TEACHERS' BELIEFS ABOUT CLASSROOM PRACTICES THAT DEVELOP STUDENTS' METACOGNITION AND SELF-REGULATED LEARNING SKILLS[1]

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Abstract: Teachers have an important role in promoting the development of metacognition and self-regulated learning in students. This study aims to reveal the beliefs and practices of pre-university teachers regarding the best teaching strategies that can be used in the classroom to facilitate the development of students' metacognition and self-regulated learning skills. Teachers from pre-primary and school levels (ISCED 02-3) (International Standard Classification of Education (ISCED) - Statistics Explained (europa.eu) participated in this research. Participants, 120 teachers, had to filled in an online form of the adapted version of the 'Self-Regulated Learning Opportunities Questionnaire', developed by Vrieling, Bastiaens, and Stijnen (2012), and to answer three open-ended questions. The questionnaire assessed the extent to which teachers use the following two strategies to promote metacognition and self-regulated learning in their classroom: planning (including goal-setting, metacognitive knowledge activation, task value activation, and time management) and monitoring of the learning process (including metacognitive awareness and monitoring of cognition). The open-ended questions aimed to reveal the participants' opinions about the best teaching practices that facilitate the development of metacognition and self-regulated skills of students, the factors that hinder the development of these skills and how teachers can promote self-regulated learning in their classrooms. Data were analyzed using the SPSS software for the quantitative data, and the thematic-analysis for the qualitative ones. Results show that teachers create some opportunities for students to develop their self-regulated learning skills, but face various problems in trying to develop these skills in the classroom context. The results of this study are discussed in relation to both classroom and school contexts, and the broader level of educational policies.

Keywords: pre-university teachers, self-regulated learning, metacognition, preuniversity teachers.

1. Introduction

Being an effective learner is of high importance in today's society if we consider the amount of information that can be found in various environments. Students need to be effective learners to be able to cope with the huge amount of information and be able to adapt to the changes required by the information society. How can a student be an effective learner? There are many ways in which a student can improve his/her learning and one is through the use of metacognition and self-regulated learning. Learning is a complex activity that involves the use of various strategies, including planning, knowledge activation, monitorization, assessment, and reflection. In the literature, these strategies have become known as self-regulated learning strategies. Metacognition and self-regulated learning have been the focus of research within the field of education for many years. Thus, there are many studies on this topic, which are important for the research focused on learning. The importance of this topic is given mainly by the role that it seems to have in school performance and lifelong learning. Research shows that students who use self-regulated learning have higher motivation and academic performance compared to students who don't use these strategies (Erskine, 2009; Montalvo & Torres,

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2004; Shunk & Ertmer, 2000), are active and independent learners, and are able to solve various problems (Coutinho, Wiemer-Hastings, Skowronski & Britt, 2005; Gott, Lesgold & Kane, 1996).

2. Metacognition and self-regulated learning

Metacognition and self-regulated learning have been used as interchangeable terms in many studies and this made it difficult to find a unanimously accepted definition for each concept. The main contribution to the field of metacognition was made by John Flavell (1970) who defined it as how one thinks about his/her cognitions and how one monitors his/her cognitions. Flavell operationalized the concept through metacognitive knowledge, experiences, goals, and strategies (Dinsmore et. al, 2008). Although Flavell can be considered the promoter of metacognition, many researchers brought essential contributions to this field. Whilst there are many different models of metacognition, what all have in common is the fact that metacognition has a clear cognitive orientation, being concerned with how one thinks about his/her cognitions. Unlike metacognition, self-regulated learning has its roots in the social cognitive theory of Albert Bandura, who emphasized the behavioral and emotional aspects of self-regulation. However, Graham et al. (1991) and Zimmerman (2010) are the ones who introduced self-regulation in the learning field, correlating this concept with academic contexts. For this study, we consider metacognition as an important component of the self-regulated learning concept. Self-regulated learning can be defined as the active participation of a person in his/her learning, and involves the control and monitoring of the cognitive, emotional, and behavioral aspects of learning, with the interaction of personal, behavioral, and environmental factors. The self-control and self-monitorization of cognition can be considered a part of the metacognitive dimension of self-regulated learning (Graham et al., 1991; Zimmerman, 2010).

