

Article

Teachers and the Teaching of Self-Regulated Learning (SRL): The Emergence of an Integrative, Ecological Model of SRL-in-Context

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Abstract: Teachers are effective agents who can introduce and support students' self-regulated learning (SRL) in classrooms. This qualitative study presents an integrative, ecological model of SRL-in-context from the teachers' perspectives. Data were obtained from in-depth interviews, participant observations and informal conversations gathered from the classrooms of six teachers working in three different state primary schools located in Queensland, Australia. The model builds on teachers' beliefs and understandings about SRL, the different ways through which they adopt SRL-supportive practices and the enactment of SRL in classrooms. It represents a complex structure of nested and mutually dependent systems with teachers having a central position, thereby forming the microsystem. However, teachers' efforts to support students' SRL are influenced by the exosystem (e.g., school, curriculum) and macrosystem (e.g., home, community) in a reciprocal fashion. The SRL-in-context model has implications for both theory and practice.

Keywords: Self-regulated learning; SRL-in-context model; teachers; primary school; qualitative research

1. Introduction

Self-regulated learning (SRL) as a core conceptual framework, refers to the cognitive, metacognitive, motivational, behavioral, and affective actions that learners take in strategic ways [1]. This implies that SRL involves multiple domains (e.g., behavioral, cognitive, and metacognitive) that need to be activated in conjunction with each other rather than as separate entities. For example, self-regulated learners maintain focus on goal-directed activities and consistently utilize task-related strategies in cyclical phases. At the same time, they monitor their progress, seek external feedback, adjust strategies, regulate emotions, and summon motivational tools to attain their goals [2]. While goal-attainment marks the completion of a cycle, self-regulated learners systematically reflect on their learning experiences and set new goals which often leads to another SRL cycle [3,4].

SRL involves multiple variables that influence one's learning. This is why a number of different theoretical models exist in the SRL literature. Each one provides a more specific focus on the role of SRL in classroom teaching and learning. For example, Boekaerts [5] described SRL as a complex interactive process and argued that SRL does not only involve cognitive self-regulation, but it also involves motivational self-regulation. Pintrich [6] also presented a framework that emphasized the role of motivation in SRL. Winne [7] emphasized the centrality of monitoring and feedback in the information processing model of SRL. He highlighted four different phases that operate in an iterative, back and forth fashion during SRL. These include: Defining the task; goal setting and planning; enacting tactics and adapting metacognition. Zimmerman [4] defined SRL in process terms and argued that it is simply

not a mental ability or an academic trait, rather it is a self-driven process which allows learners to transform their abilities into skills (e.g., self-monitoring). He presented a triadic, cyclical model of SRL which includes three key phases: Forethought, performance, and self-reflection. Although these models emphasize different components and details, they share some common elements, including cognitive, metacognitive, behavioral and motivational aspects of SRL.

Zimmerman's cyclical model [4] serve as an appropriate framework to define and operationalize SRL for the purpose of this study. This implies that although SRL is a self-directive process, it takes into account the role of the social and physical environment, modeling, and instruction. Thus, learners set their goals and identify task-related strategies in the forethought phase, which allow them to set the stage for learning. As they perform the task, they implement strategies, monitor performance and/or effectiveness of the strategies, and act upon environmental conditions (e.g., distractions). In the final phase, learners evaluate the performances and reflect on their previous and future actions/strategies related to the task. It is important to note that learners require an effective array of cognitive, meta-cognitive, motivational and behavioral strategies throughout the cyclical process to successfully accomplish their goals. Consequently, teachers are encouraged to develop SRL-supportive skills and behaviors among students.

Although the research on SRL has proliferated with diverse yet related phenomena, such as cognition and metacognition [8], motivation and affect [9,10], students' characteristics [11], and developmental processes and trajectories [12,13]; there has been a less attention on what teachers say and do to promote students' SRL in the classroom [14,15]. This may be because earlier conceptualizations of SRL have generally been influenced from a solo-constructivist perspective that emphasized individual characteristics, such as, cognition, learning and study strategies [16]. However, more recent conceptualizations of SRL view it as essentially a social process and emphasize ideas like social interactions, shared construction of knowledge, contextual factors and dynamic interactions [17–20].

