS, D. C., & RINGDAL, A. (2012). Self-Regulated Learning in the Classroom: A Literature Review on the Teacher's Role. *Education Research International*, *2012*, 1-15. https://doi.org/10.1155/2012/423284

NESS, M. (2016). Reading Comprehension Strategies in Secondary Content Area Classrooms: Teacher Use of and Attitudes towards Reading Comprehension Instruction. *Reading Horizons: A Journal of Literacy and Language Arts*, *55*(1).

NÚÑEZ, J. C., AMIEIRO, N., ÁLVAREZ, D., GARCÍA, T. Y DOBARRO, A. (2015). Escala de Evaluación de la Autorregulación del Aprendizaje a partir de Textos (ARATEX-R). *European Journal of Education and Psychology*, *8*(1), 9-22. https://doi.org/10.1016/j.ejeps.2015.10.002

NUÑEZ, R. (2020). *Autorregulación del aprendizaje y comprensión de textos: análisis de una práctica de aula* [Unpublished final degree project]. Universidad Católica del Uruguay.

OKKINGA, M., VAN STEENSEL, R., VAN GELDEREN, A. J. S., VAN SCHOOTEN, E., SLEEGERS, P., & ARENDS, L. R. (2018). Effectiveness of Reading-Strategy Interventions in Whole Classrooms: a Meta-Analysis. *Educational Psychology Review*, *30*(4), 1215-1239. https://doi.org/10.1007/s10648-018-9445-7

PANADERO, E. (2017). A Review of Self-regulated Learning: Six Models and Four Directions for Research. *Frontiers in Psychology*, *8*, 1-28. https://doi.org/10.3389/fpsyg.2017.00422

PANADERO, E., KLUG, J., & JÄRVELÄ, S. (2015). Third Wave of Measurement in the Self-Regulated Learning Field: When Measurement and Intervention come Hand in Hand. *Scandinavian Journal of Educational Research*, *60*(6), 1-13. https://doi.org/10.1080/00313831.2015.1066436

PERRY, J., LUNDIE, D., & GOLDER, G. (2018). Metacognition in Schools: What does the Literature Suggest about the Effectiveness of Teaching Metacognition in Schools? *Educational Review*, *71*(4), 1-18. https://doi.org/10.1080/00131911.2018.1441127

PINTRICH, P. R. (2004). A Conceptual Framework for Assessing Motivation and Self-Regulated Learning in College Students. *Educational Psychology Review, 16*(4), 385-407. https://doi.org/10.1007/s10648-004-0006-x

RAMOS, J. L., & CUETOS, F. (2003). *PROLEC-SE*. TEA.

RIPOLL, J. C., & AGUADO, G. (2014). La mejora de la comprensión lectora en español: un metaanálisis. *Revista de Psicodidáctica/Journal of Psychodidactics*, *19*(1), 27-44. https://doi.org/10.1387/RevPsicodidact.9001

RITCHEY, K. D., PALOMBO, K., SILVERMAN, R. D., & SPEECE, D. L. (2017). Effects of an Informational Text Reading Comprehension Intervention for Fifth-Grade Students. *Learning Disabilities Quarterly*, *40*(2), 68-80. https://doi.org/10.1177/0731948716682689

ROGIERS, A., MERCHIE, E., & VAN KEER, H. (2020). Learner Profile Stability and Change over Time: The Impact of the Explicit Strategy Instruction Program "Learning Light". *Journal of Educational Research*, *113*(1), 26-45. https://doi.org/10.1080/00220671.2019.1711005

ROGIERS, A., MERCHIE, E., & VAN KEER, H. (2020). Opening the Black Box of Students' Text-Learning Processes: A Process Mining Perspective. *Frontline Learning Research*, *8*(3), 40-62. https://doi.org/10.14786/flr.v8i3.527

RONQUI, V. (2017). *El papel del lenguaje y la autorregulación en comprensión de textos según el nivel socioeconómico* [Unpublished master's thesis]. Universidad Católica del Uruguay.

SÁNCHEZ-MIGUEL, E. (2016). Aspiraciones y conocimientos: ¿cómo explicar que la innovación educativa resulte decepcionante? El caso de la comprensión lectora. Álabe, *7*(13), 1-22.

SANDERS, S., LOSINSKI, M., PARKS ENNIS, R., WHITE, W., TEAGARDEN, J., & LANE, J. (2019). A Meta-Analysis of Self-Regulated Strategy Development Reading Interventions to Improve the Reading Comprehension of Students With Disabilities. *Reading and Writing Quarterly*, *35*(4), 339-353. https://doi.org/10.1080/10573569.2018.1545616

SHADISH, W. R., COOK, T. D., & CAMPBELL, D. T. (2002). *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Houghton Mifflin. https://www.alnap.org/system/files/content/resource/files/main/147.pdf

STEINER, M., VAN LOON, M. H., BAYARD, N. S., & ROEBERS, C. M. (2020). Development of Children's Monitoring and Control when Learning from Texts: Effects of Age and Test Format. *Metacognition and Learning*, *15*(1), 3-27. https://doi.org/10.1007/s11409-019-09208-5

TOMCZAK, M., & TOMCZAK, E. (2014). The Need to Report Effect Size Estimates Revisited. An Overview of Some Recommended Measures of Effect Size. *Trends in Sport Sciences*, *1*(21), 19-25.

TRÍAS, D. (2017). *Autorregulación en el aprendizaje, análisis de su desarrollo en distintos contextos socioeducativos* [Unpublished doctoral thesis]. Universidad Autónoma de Madrid.

UNESCO (2016). *Declaración de Incheon para la Educación 2030 y Marco de Acción. Hacia una educación inclusiva y equitativa de calidad y un aprendizaje a lo largo de la vida para todos.* http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Santiago/pdf/ESP-Marco-de-Accion-E2030-aprobado.pdf

VANDEVELDE, S., VAN KEER, H., & MERCHIE, E. (2016). The Challenge of Promoting Self-Regulated Learning among Primary School Children with a Low Socioeconomic and Immigrant Background. *Journal of Educational Research*, *110*(2), 113-139. https://doi.org/10.1080/00220671.2014.999363

ZEIDNER, M., & STOEGER, H. (2019). Self-Regulated Learning (SRL): A guide for the perplexed. *High Ability Studies*, *30*(1-2), 9-51. https://doi.org/10.1080/13598139.2019.1589369

ZIMMERMAN, B. J. (2013). From Cognitive Modeling to Self-Regulation : A Social Cognitive Career Path. *Educactional Psychologist*, *48*(3), 135-147. https://doi.org/10.1080/00461520.2013.794676

ZIMMERMAN, B. J. (2000). Attaining Self-regulation. A Social Cognitive Perspective. In M. Boekaerts, P. Pintrich & M. Zeidner (Eds.), *Handbook of Self-Regulation* (pp. 13-41). Academic Press.