Teachers have an important role in the development of metacognition and self-regulated learning of students. Research indicates (Moos & Ringdale, 2012; Peeters et al., 2014) that teachers themselves need to have metacognitive knowledge, to be able to explicitly model metacognitive and self-regulated learning skills, and to use teaching practices that involve the active participation and interaction of students.

Vrieling and colleagues (2010) have developed a model of self-regulation that can be used by teachers in creating opportunities for the development of self-regulation skills in the classroom context. Their model is based on several principles that are considered essential for creating and increasing classroom opportunities for self-regulated and metacognitive learning. First, when teachers promote self-regulated learning in the classroom, they should develop the knowledge of students in a given subject area (1st principle). Secondly, the promotion of self-regulated learning in the classroom context involves the integration of the domain-specific knowledge with strategies for learning and thinking (the 2nd principle). It is also essential to explicitly model self-regulated and metacognitive learning skills (the 3rd principle). The process of learning self-regulated and metacognitive strategies has to be explicitly and verbally guided by teachers. Students in general, and primary school students in particular, need to have teachers that demonstrate them how to use metacognition and self-regulated skills in learning, to be able to use later these skills and strategies independently, without any guidance from an adult. The process of modeling is closely related to scaffolding, which involves the gradual decrease of the teacher's control in the favor of the student's control (the 4th principle). Besides these principles, it is essential to take into account the curriculum, the use of specific materials, and the conditions of the school context for promoting self-regulated and metacognitive learning in the classroom (the 5th principle) and to involve students in collaborative learning environments (the 6th principle). In promoting self-regulated learning in the classroom, teachers have to focus on the following aspects of the learning task: goal setting, prior knowledge activation, metacognitive knowledge activation, metacognitive awareness and monitoring of cognition, judgments, attributions, task value activation and time management (Vrieling et al., 2010).

Considering the important role that metacognition and self-regulated skills play in learning in general and in academic performance, in particular, we aim to identifythe opportunities that teachers create in the classroom for students to develop metacognition and self-regulated skills. In addition, we aimed to identify the most appropriate strategies to develop these skills in the classroom context and the factors

that hinder the development of self-regulated learning. To summarize, the research questions of this study are:

1. What opportunities do teachers create to develop students' metacognition and self-regulated learning skills in the classroom?
2. What are the best teaching strategies that develop metacognition and self-regulated learning skills of students, in your opinion? (The teachers' opinion).
3. How can teachers develop metacognition and self-regulated learning skills of students, in classroom?
4. What are the factors that hinder the development of students' metacognition and self-regulated learning skills?

3. Methodology

In this study, we decided to use both quantitative and qualitative methods. We have adapted the questionnaire developed by Vrieling and colleagues (2012), the Self-Regulated Learning Opportunities Questionnaire, to identify the extent to which teachers create opportunities for students to develop self-regulated learning skills. Additionally, we asked participants to answer three open-ended questions to get detailed information about how can teachers develop metacognition and self-regulated learning skills of students, in the classroom context, and identify the factors that hinder the development of these skills.

3.1. Participants

To identify the opportunities that teachers create for the development of metacognition and self-regulated skills in the classroom, we invited pre-primary and school teachers (ISCED 02-3) (International Standard Classification of Education (ISCED) - Statistics Explained (europa.eu) to participate in this research and 120 teachers accepted the invitation and completed an online self-assessment scale. Participants are teaching at all levels of the pre-primary and school education (ISCED 02-3): 38 of the participants are pre-primary teachers, 39 are teaching at the primary school level, 22 at the middle school level, and 21 at the high school level. Most of the participants are Romanian females (112) who teach in urban areas, males being underrepresented in this study. The sample has also 8 Hungarian teachers. The mean age of the participants is 41.88 years old. The teaching experience varies between 1 and 40 years: 30 participants have between 1-10 years of experience, 28 between 11-20 years, 45 between 21-30 years of experience, 15 between 31-40 and 2 participants have a teaching experience of 41-45 years.