Teachers are believed to be active agents in introducing and supporting students' SRL [21]. Although several training models and intervention programs have been proposed to support the teaching and learning of SRL skills [22,23], teachers often remain unsure about how to promote it in classrooms [24,25]. Nonetheless, a few studies have examined teachers' beliefs and practices within naturalistic settings (i.e., classrooms) to understand their perspectives and modes of supporting students' SRL [14,15]. While the teaching of SRL is mostly implicit [25] and specific to the contexts in which teachers find themselves [17,26], it is critical to highlight SRL-supportive approaches that are contextualized and specific to the teachers' beliefs and practices.

This paper presents an integrative, ecological model of SRL-in-context, from the teachers' perspectives. The model has implications for pre- and in-service teachers who are keen to develop a better understanding of the necessary knowledge, skills, and practices to support students' SRL. Such an understanding is not only specific to themselves as teachers, but also to the contexts in which they find themselves. As such, the paper addresses the following research questions:

- How do primary school teachers' SRL-supportive beliefs, practices and overall approaches inform the development of an integrative, ecological model of SRL-in-context? What does the model look like?

Overall, the paper presents an integrated and ecological model of SRL-in-context by highlighting primary school teachers' perspectives and practices. This is important, since teachers' views and practices that support students' SRL, as enacted in real-life settings, such as classrooms, have not been prioritized in the SRL literature.

Theoretical Background

SRL has been generally conceived as a dynamic cyclical process which includes several sub-processes (i.e., planning, performance, and evaluation) during which learners activate, control and regulate their learning processes [4,19,27]. While SRL has been predominantly conceptualized in

terms of students' abilities related to, and engagement in, cyclical phases; little attention is focused on teachers' perspectives and practices in order to effectively support students' engagement in critical SRL processes. Kramarski [21], for example, presented a practical model for teachers by highlighting their dual roles, including the *learner role* and the *teacher role*, which run parallel to each other in cyclical phases and are in continuous interplay with students' SRL. For example, teachers set goals and plan specific strategies and resources to take charge of the topic that they teach (teachers' *learner role*). Similarly, they guide students to set goals and allocate time to help them control their learning (teachers' *teacher role*). In response, students plan task-related activities and strategies which allows them to engage in SRL (students' SRL).

While Kramarski's training model [21] makes an important contribution to the SRL literature by highlighting the teachers' role, it focuses on the effects of training teachers to use generic and specific prompts that support students' SRL. Furthermore, the model was assessed for pre-service teachers in university classrooms that employed an SRT (self-regulated teaching) oriented design only. However, we posit that it is important to add teachers' perspectives and practices as enacted in classrooms (authentic context), to the array of well-articulated SRL models/perspectives. This can be achieved by interweaving rich theoretical analysis of teachers' beliefs and practices in varying contexts of classrooms, and generating multiple portraits of SRL-in-practice [14,15,28].

In this paper, we propose an integrative ecological model of SRL-in-context, to understand how primary school teachers support students' SRL by integrating teachers' beliefs and practices as enacted in real-life settings, that is, classrooms. We are aware that articulating interactions and transactions in a social process like classroom research is difficult, because it requires adopting new perspectives that focus on activity and participation (such as social and contextual). Consistently, we employed a systems-ecological perspective [29,30], to understand and highlight teachers' roles in supporting students' SRL. We used this framework to situate and interpret the findings that emerged from the in-depth case studies of six primary school teachers [14,15,26,28]. Bronfenbrenner's ideas allowed us to understand and explicate how these teachers supported students' SRL by examining the process in classroom contexts. Thus, while SRL remains the unit of analysis by preserving "the holistic nature of phenomena rather than dividing [it] into separate elements," [31] (p. 123); the knowledge, understanding, and interpretations that are integrated into this paper are informed by the teachers' perspectives.

Bronfenbrenner [29] offered a systems-ecological view to conceptualize the evolving interaction between a person's development and the environment, with a central focus on the phenomenon of development. Bronfenbrenner viewed the ecosystem of human development as a nested arrangement of systems that extended beyond the immediate settings of the individual and referred to them as micro-, meso-, exo-, and macrosystems.

