frontiers | Frontiers in Education

TYPE Original Research
PUBLISHED 10 October 2023
DOI 10.3389/feduc.2023.1281438

OPEN ACCESS

EDITED BY
Luisa Losada Puente,
University of A Coruña, Spain

REVIEWED BY
Juan Manuel Trujillo Torres,
University of Granada, Spain
Anouschka Van Leeuwen,
Utrecht University, Netherlands

*CORRESPONDENCE
Slavica Šimić Šašić
ssimic@unizd.hr

RECEIVED 22 August 2023
ACCEPTED 11 September 2023
PUBLISHED 10 October 2023

CITATION
Šimić Šašić S, Nikčević-Milković A and Cindrić M (2023) How much do teachers know about self-regulated learning? To what degree and in what way do they encourage it in students?
Front. Educ. 8:1281438.
doi: 10.3389/feduc.2023.1281438

How much do teachers know about self-regulated learning? To what degree and in what way do they encourage it in students?

Slavica Šimić Šašić[1]*, Anela Nikčević-Milković[2] and Maja Cindrić[1]

[1]Department of Teacher and Preschool Teacher Education, University of Zadar, Zadar, Croatia, [2]Department of Teacher Studies in Gospić, University of Zadar, Gospić, Croatia

Introduction: Self-regulated learning (SRL) is a multidimensional process that involves personal (cognitive and emotional), behavioral, and contextual components. Teachers, as mediators in socialization, can influence SRL in various direct and indirect ways: by instructing students on effective learning strategies and structuring the learning environment. Most teachers agree that students should be helped to become self-regulated in their learning, however, they are unsure of how to do this, which is why they encourage it to a limited degree. Therefore, the objectives of the research were: (1) to examine how much teachers know about SRL, to what degree and how they encourage it in students; (2) to examine the differences in encouraging SRL with regard to gender, seniority, type of school and status of school subjects they teach.

Method: The research was conducted using an online questionnaire at two measurement points. A total of 251/179 primary and secondary school teachers in Croatia participated in the study. To assess teaching knowledge and methods of encouraging SRL, the questionnaire employed both open-ended questions ("Provide your own subjective definition of self-regulated learning."; "How you promote self-regulated learning in your practice? Which approaches are most effective?") and the Self-Regulated Learning (SRL) Encouragement Scale (encouragement of learning planning and learning organization strategies, metacognitive monitoring of learning, elaboration and evaluation, understanding and effort investment).

Results: Teachers only partially know what self-regulated learning constitutes. About two-thirds of teachers have heard of the SRL, but only 14% accurately defines the construct. When defining SRL, they most often emphasize independently regulated/directed learning, and the definitions are mostly partially correct. On the other hand, teachers estimate that they encourage SRL to a significant extent. There are certain discrepancies in the data regarding the methods of encouraging SRL depending on the methodology (qualitative/quantitative). Teachers encourage SRL to a limited extent and provide implicit and indirect SRL encouragement. The results indicate that female teachers and teachers in humanities encourage SRL to a greater extent when compared to natural science and technical subject teachers, and the same goes for elective subject teachers when compared to compulsory subject teachers.

Discussion: The results have theoretical, but also great practical implications when it comes to the implementation of this multidimensional and complex construct in the educational system. They corroborate the theoretical foundations of SRL and SRL encouragement, whilst indicating the need for improving teachers' knowledge and competencies in regard to SRL encouragement in students.

KEYWORDS

encouragement of self-regulated learning, primary and secondary school teachers, self-regulation of learning, teacher knowledge, differences in encouraging self-regulated learning

1. Introduction

Self-regulated learning (SRL) is a multidimensional process that involves personal (cognitive and emotional), behavioral, and contextual components. It is a process that integrates metacognitive aspects (planning, goal-setting, organization, self-monitoring, self-evaluation), cognitive aspects (selecting learning strategies, structuring the environment), as well as motivational aspects (self-efficacy, task interest, self-attribution), leading students to effectively regulate their own learning process (Zimmerman, 2002). According to Zimmerman (2002), SRL unfolds through three phases: during the preparation phase (prior to learning), the student analyses the task, sets goals, plans, selects learning strategies, and defines motivational beliefs. This includes assessing self-efficacy, setting expectations, goal orientation, and intrinsic interest. The performance phase (during learning) involves self-control and self-observation processes. The student focuses on the task, adjusts effort, monitors performance, analyses the conditions under which the performance occurs, and the consequences it entails. This involves applying different ways to enhance performance. The third phase, self-reflection (after learning), includes self-evaluation and self-directed action. The students assess their own achievement, reflect on the reasons behind that achievement, and identify the emotions triggered by that achievement (satisfaction/dissatisfaction) along with adaptive or defensive reactions (Zimmerman, 2002).

The terms SRL and SRL models primarily emerged within the socio-cognitive perspective, with Hadwin and Oshige (2011) asserting that the social context plays a crucial role in shaping and influencing SRL. Teachers, as intermediaries in socialization, can impact SRL in various direct and indirect ways: by teaching students effective learning strategies, or by structuring the learning environment to allow students to discover effective learning strategies on their own (Kistner et al., 2010; Dignath-van Ewijk and van der Werf, 2012; Karlen et al., 2020). Teachers may promote self-regulated learning through direct instruction of learning strategies, both implicit and explicit ones. Implicit instruction involves demonstrating specific behaviors, such as modelling strategy usage or verbalizing thought processes by the teacher. In this case, students are not explicitly informed that the behavior can be an effective learning strategy. This type of instructional strategy is referred to as blind training (Brown et al., 1981). Teachers can also engage their students in strategic behavior by asking questions. On the other hand, through direct instruction, teachers are able to explicitly demonstrate and tell students that a certain activity is a learning strategy that can enhance their performance. They can advise why it's important to use a particular strategy, how to apply it, when or in which situations it's appropriate, and what skills are necessary for its use. In that case, students receive some information about the meaning and importance of that strategy, and Brown et al. (1981) refer to this explicit strategy as informed training. Blind training can improve the use of a specific strategy, but it does not generalize, whereas informed training enables the transfer of strategy application to the appropriate environment, which is particularly useful for less-able students (Veenman, 2007). The highest level of instruction is self-control training, combining guidance in strategy usage and informed training with explicit instructions on how to apply, monitor, check, and evaluate a specific strategy. This type of training facilitates the transfer of strategy application to relevant environments in the most sustainable way (Brown et al., 1981). Pintrich (2002) also emphasizes the need for explicit teaching of metacognitive knowledge. In most cases, teachers instruct metacognition in a rather implicit manner, assuming that students will autonomously acquire knowledge and skills. However, students need to be informed about the significance of strategies and how to use, monitor, and evaluate them. When it comes to encouraging SRL, another possibility comes indirectly through creating a supportive learning environment. The learning environment encompasses not only the characteristics of students and teachers but also the learning content, tasks, and teaching methods. An essential prerequisite for practicing self-regulation in classrooms is a learning environment that enables and encourages students to learn in ways they determine themselves (Kistner et al., 2010). In indirect instruction, the teacher creates a learning environment based on constructivist principles: presenting students with complex, authentic, and meaningful learning activities that promote specific subject knowledge and knowledge about SRL; granting students autonomy/choice in terms of what to learn, when, with whom, and for how long; facilitating self-regulated and meaningful learning directed towards clear objectives; adapting support and feedback to individual student needs in challenging situations; implementing forms of assessment and self-assessment in service of learning enhancement and monitoring, as well as actively involving students in evaluating their own learning; supporting positive self-beliefs related to learning and problem-solving (Karlen et al., 2020). De Corte et al. (2004) emphasize several main principles in their CLIA model (Competence, Learning, Intervention, Assessment): social interaction among students (collaboration), active knowledge construction (constructivism), learning embedded in authentic situations to encourage transfer (situation), and the development of self-regulation skills (self-guidance). Various studies empirically verify the positive effects of strong CLIA-based learning environments, such as improved student problem-solving competencies (Verschaffel et al., 1999), increased self-regulation activity in students, and improved academic achievement (Masui and De Corte, 2005). Vandevelde et al. (2012) highlight modelling, prompting and scaffolding as key tools for fostering learning self-regulation, creating a supportive environment, and explicitly teaching effective self-regulation strategies, while also transitioning from maladaptive to adaptive strategies as needed. In conclusion, we can deduce that there are various approaches to fostering learning self-regulation: (a) direct instruction, modelling, verbalization of thinking, which encourage cognitive and