3.2. Instrument

The English version of the Self-Regulated Learning Opportunities Questionnaire (SRLOQ, Vrieling, Bastiaens & Stijnen, 2012) was used to assess what opportunities pre-primary and school teachers create for their students to develop self-regulated and metacognitive skills. For this study, we have adapted 2 subscales of the questionnaire, namely the planning scale and the monitoring of the learning process scale. The Planning scale of the SRLOQ has four dimensions: goal setting (8 items), metacognitive knowledge activation (2 items), task value activation (2 items), and time management (4 items), and a Cronbach alpha of 0.84. The second scale, monitoring of the learning process, has 6 items that assess the metacognitive awareness and monitoring of cognition and has an internal consistency of 0.81. In this study, the alpha Cronbach for the planning scale was 0.95 and 0.84 for the monitoring scale. We have first analyzed the items to see if they would be appropriate for the study and this analysis was made by three experts. After this analysis, the items were translated and verified by an expert teacher in educational sciences. In the introduction of the questionnaire, we added a short description of what metacognition and self-regulated learning means and a short list of demographic items (age, school, didactic degree, level of education, level of teaching, the teaching environment, and years of experience in teaching).

In addition to the adapted version of the Self-Regulated Learning Opportunities Questionnaire, we have added three open-ended questions: (1) „What are the best teaching strategies that develop the

metacognition and self-regulated learning skills of students, in your opinion? (teachers' opinion)', (2) „How can teachers contribute to the development of metacognition and self-regulated learning skills of students? and (3) „What are the factors that hinder the development of students' metacognition and self-regulated learning skills?".

3.3. Procedure

We used a convenient sampling strategy (the snowball technique) and asked the teachers enrolled in MA and Ph.D. programs in Romania to complete an online version of the adapted SRLOQ (Vrieling, Bastiaens & Stijnen, 2012). Participants received an email with a link that directed them to the scale. We invited those who agreed to participate in the study to share the link with their colleagues to increase the number of participants. We informed teachers that their participation in the study is voluntary and anonymous and they can opt-out of completing the questionnaire at any time. No rewards or benefits were offered for participating in this research. The final sample has 120 Romanian and Hungarian teachers from pre-primary and school levels (ISCED 02-3) in Romania.

4. Results

For the quantitative data analysis, we used the SPSS software, the IBM SPSS Statistics 21. Table 1 illustrates the means and standard deviations of the 5 subscales of the questionnaire. The first four dimensions (goal setting, metacognition knowledge activation, task value activation, and time management) measure the planning of the learning process while the last one measures the monitoring of the learning process. Table 1 shows that the lowest mean is 2.75 for the time management subscale and the higher one is for monitoring the learning process. Nevertheless, the means are quite similar for all dimensions, the differences between the values being small. Considering that the maximum score is 5 and that the means range between 2.75 and 3.19, teachers create some opportunities for students to develop their self-regulated skills. Accordingly, there are some contexts in which students are encouraged to set learning goals, monitor their learning, activate metacognition and task value, and organize their learning time.

Table 1: *Means and standard deviations of the 5 subscales*

	Goal setting	Metacognition knowledge activation	Task Value Activation	Time management	Monitoring learning
Mean	3.09	3.04	2.86	2.75	3.19
Std. Deviation	.94	.99	1.06	.95	1.02

Teachers who create opportunities for students to develop their planning skills also create opportunities for the development of monitorization skills. The sub-scales of the Planning dimension of SRLOQ are metacognition knowledge activation, task value activation, time management, and goal setting. All these sub-scales are strongly and positively correlated. Metacognition knowledge activation is highly correlated to the task value activation (r=0.793, p=0.01), time management (r=0.736, p=0.01) and goal setting (r=0.714, p=0.01). Otherwise said, students who activate their metacognition knowledge also use time management and goal setting skills and activate the value of the task. Task value activation is highly correlated with both time management (r= 0.782, p=0.01) and goal setting (r=0.780, p=0.01), and the last two (time management and goal setting) are also strongly and positively correlated with each other (r=0.652, p=0.01).