Applied to the concept of SRL, we understand that microsystem refers to the processes, roles, and interpersonal relationships experienced by individuals (both teachers and students) within a specific context (i.e., classroom) [29]. These processes, roles, and relationships constitute the building blocks of the microsystem, and play a significant role in supporting students' SRL in classrooms.

The mesosystem is an interlinked system of microsystems comprising the interactions between systems or settings in which individuals grow [29], such as the relationship between the school and home environment, in influencing students' development as self-regulated learners. An exosystem refers to the system(s) that are beyond the immediate context of the individuals, but affect the individuals because of the influence they exert on the microsystem. For example, the school culture may act as an exosystem by exerting influence on the beliefs and practices of teachers and students within the microsystem. Finally, the macrosystem involves the patterns, consistencies that exist or could exist in the overall culture. This may include global contrasts (e.g., the way home and school relations may vary from one nation to another), and intra-societal contrasts (e.g., how home and school relationships may vary for advantaged and disadvantaged families within the same society). In all, the macrosystem involves ideologies and attitudes of the culture, social systems, and future plans as

envisaged by political leaders, educators, social planners, and philosophers. Overall, the ecological system contains several mutually dependent elements, such as individuals, environments, contextual settings, and the processes involved within and between them, that not only interact within a specific level, but also among different levels.

Systems-ecological perspective has been effectively utilized in different educational settings, including early childhood education and family life [32], music education [33], special education and professional development of teachers [34]. Borich and Tombari [35] argued that the relationships between subsystems that exist within an ecosystem are critical to promoting the development of the members of the ecosystem (e.g., students). They stressed the value of systems-ecological perspective in developing a deep understanding of the behavior of teachers, parents, and learners in a social context. Similarly, McCabe, Rebello-Britto, Hernandez, and Brooks-Gunn [36] reviewed the development of self-regulation in young children and suggested that such an understanding can be effectively developed from the systems-ecological perspective because it enables the exploration of individual characteristics and environmental contexts in which the learners find themselves. More recently, Ben-Eliyahu and Bernacki [17] employed Bronfenbrenner's system-ecological perspective to illustrate how learners are influenced by the nested structure of the environment (i.e., learning tasks), how the ecology of factors (e.g., school, neighborhood) exert an influence on learners, and how does SRL occur within this ecological system.

Although Bronfenbrenner's theory [29,30] has been generally employed to study learners' development within specific contexts, we used his ideas to examine the teachers' role in promoting students' SRL in classrooms. This is because it allowed us to develop a deep understanding of the teachers' perspectives and practices in supporting students' SRL by not only integrating different teachers' beliefs and practices, but also by focusing on the contextual forces operating within and outside the system. Bronfenbrenner's views informed our understanding in multiple ways. First, we understand that developing individuals (students) are not only influenced by the environment, but they also have the potential to restructure the context in which they grow (e.g., classrooms). Second, we are aware that the interactions between the individuals (teachers and students) and context (classroom) are bi-directional, characterizing mutual accommodations and reciprocity. Third, the environment (classroom contexts) not only incorporates interconnections between its constituent parts, but is also receptive to external influences stemming from the larger surroundings, such as the school and the community. In all, we argue that teachers' efforts to develop students' SRL are contained within a nested arrangement of concentric circles, where each entity influences, and is also influenced, by the other.

2. Materials and Methods

2.1. Overview of the Study

Our research occurred in three different state primary schools in Queensland, Australia. We conducted multiple, qualitative case studies of six primary school teachers who supported students' SRL in their classrooms. Case studies offer a rigorous and comprehensive frame of inquiry which allowed us to conduct in-depth investigations within natural settings [37,38]. We used a case study design to examine how the six teachers (the cases) promoted students' SRL (the process) in classrooms (the social context). The inclusion of six teachers working at different year levels (Prep/Year 1, Year 1, Year 4, and Year 7) and different sites (i.e., three different schools) allowed greater variation across cases, thus, making interpretations more compelling. This paper specifically examines how primary school teachers' SRL-supportive beliefs, practices, and overall approaches inform the development of an integrative ecological model of SRL-in-context; and asks: What does the model look like?

While the development of an integrative, ecological model of SRL-in-context is the central focus of this paper, an overview of the results from the previous publications is essential to develop a better

understanding of the model. Consistently, we briefly document a recap from the previous results related to the study.