metacognitive aspects of SRL, such as learning strategies, planning, progress monitoring, comprehension, evaluation, etc.; (b) cognitive-behavioral modification, promoting attention direction and retention, modifying student beliefs and goals, dealing with negative emotions; (c) classroom environment modification, through task types, authority, rewards, student grouping methods (collaborative learning), evaluation methods, altering interpersonal relationships to create a more positive classroom/school atmosphere, etc. Perry et al. (2006) state that students develop effective forms of SRL when engaged in complex, meaningful tasks, when they have a say in their learning, products, and evaluation criteria, when working in groups and seeking feedback from peers, and when evaluating their own learning. Combining direct and indirect approaches yields the best results (Paris and Paris, 2001). In sum, the listed means of promoting SRL show that teachers are able to encourage all components of SRL in all phases of SRL. Furthermore, in the process of self-regulated learning, students seek the support of teachers, value their feedback, and critically reflect on the teaching strategies used (Chaves et al., 2015, 2016).

Teacher knowledge is typically classified into three categories: content knowledge, pedagogical knowledge, and pedagogical content knowledge. Askell-Williams et al. (2012) suggest that teachers should also possess content and pedagogical content knowledge about fostering SRL, including cognitive and metacognitive learning strategies. Karlen et al. (2020) discuss teacher professional competencies in SRL, which encompass teachers' personal competencies in SRL and experience as a self-regulated learner (teacher as a self-regulated learner), as well as competencies in teaching, diagnosing, and supporting SRL in the classroom (teacher as an agent of SRL). Teacher professional competencies in the field of SRL are related to teaching practices and the development of SRL in students (Wilson and Bai, 2010; Moos and Ringdal, 2012; Spruce and Bol, 2015). Studies have shown that teachers rarely integrate SRL into their everyday classroom teaching, that they tend to provide limited direct instructions on strategies, and seldom emphasize metacognitive aspects of SRL (Dignath-van Ewijk and van der Werf, 2012; Vandevelde et al., 2012; Kistner et al., 2015; Spruce and Bol, 2015; Dignath and Büttner, 2018; Karlen et al., 2020). Moreover, targeted SRL training occurs very infrequently (Hamman et al., 2000). While most teachers agree that students need help to develop self-regulated learning, they are unsure about how to achieve this (Perry et al., 2008). Vandevelde et al. (2012) found that teachers stimulate SRL only to a limited extent. Research into the connection between teacher beliefs, knowledge, and teaching practices indicates that teachers express positive beliefs about SRL, but their knowledge about SRL and its implementation in the classroom is generally weak (Spruce and Bol, 2015; Karlen et al., 2020). Dignath-van Ewijk and van der Werf (2012) found that teachers perceive and understand concepts of SRL and "learning to learn" as separate concepts, i.e., they associate SRL with creating a supportive environment and "learning to learn" with teaching learning strategies, while also exhibiting a more positive attitude toward constructivism compared to SRL. Teachers typically grant students freedom in self-regulation but fail to prepare them to handle new challenges (Bolhuis and Voeten, 2001). They prefer to use active teaching methods but do not instruct students in how to learn (de Kock et al., 2005). Similarly, Dignath-van Ewijk and van der Werf (2012) investigated teachers' knowledge about SRL and fostering SRL, finding that most teachers emphasize student autonomy and a constructivist learning environment, while only a smaller portion focus on teaching learning strategies. Wilson and Bai (2010) identified a weak correlation between teachers' knowledge about SRL and their teaching practices when it comes to encouraging SRL. Even teachers with greater knowledge did not consistently exhibit a high level of teaching that supports SRL strategies. Therefore, it is extremely important to promote the development of teacher competencies in the field of SRL so that teachers can effectively encourage it, especially through informed instruction and self-control training for students.

Encouraging SRL depends on teacher characteristics, such as gender, age, teaching experience, teacher beliefs, teacher competencies for their own self-regulation, etc. (Hargraves, 2005). However, research results on this matter are not consistent. Lombaerts et al. (2009) found that the gender of elementary school teachers does not significantly impact the degree to which SRL is encouraged, while some other authors discovered that female teachers tend to use approaches that promote SRL more (Elmas et al., 2011; Yan, 2018). Peeters et al. (2015) determined that older teachers are less likely to support SRL. Lombaerts et al. (2007) established that teaching experience influences the teaching of metacognition in the classroom, while Yan (2018) found that teaching experience is not a significant predictor of SRL encouragement practices in instruction. Yan also noted that elementary school teachers perceive more benefits from SRL than high school teachers. In general, the research confirms that promoting SRL tends to be more beneficial for elementary school students compared to high school students (De Smul et al., 2018). Teachers in middle school and high school create opportunities for learning self-regulation but rarely engage in direct instruction on learning strategies. Teachers in lower grades of elementary school (up to 6th grade) predominantly encourage learning self-regulation (Moos and Ringdal, 2012). Teachers who possess a strong understanding and value the content of their school subject are more likely to use advanced, student-cantered teaching methods (Baumert and Kunter, 2013). Fauzi and Widjajanti (2018) discovered that mathematics teachers more frequently use teaching techniques that promote SRL compared to teachers of other subjects. They also found that mathematics teachers provide more opportunities for students to solve problems using SRL strategies. Chatzistamatiou et al. (2013) emphasized that mathematics teachers employ teaching strategies that facilitate independent learning and creative problem-solving. They also found that, compared to less successful mathematics teachers, the best ones more often utilize techniques that encourage SRL. However, Coggin (2020) did not find differences in teaching SRL among teachers of different subjects (languages, mathematics, natural sciences, social sciences, and others/multiple subjects). Therefore, we wanted to examine how much teachers in Croatia know about SRL and how they encourage it in students. Considering the inconsistent results, we also sought to examine the differences in promoting SRL based on gender, teaching experience, type of school, and school subject status (science field; compulsory/elective). We assume that the knowledge about SRL will be weak, that teachers will rarely promote SRL, especially directly, and we do not expect differences based on gender, teaching experience, type of school, and school subject status.