Teachers' experience might have an essential role in developing the self-regulated learning skills of students in the classroom and thus we analyzed the data according to this variable. The analysis of the data distribution done in SPSS shows that we have a normal distribution, and the one-way (between groups) ANOVA test was done to see if there are any differences in developing students' metacognition and self-regulated learning skills due to the teachers' experience. Tables 2, 3, 4 and 5 illustrate the results of this analysis.

Table 2: *SRL Opportunities. Descriptive statistics.*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1-10 years	30	3,38	,55	,10	3,17	3,59	2,48	4,31
11-20 years	28	3,47	,82	,15	3,15	3,78	1,71	4,82
21-30 years	45	3,56	,68	,10	3,34	3,77	2,19	4,90
31-40 years	15	3,49	,53	,13	3,19	3,79	2,49	4,58
41-45 years	2	4,48	,48	,34	,11	8,85	4,14	4,83
Total	120	3,50	,68	,06	3,37	3,62	1,71	4,90

Table 3: *SRL Opportunities: Test of Homogeneity of Variances*

Levene Statistic	df1	df2	Sig.
1,31	4	115	,269

Table 4: *SRL Opportunities: ANOVA*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,49	4	,62	1,36	,250
Within Groups	51,17	115	,45		
Total	53,67	119			

Table 5: *SRL Opportunities: Robust Tests of Equality of Means*

	Statistic[a]	df1	df2	Sig.
Welch	1,93	4	7,67	,201
Brown-Forsythe	1,62	4	32,58	,191
a. Asymptotically F distributed.				

It can be concluded that there are no statistically significant differences between group means as determined by one-way ANOVA ($F(4,115)=1.36$, p=0.25). In other words, there are no statistically significant differences in the opportunities that teachers' create to develop the metacognition and self-regulated learning skills of students due to the teaching experience.

To analyze the qualitative data, we used the thematic analysis procedure, particularly the bottom-up or the inductive approach. We read the open-ended responses of the participants several times and noted the main codes that appeared in the text. Data were organized into codes which considerably helped us reduce the analysis into small sub-texts with particular meanings. This approach has been used for each of the three open-ended questions addressed in the measurement instrument and the results of the analysis are presented in Table 6, Table 7, and Table 8.

Table 6: *The best teaching strategies that develop the self-regulated learning skills of students, according to teachers' opinion.*

The main themes identified	Key terms
1. Self-regulated learning development through interaction.	"IT" / "interactive" / "cooperation" /"collaboration" / "working in groups" /"teamwork" / "active and participative"/"active involvement" / "the cube method"/ "role play" / "the didactic game" / "the game",

2. Self-regulated learning development through rationality.	"critical thinking" / "algorithmic" / "cognitive" / "inductive" / "deductive" / "research" / "discovery learning" / "the exercise" / "the experiment" / "the investigation",
3. Self-regulated learning development as a traditional approach.	"the project" / "the case study" / "individual learning" / "repetition" / "memorization" / "problem solving" / " debate" .
4. Self-regulated learning development through stimuli.	"motivation" / "feedback" / "self-evaluation".