We have already reported results from the within-case analysis of the three cases study teachers [14,15,28]. Our analysis revealed that each teacher supported students' SRL in her own way that was influenced by several factors, such as the teacher's beliefs, practices, and classroom contexts. For example, in one of the case study reports, we described how one of the six teachers (T5) supported students' SRL by emphasizing social interactions in her classroom [15]. The analysis of data collected through T5's interview, informal conversations and classroom observations revealed that her overall approach to supporting students' SRL involved several sub-processes, including constructive social interactions, guiding students' from individualization to socialization, promotive interactions, mediations, directing from simple to complex processes, reflections and evaluations of learning, and moving from social interactions to SRL. Overall, we discerned that the teacher (T5) supported students' SRL by promoting social interactions, and thus, SRL and constructive social interactions are closely linked.

In this way, we presented our findings first as individual case study reports [14,15,28], and then we offered a cross-case analysis that highlighted the unified descriptions of the six teachers' beliefs and practices and further examined how are these enacted in regular classrooms to support students' SRL [26]. The main findings from the analyses suggest that the six teachers emphasized cognitive, meta-cognitive, motivated, and behavioral aspects in their descriptions of SRL. However, a close examination of their classroom practices revealed that they emphasized cognitive and motivational components of SRL more often than meta-cognition and strategic actions.

The unified descriptions of the six case study teachers' beliefs and practices as enacted in real-life classrooms led us to conceptualize data from all six cases and present these understandings as an integrated, ecological model of SRL-in-context in this paper [38]. The model draws upon Bronfenbrenner's system-ecological views [29,30] that conceptualize the evolving interaction between a person's development and the environment as a nested arrangement of systems that extended beyond the immediate settings of the individual. We, therefore, present herein, a unified, ecological and structural description of how the six teachers supported students' SRL in their classrooms. In doing so, we continuously refer to the underlying, precipitating, and contextual factors (e.g., teachers' beliefs, practices, parents, home) that account for students' development of, and engagement in, SRL, from the teachers' perspective.

2.2. Settings

The study involved six teachers from three state primary schools in Queensland, Australia. The schools were located within lower middle-to-upper-middle class areas of a large urban city. There were no specific criteria that were in place for the selection of the schools, except that only state primary schools were considered for the purpose of the study. All state primary schools in Queensland offer one Preparatory (Prep) year and seven years of learning from Year 1 till Year 7. The schools are encouraged to recognize the needs of the diverse community and further develop active, meaningful, and sustainable relationships with the local communities to maximize learning and well-being outcomes for students. Furthermore, the school-community partnership is advanced through effective communication, partnerships, community collaboration, parents' and students' involvement in decision-making, and a respectful school culture [39]. Teachers work with a well-defined, broad curriculum that can be adjusted to suit local and individual needs. Maximum class size is 25 students per class for Prep till Year 3, and 28 students per class for Year 4 till Year 7.

2.3. Participants

The participants of the study were six generalist primary school teachers who are identified as T1, T2, ... T6 in this paper. We selected the teachers on purposeful sampling basis [40] because of the competencies they demonstrated in supporting students' independent and self-regulated forms of

learning. The selections were made in consultation with the school principals who recommended these teachers on the basis of the selection criterion for the inclusion of exemplary cases in the study. Besides, the participation of the subjects (teachers) was completely voluntary. Exemplary, within the context of the study, refers to teachers who not only exhibit effective teaching practices with regards to SRL, but also combine and transform these practices in their own unique ways to support students' SRL [41].

The selection criteria refer to teachers who are keen to employ effective teaching approaches that help them to support students' SRL, as also highlighted in the literature [14]. It includes practices, such as providing students with the instructional, motivational, and instrumental support, encouraging independent and critical thinking, continuous monitoring and feedback and establishing a safe and supportive classroom environment [31,42,43]. The first author remained involved and conducted volunteer work for three months (two days a week) in the classroom of each teacher before inviting them to participate in the study. This opportunity allowed her to substantiate the principals' recommendations and ensure that the teachers were keen to support independent and self-regulated forms of learning.