2. Method

2.1. Participants

The research was conducted as part of a wider research project titled "The Role of Teachers in Self-Regulated Learning

TABLE 1 Sample characteristics with respect to gender, teaching experience, type of school, science field of the school subject, and subject's status.

	%
Gender	
Women	80.88
Men	19.12
Years of teaching experience	
0–7	22.71
8–15	38.65
16–23	24.30
Over 24	14.34
Type of school	
Elementary	47.41
Grammar (high) school	21.12
Vocational (high) school	31.47
Subject's science field	
Humanities	46.61
Social	9.96
Natural	27.89
Technical	15.54
Subject's status	
Compulsory	90.44
Elective	9.56

Encouragement," and the data were collected across two measurement points. In the first measurement point, 251 and in the second, 179 primary and secondary school teachers from 17 counties of the Republic of Croatia participated. Table 1 shows the sample structure in the first measurement point (the sample structure in the second measurement point was similar). The average age of the teachers was 42 years.

2.2. Measurement instrument

General Information and SRL Knowledge Questionnaire – used to collect data pertaining to gender, teaching experience, type of school where teachers work, field, and the status of the subject they teach. In the first measurement point, we also asked teachers if they had heard of the concept of self-regulated learning (YES/NO) and to provide their own subjective definition of self-regulated learning. In the second measurement point, among other things, we asked teachers how they promote self-regulated learning in their practice? Which approaches are most effective? (open-ended questions). Definitions of SRL were evaluated as accurate if they emphasized the majority of SRL elements (e.g., "…an active process in which students set learning goals, use various learning strategies, monitor their progress, and adapt to their environment; "Planning and setting learning goals while consistently monitoring and evaluating what has been learned"), partially accurate if they highlighted several SRL elements (e.g., "Students independently direct their learning and develop learning skills"; "They plan study time, break learning content into smaller units, schedule time for review"), and inaccurate (e.g., "You regulate learning on your own, learn as much as you want"; "Students learn… what they themselves or the teacher think needs to be learned and known"; "Process of directing students towards independent learning"). Teacher responses on the means of SRL encouragement were coded based on the processes tied to individual SRL components and phases (see the categories in Table 2). Two assessors separately analyzed the teachers' responses to open-ended questions, with consensus being ultimately achieved.

Self-Regulated Learning Encouragement Scale (Šimić Šašić et al., in press) – It was constructed based on the existing models of self-regulated learning and the literature on self-regulated learning encouragement, ultimately incorporating 51 statements in total. The analysis revealed a five-factor structure, meaning that the scale measures teacher encouragement of self-regulated learning in the following five areas:

a. Encouragement of Learning Planning and Learning Organization Strategies (ELPLO) – measures the degree to which the planning of learning is encouraged (setting learning goals, allocating time, using learning strategies, organizing the learning environment, encouraging task assessment, identifying causes of success/failure, etc.) and the encouragement of learning organization strategies (breaking content into smaller meaningful units, identifying key concepts, summarizing, asking questions). One example is the following statement: "I ask students to create a study plan or set goals for their learning."
b. Encouragement of Metacognitive Monitoring of Learning (EMML) – the statements pertain to encouraging students to maintain and direct their attention during learning, try various learning/problem-solving approaches, and engage in activities when motivation wanes or negative emotions arise. This includes supporting interest in learning, investing extra effort, reminding students of task value, etc. One such example is the following statement: "I encourage students to direct and maintain their attention on the content they are learning."
c. Encouragement of Elaboration and Evaluation (EEE) – measures the encouragement of explanation/discussion among students, graphical representation of information, application of knowledge/creation, assigning less structured tasks, independent task solving, working in pairs/small groups, and involving students in setting evaluation criteria, self-evaluation, and evaluating the work of others. One such example is the following statement: "I ask students to explain the content they are learning to each other or to discuss the content amongst themselves."
d. Encouragement of Understanding (EU) – the statements pertain to activating previously acquired knowledge, initiating teaching with intriguing tasks, encouraging drawing conclusions, connecting information from various sources, correcting misunderstandings, and linking information to everyday life situations. One such example is the following statement: "I give students enough time to explore and gain understanding of new concepts/content."
e. Encouragement of Effort Investment (EEI) – the statements relate to encouraging students that they can accomplish tasks, motivating effort investment, attributing success to effort, and emphasizing the value of knowledge. One such example is the following statement: "I encourage students suggesting they can learn/accomplish a task."

TABLE 2 Analysis of teachers' responses concerning the SRL definition ($N = 251$).

Areas emphasized in their definitions	Examples of their claims	f
SRL	*…an active process, where students set goals, utilize various learning strategies, monitor their progress, and adapt to their environment…*	36
Learning autonomy	*students learn what they themselves or the teacher believe needs to be learned… you learn as much as you want… regular and independent learning… with the application of their own learning methods and self-discipline…*	48
Learning organization	*the student organizes their own learning… time, responsibilities*	24
Planning (of learning, time)	*…students independently plan their learning… study time… learning methods…*	35
Goal-setting	*setting personal goals… the student determines the goal…*	13
Intrinsic motivation	*students self-motivate… their motivation is to learn well… they learn without external motivation…*	25
Learning strategies	*students independently find the best methods to learn…*	46
Learning supervision	*students self-direct their learning… self-regulate/manage learning… monitor progress… adjust learning methods…*	93
Active learning	*active learning… students active in the learning process…*	7
Efficient learning	*students independently and effectively organize their learning and achieve success… with the goal of personal development…*	
Evaluation	*students value progress… learning… self-evaluation*	5
Effort investment	*students are willing to invest extra effort…*	1
Responsibility for one's own progress	*…students take responsibility for their learning…*	4
Additional learning	*…students expand their knowledge…*	1
Behaviors directed to goals	*…behaviors that achieve the goal…*	1
Seeking help	*…ask for help when something is not clear…*	2
Positive motivation and emotions	*…have positive motivational beliefs and emotions…*	1
Adjusted learning	*…adjusted to the students' abilities, motivation, interests, and capabilities… students' needs…*	2
External regulation	*…we guide students towards independent learning…*	1
Long-term learning	*…students have the goal of attaining knowledge on something permanently…*	1
Do not know		3
No response		4

Teachers were asked to rate their agreement with these statements on a scale from 1 (strongly disagree) to 5 (strongly agree), and the subscales showed satisfactory reliability coefficients with Cronbach's alpha as follows (respectively): 0.90, 0.89, 0.83, 0.85, and 0.71.