For the first question for instance (Which strategies do you consider to be the most suitable to develop the self-regulated learning skills of students?") participants considered that self-regulated learning skills of students can be developed through: "cooperative learning, involving students in activities in which they are put in a position to analyze, critically reflect, investigate, share their opinions, to self evaluate, to give and receive feedback" (Primary school teacher, female, 34 years of experience, urban teaching area); "Transforming information through graphic organizers, summarizing content, repetition" (Primary school teacher, female, 21 years of experience, urban teaching area); "The most appropriate strategies, in my opinion, are those strategies that involve the student in a real and active way in the learning activity. First of all, the strategies through which we want the student to learn must appeal to the motivational dimension to arouse not only the student's curiosity and interest but also his desire to learn. At the same time involving the student in searching for sources of information, helping him and guiding him in selecting the information he/she needs, operationalizing with the new information in an applied way, and lead the student to identify the purpose and benefits of what he has learned. Cooperation and collaboration are the basis for stimulating learning (not competitivity and hierarchization). The student will have opportunities and courage, if an open learning environment has been created, to recognize what he knows, to identify what he does not yet master and thus asking for help to be able to acquire the necessary skills" (Primary school teacher, 22 years of experience, rural teaching area).

Another important question in this study was concerned with how teachers can contribute to the development of self-regulated learning skills of students. To identify how teachers develop students' self-regulated learning, we asked participants to answer an open-ended question: "How can teachers contribute to the development of self-regulated learning skills of students?". Table 7 illustrates some of the participants' answers to this open-ended question and the main themes identified in data analysis.

Table 7: *How can teachers contribute to the development of self-regulated learning skills of students?*

The main themes identified	Key terms
1. Self-regulated learning development through individualized learning.	"individualization", "the needs analysis", "liberty".
2. Self-regulated learning development through self-assessment.	"self-assesment", "monitorization".
3. Self-regulated learning development through active participation of students.	"student involvement", "active involvement of students", "interactive methods".
4. Self-regulated learning development through team-work.	"collaboration", "team-work", "group discussions", "group thinking".

Research clearly indicates that teachers must provide explicit guidance and support for developing and increasing students' self-regulated and metacognitive skills of students. Considering this important role of teachers, we asked participants to express their opinions concerning the way in which teachers can contribute to the development of the self-regulated learning skills of students. Participants believe that "teachers can encourage them [students] in their self-assessment process and teach them to use metacognitive strategies, to teach them how to learn". (Primary school teacher, female, 10 years of experience, urban area); „setting goals, using attentional resources, using mind maps for easy retention

of information, organizing learning space, etc.". (Primary school teacher, female, 13 years of experience, urban area); „the teacher contributes to the development of students' self-regulated learning skills if, first of all the, provide immediate feedback and show availability and present themselves to students as a source of information and regulation through specific learning activities so that the student can reach an autonomous learning behavior". (Primary school teacher, female, 8 years of experience, urban area).

Besides identifying the teachers' opinions regarding the best teaching strategies that develop students' self-regulated learning, and the way in which teachers can develop these skills in their students, we aimed to also identified the factors that hinder the development of these skills. We asked the participants to answer to the following open-ended question: "What are the factors that hinder the development of self-regulated learning skills?". In Table 8 we present the main factors identified through the qualitative analysis.

Table 8: *What are the factors that hinder the development of students' self-regulated learning skills?*

The main themes identified	Key terms
1. School / Educational system factors.	"reduced time for teaching", "vast school curricula", "lack of time", "low resources", "the high number of students", "low professional motivation".
2. Factors related to students.	"communication barriers", "lack of communication", "inefficient communication", "inadequate teaching strategies", "reduced experience of teachers".
3. Factors related to teachers.	"lack of motivation", "lack of belief in one's self person", "lack of interest", "lack of involvement"., "behavior and attention difficulties of students".