We obtained formal ethical permissions from all relevant authorities before contacting the participants and inviting them to participate in the study. The six teachers who participated in the study were teaching in three different primary schools in Queensland, Australia. They taught at different year levels and had a varied number of years of teaching experience. Each case study teacher was similar, as well as dissimilar to others in certain ways, including school, teaching experience, and year level at which they taught. Gender was not a consideration for the purpose of this study, since the sample predominantly comprised of female teachers. Table 1 presents demographics of the six case study teachers.

Table 1. Participants of the study.

Participant Teacher	Gender	Demographic Characteristics		
		School	Year Level	Teaching Experience (In Years)
T1	Female	SC1	YP/Y1	2
T2	Female	SC2	Y1	4.5
T3	Female	SC3	Y4	30
T4	Male	SC3	Y4	35
T5	Female	SC1	Y7	44
T6	Female	SC2	Y7	4

2.4. Data Collection

The first author conducted in-depth interviews with each of the six case study teachers. The interviews were conducted in the classroom of each teacher and were audio-recorded. Each interview lasted between 20 to 60 minutes. As the interviewer encouraged the participants to reveal their SRL-related beliefs and experiences, she further engaged in a meaning-making partnership with them by asking open-ended questions in a flexible and conversational style [38,44]. Overall, she asked questions that focused on teachers' beliefs, experiences and interpretations related to SRL, like: What are your views about independent and self-regulated forms of learning? How would you describe the features of a classroom that foster independent and self-regulated forms of learning? How do you motivate students to take the responsibility of learning? [14,28].

The first author also conducted participant observations in the classrooms of each case study teacher over a period of an academic term (11 weeks) with a minimum of two hours per week. However, she conducted more observations where circumstances allowed. Thus, the total hours of observation varied for each teacher, starting from 20 to 34 hours. The observations were conducted on a protocol that emphasized effective teaching practices known to promote students' SRL (e.g., instructional and motivational support, continuous monitoring and feedback); students' involvement and reactions related to the teachers' practices; and overall classroom context (e.g., physical settings, classroom rules

and procedures) [14]. Teachers' and students' artifacts were collected, and informal conversations with each teacher were held during classroom observations. In this way, we developed a holistic understanding of the events and behaviors that occurred within the classroom context, and to seek information regarding any point that required further clarification. The first author strived to maintain the roles of *insider* and *outsider* during participant observations [38]. This means that while she participated in the research settings and activities as a *helper* during the volunteer work; she detached herself from the helper's role when she started to conduct classroom observations. In this way, she maintained a professional distance and participated in *some*, but not *all*, of the classroom activities, which further allowed her to maintain an *outsider* image.

2.5. Data Analysis

We developed case records for each of the six teachers to collate the voluminous piles of data related to a case at one place [40]. We organized these records by editing information, sorting redundancies, and organizing information both chronologically (e.g., classroom observations) and topically (e.g., interviews). Qualitative data processing software, NVivo 10, was used to organize and analyze data.

We employed both inductive, as well as deductive analytical strategies in a repetitive, cyclical fashion to examine and integrate teachers' beliefs and practices that supported students' SRL [24]. This involved breaking down the data into chunks, developing codes and categories directly from the data, and interpreting codes and categories in the light of existing literature to identify patterns that permeated the beliefs and practices of the six teachers [38]. The process began by examining data from the teachers' interviews. The insights developed from interview data provided a framework to situate teachers' SRL-supportive beliefs and practices. For example, we identified teachers' emphasis on cognitive (e.g., "examples", "elaborate"), meta-cognitive (e.g., "make their own decisions"), motivational (e.g., "motivate", "stimulating"), behavioral (e.g., "help one another at least in a paired situation"), and strategic (e.g., "make sure they know how to") components of SRL. We also categorized SRL-supportive teaching practices that teachers reported using in their classrooms. These included: Instructional support, motivational and behavioral support, instrumental/strategic support, fostering critical and independent thinking, continuous monitoring and feedback, recreational support, and involving the community.

Later, we examined data from participant observations to seek any consistencies and/or inconsistencies between what teachers say and do to support students' SRL. This, in particular, included the identification of the SRL-supportive practices highlighted by the teachers during the interviews. Data were triangulated by converging evidence from interviews, participant observations and artifacts collected from the classrooms.