2.3. Procedure

The research was conducted in the form of an online questionnaire. Approval for conducting the research was obtained from Ministry of Science and Education of the Republic of Croatia (2019), the Ethics Committee of the University of Zadar, as well as school principals. Teachers were informed about the research's purpose, objectives, and methodology, and their participation was voluntary and anonymous. The questionnaire link was sent to school coordinators who then forwarded it to the teachers. Filling out the questionnaire took approximately 15 min.

2.4. Data processing

Considering that research tends to report different results in relation to teachers' knowledge and beliefs about SRL when using qualitative and quantitative methods (Dignath-van Ewijk and van der Werf, 2012; Šimić Šašić et al., 2021), in accordance with the advantages and disadvantages of each, we measured the teachers' knowledge of SRL and their encouragement of SRL using both open-ended questions and the SRL Encouragement Scale. We analyzed the responses to open-ended questions qualitatively, conducted content analysis, and presented response categories and frequencies. Quantitative data were processed using descriptive and inferential statistics (t-test, analysis of variance, Bonferroni test for *post hoc* analyses).

3. Results

Table 3 presents the teacher responses (%) to the question of whether they have heard of self-regulated learning, along with the analysis of teachers' subjective definitions of SRL. Table 2 provides an analysis of teacher response categories when it comes to defining SRL.

One-third of the teachers stated that they have not heard of SRL. Based on the data and the number of teachers who did not respond or wrote that they did not know, it was found that 21.12% of teachers are not familiar with self-regulated learning. In their

TABLE 3 Analysis of familiarity and accuracy teachers' definitions of SRL.

Have you ever heard of self-regulated learning	f	%	Definition	f	%
Yes	169	67.60	Accurate definition	36	14.34
No	81	32.40	Partially accurate definition	162	64.54
			Inaccurate definition	46	18.33
			No response/do not know	7	2.79

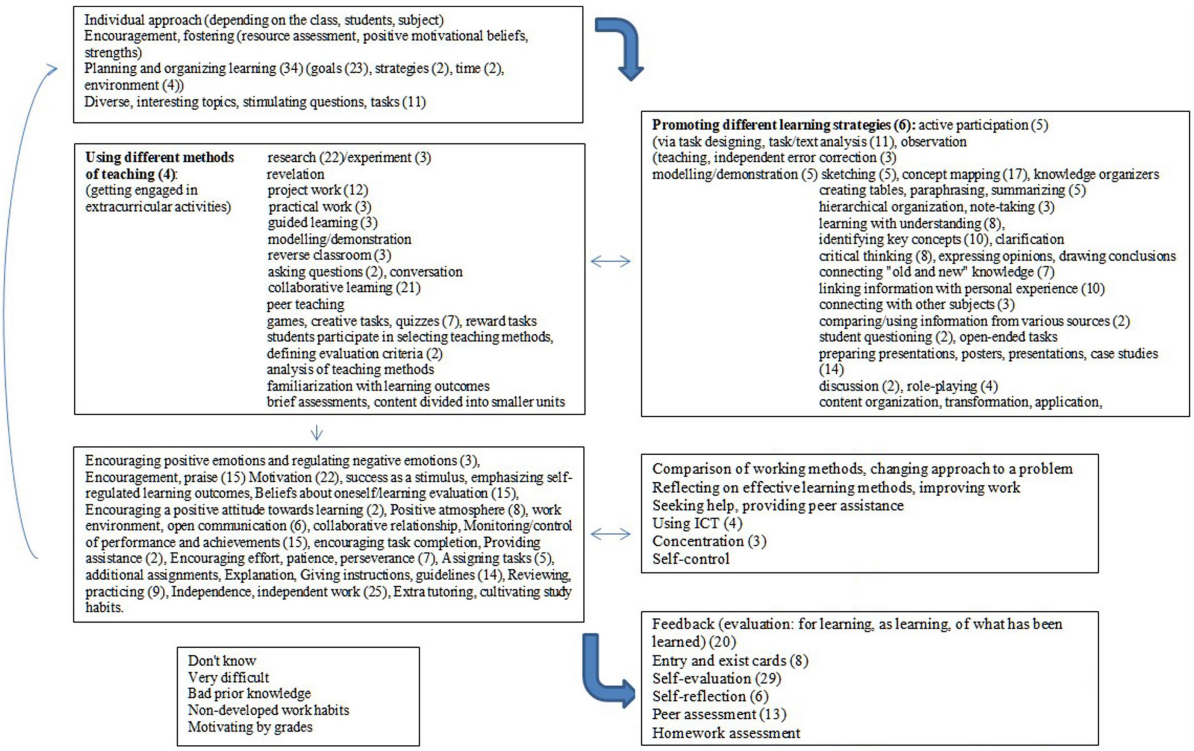

FIGURE 1
Teacher responses to the questions: "How do you encourage self-regulated learning in your practice? What approaches are most effective?" (*N* = 179).

definitions of learning, teachers predominantly emphasized metacognitive monitoring/self-direction, independence, use of learning strategies, and learning planning.

In similar fashion, we analyzed the teachers' responses to the questions in the second measurement point: "How do you encourage self-regulated learning in your practice? What approaches are most effective?." The results of the analysis are presented in Figure 1.

The teachers' responses could have been grouped according to the components of SRL (metacognitive, cognitive, motivational, and contextual), the phases of SRL (preparation, performance, and self-reflection), and the methods of encouraging SRL (direct/indirect). Teachers most commonly referred to encouraging planning and organization of learning, self-evaluation, autonomy, goal-setting, inquiry-based learning, motivating, collaborative learning, providing feedback, creating mind maps, promoting monitoring/performance control, beliefs about the actor, and preparing presentations (Figure 1).

Teachers provided relatively high to very high assessments when it comes to them encouraging SRL. Their estimates suggested that they mostly encouraged effort investment, followed by metacognition and understanding, while having least encouraged learning planning and organizational strategies, as well as elaboration and learning evaluation (Table 4).

The Levene's test showed that all variables have homogeneous variance except for Encouragement of Understanding (which is why a non-parametric test was additionally conducted ultimately yielding the same results; for consistency in presentation, see the included the parametric test). Statistically significant differences were found in terms of gender in all components of promoting SRL except for Encouragement of Effort Investment. Female teachers tended to promote SRL to a greater extent (Table 5).

No differences in encouraging SRL were found based on teaching experience and educational level (primary/secondary school – grammar/vocational school).

The Levene's test showed that all variables have homogeneous variance except for Encouragement of Effort Investment (therefore, an additional non-parametric test was conducted which yielded the same

TABLE 4 Indicators of descriptive statistics for the SRL Encouragement Scale in the 1st measurement point ($N = 251$) and the 2nd measurement point ($N = 179$).