Developing self-regulated and metacognitive skills of students in the classroom context can be a difficult task for teachers. There may be several factors that have to be taken into consideration when developing these skills in students. Teachers suggest that the factors that hinder the development of students' self-regulated and metacognitive skills are related to students, teachers, and the educational system: „*The time allocated to previous activities to develop basic skills in this regard. Students' abilities to work independently. Students need support and continuous external feedback.*" (Primary school teacher, female, 10 years of experience, urban area); *"First of all, I think that the textbooks, the contents, which are very necessary for the primary cycle, are not made according to the syllabus. Then the integrated teaching cannot be achieved in a real and substantial way in all subjects in primary education. Another reason is that the curriculum does not provide an integrated and overview of the skills that the student in primary school should develop. The student is more tempted to show his value through the grades he receives and not to learn to know and know what to do with what he knows. Thus, a primary school graduate should consciously use in real life the skills formed in the five years of school, and reality shows us that this is not the case. In my opinion, a primary school graduate should have those skills that will practically help him to solve problem situations in everyday life!"* (Primary school teacher, female, 22 years of experience, rural area); „*The lack of continuity, fragmentation of contents, tasks, misunderstanding of the need for self-regulated learning.*" (Primary school teacher, female, 35 years of experience, rural area).

5. Discussion and conclusions

Promoting and developing self-regulated and metacognitive learning in school is of high importance nowadays if we consider the large volume of information that students have access to and the changing role of a "good professional" who must unceasingly learn and adapt to new tasks and working contexts. The need to learn throughout life and to be a life-long learner is highly related to the use of self-regulated and metacognitive skills and strategies in learning. Self-regulated learning skills have to be taught or developed in the school context since students, particularly those in the primary level, need to get explicit and overt guidance from teachers to be able to independently regulate their learning. The development of these skills is influenced and determined to a certain degree by teachers who should develop and promote self-regulated learning in the classroom. But since research shows

that often teachers have difficulties in creating a proper environment, and offering explicit guidance for the development of self-regulated learning skills in students, this study aimed to identify what are the opportunities created by teachers to promote self-regulated learning in the classroom, specifically planning and monitorization skills. Data analysis indicates that pre-primary and school teachers (ISCED 02-3) create opportunities for developing self-regulated learning in the classroom, although to an average extent. Students set goals while learning, activate their metacognitive knowledge and the task value and manage their learning time, all these being included under the umbrella of planning skills and strategies in Vrieling and colleagues' vision. Besides planning, students monitor their learning process and adapt it to reach the goals they have set up.

Developing students' metacognition and self-regulated learning in the classroom context is not influenced by the teachers' experience in teaching. It seems that creating opportunities for students to develop their metacognition and self-regulated learning skills is not something that develops with teachers' experience. The fact that the teaching experience does not have an impact on the opportunities created in the classroom context to develop students' metacognition and self-regulated learning has to be taken into account by policy makers and by those who deliver life-long learning education programs for teachers.

The results obtained through the quantitative data analysis were completed by qualitative ones, which allowed us to better understand how teachers create classroom opportunities to develop self-regulated and metacognitive skills in students. To promote planning and monitorization skills in students, teachers believe it is essential to actively involve students in their learning, use interactive activities, and focus on individual characteristics of students, and adapt teaching and learning to these characteristics. Furthermore, feedback and self-assessment are essential in an environment that wants to promote self-regulated learning. Although teachers strive to create learning environments in which students use their self-regulation skills, some factors make this task difficult. These factors can be categorized into three categories, according to teachers' opinions: factors related to students, teachers, and the educational system. Participants believe that students' lack of motivation, interest and involvement makesit difficult to develop and use their self-regulated learning skills. Moreover, some teachers might not be prepared to teach these skills to students because they have communication difficulties with students and use inadequate teaching strategies. To these factors, we can add a series of shortcomings of the Romanian educational system like the loaded school curriculum, the high number of teaching hours (with little time for preparation), the lack of time and resources, and a large number of students in a classroom.

The contributions of this study to the existing self-regulated learning literature in Romania should not be neglected since there is a lack of research on how this learning develops in the classroom context and how and to what extent teachers promote it through their teaching approach. The results of such studies are valuable since they can be used for the development and implementation of training programs for both teachers and students. Moreover, policymakers could also use the results of these studies to change and adapt the school curricula. Researchers interested in how self-regulated learning develops in the classroom environment should use different research approaches to offer a complete picture of this phenomenon.

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