As a result, we developed detailed descriptions of teachers' perspectives and practices that supported students' SRL by offering rich descriptions in the form of excerpts from the interviews data, instances of teacher-student interactions from participant observation data, and excerpts from informal conversation. These descriptions allow us to communicate findings and interpretations generated through the six case studies. Finally, we combine these descriptions into a visual whole that represents an integrative, ecological model of SRL-in-context from the teachers' perspective.

3. Results

This section presents an integrative, ecological model of SRL-in-context, which draws on our work from the in-depth case studies of six primary school teachers and further situates our discussion of SRL in educational settings from the teachers' perspectives. The model integrates SRL-supportive perspectives, practices and enactments of primary school teachers. It further highlights how does SRL-supportive beliefs and practices of teachers are influenced by factors that are outside of their immediate contexts. These descriptions are later summarized and presented into a visual, structural model that is grounded in Bronfenbrenner's system-ecological perspective [29,30].

3.1. Teachers' Perspectives

Teachers' SRL-related perspectives are meaningful, knowable and able to influence their practices; therefore, these should be made explicit [26,45,46].

We found that the teachers' conceptualizations of SRL stressed cognitive, meta-cognitive, motivational, behavioral and strategic components (see Table 2). This implies that teachers are cognizant of the major SRL-components and therefore, have positive dispositions to support students' SRL.

Table 2. Teachers' descriptions of the major components of self-regulated learning (SRL).

SRL-Component	Excerpt from the Teachers' Interviews
Cognitive	"... in the beginning you are more structured and you give them [students] lots of examples of what they need to do and then they go away and do it themselves." (T2)
Metacognitive	"Like it's about making that choice and they [students] are making that decision. Hmm, so they are using what they knew ... They are using their own like they have got on the internet and found their own ideas. They have hmm used the information they have had from sport ... so they are using all these other ideas that we haven't seen before in structured school." (T6)
Motivational	"... motivate them [students] by giving them a stimulating introduction, or giving them equipment that might help them." (T4)
Behavioral	"You know let the kids come to you and ask you for what they need, rather than you just forcing it all the times—I think that's the way to encourage independence." (T5)
Strategic	"[teach] them a lot of strategies, you know mathematical strategies ... everybody can do things differently, that works for one person may not work for that person. So, instead of me taking up and saying, this is how you do a sum, you know let's all look at different ways we can do it." (T3)

Teachers frequently referred to SRL as a cyclical process. They argued that supporting students' SRL is a complex and dynamic process that is circuitous, and is influenced by several factors outside the classroom, such as parents, home, curriculum. Table 3 presents the excerpts that highlight the *complexity* of the process from the teachers' perspectives.

Table 3. SRL as a cyclical and complex process—teachers' perspectives.

Excerpts from the teachers' interviews	
1.	"You've got the teacher's personality, you've got the students' personalities, and you've got the environment in which they find themselves ... I think it's the combination, it's all the combination of, you know, it's the home and the school and the camps where the children go and groups they mix with too." (T4)
2.	"So, it has to do with the individual, as well as their home life, as well as their school life. It's a huge circle." (T2)
3.	"I guess it's that supportive environment. So, they [students] have got to have that support there ... being able to incorporate all those resources that are there ... home background has such a big role to play ... So, it's kind of all just leads on and goes around in a big circle ... So yeah, I think it just becomes one big circle, I guess." (T6)
4.	"It's something that has to be the part of everything in the classroom." (T3)
5.	"So, it's you know getting the parents on board ... so, once we have got them on board, it's certainly goes in the long way to help the children getting organized ... So, there are other factors [that affect students' SRL], for example, their [students'] prior knowledge or hmm exposure to school, what they've experienced in their situations, their experiences at home, parents' attitude towards learning, parents' general attitude towards them, Yeah! The classroom is a very small part of it ... I think there needs to be a lot more problem-solving and higher order thinking stuff putting into the curriculum to teach. And, we certainly do a lot of investigations and challenges ... " (T1)
6.	"Time is still a huge factor—to plan, to assess, to mark, to find resources, to talk to colleagues ... " (T5)

As the six teachers highlighted the complexity of SRL, the centrality of their own role in supporting students' SRL was also established. T6's reflections on the role of the teacher were framed in terms of her ongoing concerns for the students. She stated:

"While the student chooses to engage in independent learning, we as teachers must not assume that the students can complete all stages and levels of learning on their own. It is, therefore, essential that we provide suitable means of scaffolding and support in order to provide students with the skills, resources, and ability to succeed in their independent learning endeavors." (T6)

Similar views were presented by other teachers, for example, "I think, you could do anything if the teacher is motivated" (T3), "the ability to independently learn is also a learned skill that teachers have to foster and develop" (T2), and "It's a matter of training, independence is training" (T5). Teachers' views revealed that teachers hold a central position in supporting students' SRL. T6 elaborated this point.