	M_1	SD_1	M_2	SD_2
Encouragement of learning planning and learning organization strategies (ELPLO)	3.85	0.61	4.04	0.37
Encouragement of metacognitive monitoring of learning (EMML)	4.48	0.48	4.57	0.42
Encouragement of elaboration and evaluation (EEE)	3.77	0.61	3.89	0.34
Encouragement of understanding (EU)	4.43	0.41	4.51	0.62
Encouragement of effort investment (EEI)	4.68	0.40	4.75	0.56

TABLE 5 Testing the significance of differences in encouraging SRL with respect to gender (1st measurement point).

	M_M	M_W	t	p
	$N = 48$	$M = 203$		
Encouragement of learning planning and learning organization strategies (ELPLO)	3.66	3.90	−2.48	0.01
Encouragement of metacognitive monitoring of learning (EMML)	4.28	4.53	−3.29	0.00
Encouragement of elaboration and evaluation (EEE)	3.44	3.85	−4.28	0.00
Encouragement of understanding (EU)	4.20	4.48	−4.36	0.00
Encouragement of effort investment (EEI)	4.60	4.70	−1.59	0.11

M, male teachers; W, female teachers.

TABLE 6 Testing the significance of differences in encouraging SRL based on subject status – science field (1st measurement point).

	M_1	M_2	M_3	M_4	F	p
	$N = 25$	$N = 117$	$N = 70$	$N = 39$		
Encouragement of learning planning and learning organization strategies (ELPLO)	4.03	3.97	3.71	3.64	5.45	0.00
Encouragement of metacognitive monitoring of learning (EMML)	4.53	4.57	4.37	4.37	3.40	0.02
Encouragement of elaboration and evaluation (EEE)	3.83	3.88	3.54	3.82	4.67	0.00
Encouragement of understanding (EU)	4.43	4.51	4.37	4.27	4.12	0.01
Encouragement of effort investment (EEI)	4.65	4.73	4.66	4.59	1.47	0.22

M_1 = social; M_2 = humanities; M_3 = natural; M_4 = technical.

results; for consistency in presentation, see the included the parametric test). Statistically significant differences were found based on the science field which the subject in question belongs to, in all components of promoting SRL except for Encouragement of Effort Investment. The Bonferroni test revealed that the difference in ELPLO was statistically significant in relation to teachers whose subject belongs to the humanities field and teachers in the natural and technical field. The difference in EMML and EEE was significant between teachers in the humanities and natural science field, while the difference in EU was observed between teachers in the humanities and technical field. Teachers in the humanities field tend to promote SRL more than teachers in the natural and technical fields (Table 6).

The Levene's test further showed that the variables Encouragement of Elaboration and Evaluation and Encouragement of Understanding exhibited homogeneous variance, while the other three did not (hence, for variables without homogeneous variance, nonparametric tests were additionally conducted, which yielded the same results, but for consistency of presentation, see the included parametric test). Statistically significant differences were found based on the subject status (compulsory/elective) in ELPLO, EMML, and EEE, while differences in EU and EEI were not statistically significant. Teachers of elective subjects more strongly encouraged SRL (Table 7).

4. Discussion

Given the accelerated scientific, technological, and societal advancements that require competencies which enable lifelong learning and equip students to face the challenges of modern life, the self-regulated learning (SRL) construct becomes extremely important in the educational context, as well as outside of it. In order for teachers to promote SRL, they need to comprehend the dynamics of SRL and the dynamics of creating a learning environment that fosters SRL (Boekaerts, 2002), which means they need to possess substantial content

TABLE 7 Testing the significance of differences in promoting SRL based on subject status – compulsory/elective (1st measurement point).

	M_o	M_i	t	p
	$N = 227$	$M = 24$		
Encouragement of learning planning and learning organization strategies (ELPLO)	3.83	4.11	−2.18	0.03
Encouragement of metacognitive monitoring of learning (EMML)	4.46	4.70	−2.40	0.02
Encouragement of elaboration and evaluation (EEE)	3.73	4.15	−3.30	0.00
Encouragement of understanding (EU)	4.41	4.57	−1.81	0.07
Encouragement of effort investment (EEI)	4.67	4.77	−1.15	0.25

M_o, compulsory school subject; M_i, elective school subject.

and methodological knowledge about SRL (Askell-Williams et al., 2012; Karlen et al., 2020). To gain a better understanding of teachers' knowledge about SRL, we employed both qualitative (open-ended questions) and quantitative (assessment scale) methods. Due to limitations of scale-based self-assessments, which can prompt teachers to evaluate aspects they have not previously considered, or lack sufficient knowledge about and find unfamiliar, thus yielding desirable or acceptable responses, we also implemented open-ended questions in the questionnaire. To address the question of how much teachers know about SRL, we asked if they have heard of the SRL construct and to provide a subjective definition of SRL. The results of the quantitative methodology revealed that one-third of the teachers had not heard of the SRL construct. Although 68% of teachers have heard of SRL, an analysis of teachers' subjective definitions indicates that only 14% of teachers accurately define SRL, while as many as 65% of teachers provide partially accurate definitions of SRL. A slightly smaller percentage (21%) of those who are unsure or inaccurately define SRL compared to the percentage of those who have not heard of SRL could be a consequence of the partially accurate definitions, given that the substantial number of teachers stated that SRL is best defined as "… learning that the student personally designs/regulates/directs…." An analysis of the categories teachers use when defining SRL reveals that teachers most frequently emphasize metacognitive strategies of monitoring, regulating, and self-directing their own learning, as well as autonomy in learning. Similar findings were reported by Dignath and Sprenger (2020). In general, these results align with other authors' findings that teachers' knowledge of SRL is generally weak (Spruce and Bol, 2015; Karlen et al., 2020) and that most teachers encourage student autonomy (Dignath-van Ewijk and van der Werf, 2012). Teachers mainly grant students autonomy in self-regulation, but they do not adequately prepare them to handle new challenges (Bolhuis and Voeten, 2001). If students are only given autonomy without providing them with the means to employ strategies, it is not beneficial for them (Kirschner et al., 2006). When defining SRL, teachers also highlighted learning methods (cognitive strategies), planning and organizing learning, as well as intrinsic motivation.