"I think a lot of it does come back to the teacher. Yeah. Hmm and the mind-set—the way they do things. I think a lot of it would come back to that. Hmm and I think, a lot of it comes back largely to the experiences of the teachers." (T6)

Nevertheless, having a central position in a complex process is challenging. The teachers also experienced challenges as they supported students' SRL. Some of these challenges involved: Releasing control, teaching independence and SRL strategies, motivating students, "balance that work and home life" (T2), and "finding time to do all things for everybody" (T4). In addition, teachers expressed concerns about pressure from external sources (e.g., authority). These concerns provide general insights into how teachers might be *supported* to help them *support* students' SRL.

Overall, the six teachers identified multiple factors that influence their efforts to promote students' SRL, including their beliefs, abilities and motivational levels, classroom environment, resources, curriculum, students' home and family backgrounds, parents, and community. They believed that these factors add to the complexity of SRL, thus, making it a dynamic and complex process. Consistent with the teachers' beliefs, we do not see SRL as a linear process that progresses in a series of stages. Rather, we view it as a complex and dynamic process occurring in a circular and nested structure, where each part is dependent on and affected by the other parts.

3.2. Teachers' Practices

The six teachers described classroom practices that they use to support students' SRL. Table 4 presents the main categories that emerged from the analysis of the teachers' descriptions of SRL-supportive practices. Each category is supported by an excerpt from the teachers' interviews that served as an example of data coded at a particular category (see Table 4).

Table 4. SRL-supportive practices—teachers' perspectives.

Categories	Examples
Instructional support (cognitive and meta-cognitive)	"... in the beginning you are more structured and you give them [students] lots of examples of what they need to do and then they go away and do it themselves." (T2)
Motivational and behavioral support	"... motivate them [students] by giving them a stimulating introduction, or giving them equipment that might help them." (T4)
Instrumental/strategic support	"[teach] them a lot of strategies, you know mathematical strategies ... everybody can do things differently, that works for one person may not work for that person. So, instead of me taking up and saying, this is how you do a sum, you know let's all look at different ways we can do it." (T3) "By me being able to show them [students] the variety of ways that the one task can be done." (T6)
Fostering critical and independent thinking	"You know let the kids come to you and ask you for what they need, rather than you just forcing it all the times—I think that's the way to encourage independence." (T5)

Table 4. Cont.

Categories	Examples
Continuous monitoring and feedback	“They [students] normally have a criterion, they normally have a task sheet for anything that we do ... so that they know where they are at, and ultimately what they have to produce ... I like me to see what they are doing when they are doing it ... [because] you are looking at the whole range of things. [such as] how well did they do their research? ... It’s all that background information ... to be able to assess a lot more ... rather than only specific things.” (T6)
Recreational support	“Hmm. Games work really well ... I just think—that learning doesn’t come from two games ... sometimes, you know, you could have three games all based on the same concept.” (T1)
Involving community	“So, it’s you know getting the parents on board ... so, once we have got them on board, it’s certainly goes in the long way to help the children getting organized.” (T1)

Overall, SRL-supportive practices from the six teachers’ perspectives are categorized as: Instructional support (including cognitive and metacognitive support), motivational and behavioral support, instrumental/strategic support, fostering critical and independent thinking, continuous monitoring and feedback, recreational support, and involving the community. However, we treat these categories as sufficient rather than essential. This implies that a teacher may employ, alter, adjust, and combine some or all of these categories in different ways to support students’ SRL.