In order to see the ways in which, and the degree to which the teachers promote SRL in students, we asked them the following: "How do you encourage self-regulated learning in your practice? Which methods are most effective?" (open-ended question), and we applied the Self-Regulated Learning Encouragement Scale. In teachers' responses, we can identify metacognitive, cognitive, motivational, and contextual aspects of SRL, encouragement processes for SRL in different learning phases (Zimmerman, 2002), as well as strategies for direct and indirect promotion of SRL (Dignath-van Ewijk and van der Werf, 2012). Teachers noted metacognitive aspects (planning, goal-setting, organization, monitoring, self-evaluation), cognitive aspects (repetition, organization – mind mapping, tables, hierarchical organization, elaboration – paraphrasing, summarizing, connecting information, identifying key concepts, asking questions, mnemonic techniques…), motivational aspects (motivation encouragement, emotion regulation, beliefs about oneself…), and contextual aspects (teaching methods: research, project-based learning, collaborative learning, classroom atmosphere, etc.) of SRL. Individual approach, planning and organizing learning, initiating teaching with stimulating and interesting tasks and questions can be categorized as a process of encouraging SRL before learning. Teachers predominantly listed strategies for promoting SRL that can be associated with the learning phases. Teachers reported using various teaching methods, encouraging different learning strategies, fostering positive emotions, regulating negative emotions, motivation, positive beliefs, performance control, encouragement, praise, utilizing information and communication technology, enhancing student concentration, promoting self-control and independent work, giving instructions, guidance, repetition or practice, assigning tasks, and so on. Student self-evaluation, peer assessment, and providing feedback are processes that can be linked to the post-learning phase. Given the complexity, process-oriented nature, continuous timeline, variability, and cyclical nature of self-regulated learning, some of these processes can occur in all phases of SRL (encouragement, feedback, and self-reflection). In terms of direct encouragement, processes include modelling, guided learning, task/teaching analysis, comparing approaches, contemplating effective learning methods, metacognitive monitoring, etc. Indirect processes involve creating a learning environment (active teaching and learning methods, encouraging positive and regulating negative emotions, motivation, resource checking, beliefs about oneself, classroom environment, etc.). Teachers most frequently mentioned promoting planning and organization of learning, self-evaluation, independence, goal-setting, inquiry-based learning, motivation enhancement, collaborative learning, providing feedback, creating mind maps, encouraging monitoring/performance control, fostering beliefs about oneself, and preparing presentations. On the other hand, when analyzing teachers' self-assessments, they estimate that they significantly promote SRL. They mostly encourage effort investment, followed by metacognitive monitoring of learning and understanding, while they least promote learning planning, organizational strategies, elaboration, and learning evaluation. We can observe a certain discrepancy between qualitative and quantitative data. It should be noted that only a small number of teachers in their responses covered a greater number of various SRL-encouragement processes, while on an individual level, the answers were partial (the teachers noted only a few means and processes they encouraged). A

comprehensive image of the processes teachers can encourage is obtained through collective analysis of all teacher responses. Conversely, teachers provide more favorable self-assessments, but a limitation is evident in the content of statements in the SRL Encouragement Scale. In open-ended questions, teachers most frequently mentioned promoting learning planning and organization, self-evaluation, and independence in learning, while the assessment scale showed the opposite trend. It is possible that the previous examination using the SRL Encouragement Scale influenced teachers' responses regarding the ways of promoting SRL in the second measurement point, as there was an increase in the arithmetic means on the SRL Encouragement Scale in the second measurement point. However, this influence may not be strong since the order of results across subscales did not change. In addition, individual teacher responses continued to indicate a lack of knowledge about ways to promote SRL. Despite this methodological limitation, teachers' responses will serve for the revision of the SRL Encouragement Scale. It should be highlighted that teachers did not spontaneously highlight direct teaching of effective learning strategies. They mention modelling and guided learning but in the context of content learning. Teachers more frequently noted implicit and indirect SRL-encouragement approaches. This is in line with the results of previous research, which suggest that teachers prefer using active teaching methods but do not instruct students on how to learn (de Kock et al., 2005; Dignath-van Ewijk and van der Werf, 2012). Students' self-regulation is predicted by teaching metacognitive strategies (planning, organization, goal-setting, self-monitoring, self-evaluation) and creating a learning environment that demands and enables SRL (Dignath-van Ewijk and van der Werf, 2012; Dignath-van Ewijk and Büttner, 2013). Although most teachers agree with the concept of supporting their students to become self-regulated learners, many express uncertainty about how to do so (Perry et al., 2008). Therefore, understanding whether teachers know how to enhance their students' SRL, and at what level to initiate this education is crucial for teaching SRL. The more teachers know about SRL, the greater the likelihood that they will be able to promote it in their students (Paris and Winograd, 2001; Spruce and Bol, 2015). In other words, if teachers do not possess well-developed knowledge about learning, it is unlikely that they will effectively guide their students in developing knowledge of cognitive and metacognitive learning strategies (Askell-Williams et al., 2012). In general, we can conclude that teachers partially understand what SRL is, and within a limited scope, they tend to encourage SRL by emphasizing self-direction and autonomy, which reflects implicit and indirect encouragement. In other words, the first hypothesis has been confirmed.

The testing of differences in promoting SRL based on gender in this study revealed that female teachers significantly encourage all components of SRL, except for effort investment, which is in line with the results obtained by Elmas et al. (2011) and Yan (2018). Chen (2000) discussed gender roles in teaching with respect to feminine and masculine characteristics, emphasizing that women tended to be "caring teachers" who more often used student-centered, active, and constructivist teaching methods, while men tended to adopt a teacher-centered approach, maintaining an authoritative figure that aligns with their societal role. Although some studies show that older teachers provide less support for self-regulated learning (Peeters et al., 2015) and that teachers in lower grades of primary school (up to the 6th grade) mostly encourage self-regulated learning (Moos and Ringdal, 2012), our study did not find differences when it comes to encouraging SRL with respect to teaching experience and educational level (primary/secondary school – gymnasium/vocational). While Fauzi and Widjajanti (2018) found that mathematics teachers more frequently use teaching techniques that promote SRL, Coggin (2020) did not find differences among teachers of different subjects; our research shows that SRL is most encouraged by teachers in the humanities, followed by the social sciences, then the natural sciences, and finally the technical fields, although the differences are mostly statistically significant between teachers in the humanities and those in the natural sciences and technical fields. It's possible that teachers in the natural sciences and technical fields lack pedagogical and methodological knowledge more than teachers in the humanities and social sciences. Teachers of elective subjects tend to encourage learning planning and organizational strategies, metacognition, elaboration, and evaluation more than the teachers of compulsory subjects. This finding is not surprising since elective subjects attract motivated students who choose the subject based on their abilities and interests. It's possible that teachers adopt a more relaxed approach and are more willing to experiment with various teaching methods in said elective courses.

The research provides insight into teachers' knowledge and ways of encouraging SRL among teachers in Croatia. Teachers exhibit weak knowledge of SRL, i.e., lack of competencies in the field of SRL. A collective analysis of responses of all teachers regarding ways to encourage SRL suggests that teachers are capable of promoting all SRL components (cognitive, metacognitive, motivational, and contextual) and processes across different SRL phases (preparation, execution, and reflection), even though this is not evident in their individual responses. These results confirm the theoretical foundations of SRL and the ways to encourage it. The results also indicate insufficient use of direct explicit demonstration of self-regulation strategies with explanations of why, when, and how to apply specific strategies in terms of informed instruction and self-control training. The data also indicates that SRL encouragement depends on teacher characteristics (gender), subject area, and subject status. Its advantage is that it combines both qualitative and quantitative methods, which provides us with a clearer insight into their SRL knowledge and ways of encouragement. The limitations of this research primarily refer to a convenience sampling method and contextual specificity, making the results difficult to generalize. However, considering the heterogeneity of the sample (in terms of gender, teaching experience, school type, subject field, and subject status), and the fact that the results on SRL knowledge and the ways of SRL encouragement align with the findings of other authors, the data has indicative value. Of course, encouraging SRL among teachers also depends on the educational policies of each country, such as the transition from a traditional content- and teacher-centered approach to a student-centered, constructivist approach, and these differences across educational contexts are to be taken into consideration. Future research could focus on comparing SRL encouragement across different cultures or educational contexts. Nevertheless, the conducted research has significant practical implications. In 2019, the Ministry of Science and Education in Croatia introduced a curriculum decision on the topic "Learning to Learn" for primary and secondary schools, and yet only a small number of teachers possess the necessary knowledge about SRL and ways of encouraging it. In other words, it's important to develop models for enhancing and strengthening teachers' knowledge and competencies in fostering SRL within the educational system. These models should be integrated into training programs for both current

teachers and future educators. These programs ought to be aimed at developing teachers' content knowledge about the nature and dynamics of SRL, as well as improving their pedagogical knowledge and teacher competencies: both their own competencies in SRL (teachers as self-regulated learners) and their competencies in teaching, diagnosing, and supporting SRL in the classroom (teachers as agents of SRL). There should be a particular emphasis on direct and explicit teaching, informed training, and self-control training for students. The results also suggest that greater attention should be devoted to enhancing teaching competencies among male teachers, teachers in technical and natural sciences fields, as well as teachers of compulsory school subjects. Future research should continue to explore the role of different factors at the level of teachers, students, schools, and educational systems when it comes to encouraging SRL.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by Ministry of Science and Education of the Republic of Croatia; The Ethics Committee of the University of Zadar. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin because the subjects were of legal age, participation in the research was voluntary, anonymous, and they could withdraw their participation at any time.

Author contributions

SŠ: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review and editing. AN-M: Investigation, Methodology, Writing – review and editing. MC: Investigation, Methodology, Writing – review and editing. All authors contributed to the article and approved the submitted version.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article. The work was financed by the University of Zadar as an institutional project under the code IP.01.2021.18.

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.

Publisher's note

References

Askell-Williams, H., Lawson, M. J., and Skrzypiec, G. (2012). Scaffolding cognitive and metacognitive strategy instruction in regular class lessons. *Instr. Sci.* 40, 413–443. doi: 10.1007/s11251-011-9182-5

Baumert, J., and Kunter, M. (2013). "The COACTIV model of teachers' professional competence" in *Cognitive activation in the mathematics classroom and professional competence of teachers*. eds. M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss and M. Neubrand (New York, NY: Springer), 25–48.

Boekaerts, M. (2002). Bringing about change in the classroom: strengths and weaknesses of the self-regulated learning approach – EARLI presidential address, 2001. *Learn. Instr.* 12, 589–604. doi: 10.1016/S0959-4752(02)00010-5

Bolhuis, S., and Voeten, M. J. (2001). Toward self-directed learning in secondary schools: what do teachers do? *Teach. Teach. Educ.* 17, 837–855. doi: 10.1016/S0742-051X(01)00034-8

Brown, A., Campione, J. C., and Day, J. D. (1981). Learning to learn: on training students to learn from texts. *Educ. Res.* 10, 14–21. doi: 10.3102/0013189X010002014

Chatzistamatiou, M., Dermitzaki, I., and Bagiatis, V. (2013). Self-regulatory teaching in mathematics: relations to teachers' motivation, affect and professional commitment. *Eur. J. Psychol. Educ.* 29, 295–310. doi: 10.1007/s10212-013-0199-9

Chaves, E., Trujillo, J. M., and López, J. A. (2015). Autorregulación del aprendizaje en entornos personales de aprendizaje en el grado de educación primaria de la Universidad de Granada, España. *Form. Univ.* 8, 63–76. doi: 10.4067/S0718-50062015000400008

Chaves, E., Trujillo, J. M., and López, J. A. (2016). Acciones para la autorregulación del aprendizaje en entornos personales. *Pixel-Bit. Rev. Medios Educ.* 48, 67–82.

Chen, Y. M. (2000). *Feminization in writing pedagogy - a study of teacher's gender at EFL university composition classrooms*. Research Report, Taiwan: National Chung Cheng University.

Coggin, J. (2020). Self-regulated learning Instruction's relationships with teacher subject area, teacher beliefs, and teacher efficacy. Dissertations University of Southern Mississippi. 1793. Available at: https://aquila.usm.edu/dissertations/1793 (Accessed July 23, 2023).

De Corte, E., Verschaffel, L., and Masui, C. (2004). The CLIA-model: a framework for designing powerful learning environments for thinking and problem solving. *Eur. J. Psychol. Educ.* 19, 365–384. doi: 10.1007/BF03173216

de Kock, A., Sleegers, P., and Voeten, M. J. M. (2005). New learning and choices of secondary school teachers when arranging learning environments. *Teach. Teach. Educ.* 21, 799–816. doi: 10.1016/j.tate.2005.05.012

De Smul, M., Heirweg, S., Devos, G., and Van Keer, H. (2018). School and teacher determinants underlying teachers' implementation of self-regulated learning in primary education. *Res. Pap. Educ.* 34, 701–724. doi: 10.1080/02671522.2018.1536888

Dignath, C., and 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. *Metacogn. Learn.* 13, 127–157. doi: 10.1007/s11409-018-9181-x

Dignath, C., and Sprenger, L. (2020). Can you only diagnose what you know? The relation between teachers' self-regulation of learning concepts and their assessment of students' self-regulation. *Front. Educ.* 5:585683. doi: 10.3389/feduc.2020.585683

Dignath-van Ewijk, C., and Büttner, G. (2013). Assessing how teachers enhance self-regulated learning: a multiperspective approach. *J. Cogn. Educ. Psychol.* 12, 338–358. doi: 10.1891/1945-8959.12.3.338

Dignath-van Ewijk, C., and van der Werf, G. (2012). What teachers think about self-regulated learning: investigating teacher beliefs and teacher behavior of enhancing students' selfregulation. *Educ. Res. Int.* 2012, 1–10. doi: 10.1155/2012/741713

Elmas, R., Demirdöğen, B., and Geban, Ö. (2011). Preservice chemistry teachers' images about science teaching in their future classrooms. *Hacettepe Univ. J. Educ.* 40, 164–175.

Fauzi, A., and Widjajanti, D. B. (2018). Self-regulated learning: the effect on student's mathematics achievement. *J. Phys. Conf. Ser.* 1097:012139. doi: 10.1088/1742-6596/1097/1/012139

Hadwin, A., and Oshige, M. (2011). Self-regulation, coregulation, and socially shared regulation: exploring perspectives of social in self-regulated learning theory. *Teach. Coll. Rec.* 113, 240–264. doi: 10.1177/016146811111300204

Hamman, D., Berthelot, J., Saia, J., and Crowley, E. (2000). Teachers' coaching of learning and its relation to students' strategic learning. *J. Educ. Psychol.* 92, 342–348. doi: 10.1037/0022-0663.92.2.342

Hargraves, A. (2005). Educational change takes ages: life, career and generational factors in teachers' emotional responses to educational change. *Teach. Teach. Educ.* 21, 967–983. doi: 10.1016/j.tate.2005.06.007

Karlen, Y., Hertel, S., and Hirt, C. N. (2020). Teachers' professional competences in self-regulated learning: an approach to integrate teachers' competences as self-regulated learners and as agents of self-regulated learning in a holistic manner. *Front. Educ. Teach. Educ.* 5:159. doi: 10.3389/feduc.2020.00159

Kirschner, P. A., Sweller, J., and Clark, R. E. (2006). Why minimal guidance during instruction does not work: an analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educ. Psychol.* 41, 75–86. doi: 10.1207/s15326985ep4102_1

Kistner, S., Rakoczy, K., Otto, B., Dignath-van Ewijk, C., Büttner, G., and Klieme, E. (2010). Promotion of self-regulated learning in classrooms: investigating frequency, quality, and consequences for student performance. *Metacogn. Learn.* 5, 157–171. doi: 10.1007/s11409-010-9055-3

Kistner, S., Rakoczy, K., Otto, B., Klieme, E. I., and Büttner, G. (2015). Teaching learning strategies: the role of instructional context and teacher beliefs. *J. Educ. Res. Online* 7, 176–197. doi: 10.25656/01:11052

Lombaerts, K., Engels, N. I., and Van Braak, J. (2009). Determinants of teachers' recognitions of self-regulated learning practices in elementary education. *J. Educ. Res.* 102, 163–174. doi: 10.3200/JOER.102.3.163-174

Lombaerts, K., Engels, N., and Vanderfaeillie, J. (2007). Exploring teachers' actions to promote self-regulated learning practices in primary school. *Educ. Dev. Psychol.* 24, 4–24. doi: 10.1017/S0816512200029187

Masui, C., and De Corte, E. (2005). Learning to reflect and to attribute constructively as basic components of self-regulated learning. *Br. J. Educ. Psychol.* 75, 351–372. doi: 10.1348/000709905X25030

Ministry of Science and Education of the Republic of Croatia (2019). Decision on the adoption of the curriculum for the cross-curricular topic learning how to learn for primary and secondary schools in the Republic of Croatia. Available at: https://narodne-novine.nn.hr/clanci/sluzbeni/2019_01_7_154.html (Accessed July 28, 2023).

Moos, D. C., and Ringdal, A. (2012). Self-regulated learning in the classroom: a literature review on the teacher's role. *Educ. Res. Int.* 2012, 1–15. doi: 10.1155/2012/423284

Paris, S. G., and Paris, A. H. (2001). Classroom applications of research on self-regulated learning. *Educ. Psychol.* 36, 89–101. doi: 10.1207/S15326985EP3602_4

Paris, S. G. I., and Winograd, P. (2001). The role of self-regulated learning in contextual teaching: principles and practices for teacher preparation. Office of Educational Research and Improvement. Available at: https://files.eric.ed.gov/fulltext/ED479905.pdf (Accessed July 15, 2023).

Peeters, J., De Backer, F., Kindekens, A., Jacquet, W., and Lombaerts, K. (2015). Mechanisms underlying primary school teachers' promotion of self-regulated learning. Annual meeting of the American Educational Research Association, Chicago, SAD.

Perry, N. E., Hutchinson, L., and Thauberger, C. (2008). Talking about teaching self regulated learning: scaffolding student teachers' development and use of practices that promote self-regulated learning. *Int. J. Educ. Res.* 47, 97–108. doi: 10.1016/j.ijer.2007.11.010

Perry, N. E., Phillips, L., and Hutchinson, L. (2006). Mentoring student teachers to support self-regulated learning. *Elem. Sch. J.* 106, 237–254. doi: 10.1086/501485

Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory Pract.* 41, 219–225. doi: 10.1207/s15430421tip4104_3

Šimić Šašić, S., Kalajžić, A., and i Nikčević-Milković, A. (2021). Poticanje samoreguliranog učenja – uloga nekih sociodemografskih čimbenika, učiteljskih percepcija o poučavanju i učenju, predanosti poslu i sagorijevanja na poslu [Promoting Self-Regulated Learning – the Role of some Sociodemographic Factors, Teachers' Perceptions of Teaching and Learning, Commitment to Work and Work Burnout]. *Psihologijske teme*. 30, 467–487.

Šimić Šašić, S., Nikčević-Milković, A., and Klarin, M. (in press). Validacija Skale poticanja samoreguliranog učenja [Validating the Self-Regulated Learning Encouragement Scale]. *Suvremena psihologija*.

Spruce, R., and Bol, L. (2015). Teacher beliefs, knowledge, and practice of self-regulated learnin. *Metacogn. Learn.* 10, 245–277. doi: 10.1007/s11409-014-9124-0

Vandevelde, S., Vandenbussche, L., and Van Keer, H. (2012). Stimulating self-regulated learning in primary education: encouraging versus hampering factors for teachers. *Procedia Soc. Behav. Sci.* 69, 1562–1571. doi: 10.1016/j.sbspro.2012.12.099

Veenman, M. V. J. (2007). The assessment of metacognition: a matter of multi-method designs. EAPA Newsletter of the European Association of Psychological Assessment, 1, 8–9. Available at: http://www.eapa-homepage.org/eapa/_downloads/eapa-newsletter-200710.pdf (Accessed July 15, 2023).

Verschaffel, L., De Corte, E., Lasure, S., van Vaerenbergh, G., Bogaerts, H., and Ratinckx, E. (1999). Learning to solve mathematical application problems: a design experiment with fifth graders. *Math. Think. Learn.* 1, 195–229. doi: 10.1207/s15327833mtl0103_2

Wilson, N. S., and Bai, H. (2010). The relationships and impact of teachers' metacognitive knowledge and pedagogical understandings of metacognition. *Metacogn. Learn.* 5, 269–288. doi: 10.1007/s11409-010-9062-4

Yan, Z. (2018). How teachers' beliefs and demographic variables impact on self-regulated learning instruction. *Educ. Stud.* 44, 564–577. doi: 10.1080/03055698.2017.1382331

Zimmerman, B. (2002). Becoming a self-regulated learner: an overview. *Theory Pract.* 41, 64–70. doi: 10.1207/s15430421tip4102_2