3.3. Enactment of SRL in Classrooms

As we constructed unified descriptions of SRL-supportive beliefs and practices of the six teachers from the interview data, we also considered it necessary to demonstrate how the teachers enacted their beliefs and practices to support students’ SRL in the classrooms. The analysis of participant observations allowed us to bring the process into full view. The following vignette offers one such incident where the teacher (T1) supported students’ SRL by emphasizing SRL-supportive practices, as highlighted in Table 4. T1 had 23 students (11 males, 12 females) in her composite classroom of Year Prep and 1 (YP/Y1). The average age of students was 5 and 6 years for Year Prep and Year 1, respectively.

T1 gathered a small group of three YP students around the table with the counters and pan-balances placed on it. She appeared to be well-prepared to teach the concept of equivalence. She started the lesson with simple demonstrations with the pan balance and the objects. Table 5 presents an illustration of the interaction between the teacher (T1) and her students (S) at this point.

We discerned that although SRL was achieved differently in each teachers’ classrooms depending on his/her beliefs, practices, students’ behaviors, classroom contexts and situations; there are some commonalities across the implementation of SRL in different classrooms in the form of SRL-supportive practices. While all teachers described their SRL-supportive practices that were categorized into major categories, as presented in Table 4; the vignette presented in this section illustrates one incident of how these practices were operationalized in the classroom. These insights extended our understanding about ways in which SRL can be enacted in real-life classrooms. We found that the case study teachers supported students’ SRL in their own ways, at their own pace, and as they could fit and respond to several aspects (e.g., students’ reactions and responses, time, tasks) within their classrooms. However, teachers’ views and experiences are considered to play a central role during this process, as emphasized by T6.

“I think a lot of it does come back to the teacher. Yeah. Hmm and the mind set—the way they do things. I think a lot of it would come back to that. Hmm and I think, a lot of it comes back largely to the experiences of the teachers.” (T6)

Table 5. An instance of interaction between the teacher (T1) and her students (S).

Turn No	Speaker	Dialogue	Codes	Predominant Category(ies)
1	T	2 + 3 and 4 + 1, do they equal the same S1?	Questioning Cognitive prompt	Fostering critical and independent thinking
2	S1	No!		
3	T	OK, let's check. Who can help to check? [Another student (S2) puts the counters in the pan balances]	Demonstration Modeling Scaffolding Peer-interactions Reviewing	Providing instructional support Inviting peer support Continuous monitoring and feedback
4	S2	It equals!	Conflict resolution Cognitive prompt	
5	T1	They both equal what? 2 + 3 and 4 + 1, What are they both equal to S1?	Questioning Developing connections Developing confidence	Fostering critical and independent thinking
6	S1	5		
7	S2	10!		
8	T1	How many are in this side S2? [T1 shifting her side to S2]	Developing learning Adjusting instruction Questioning	Providing instructional support
9	S2	5		
10	T1	How many are in this side? [Turning to S1]	Developing learning through instructional sequence Scaffolding	Providing instructional support
11	S1	5		
12	T1	If there were 4 in here [pointing to one side of the pan balances], what would happen? [Both S1 and S2 remained silent and looked confused] What would happen to the pan balances, If I take one out? [T1 demonstrates the question now]	Scaffolding Cognitive prompt Demonstration Developing confidence	Fostering critical and independent thinking Providing instructional, motivational, and strategic support
13	S3	The 5 would go down and the 4 would go up. That's right S3. So S1 and S2 look they're equal, because there are 5 on each side.		
14	T1	... Read your addition sum to me S1.	Consolidating learning Ensuring success Building confidence	Continuous monitoring and feedback Motivational support
15	S1	[looking at his counters] 3 + 2 = 5.		
16	T1	Now swap it around and show me your turn around. [He swapped the counters]	Teaching strategies Developing connections Building learning	Continuous monitoring and feedback
17	S1	[hesitantly] 2 + 3 = 5 ... Tell me, did we add any more? ... Did we take any away?		
18	T1	Does it matter if I line them up like this or like that? ... Put the counters of two different sums on each side of the pan balance ... Why are the pan balances equal? What is equal to what S1?	Cognitive prompts Brainstorming Questioning Building confidence	Providing instructional, motivational support Fostering critical and independent thinking Continuous monitoring and feedback

Later the teacher (T1) mentioned that S1 struggled with the basic mathematical concepts, such as addition. She explained during an informal conversation with the first author:.

3.4. An Integrative, Ecological Model of SRL-in-Context

In this section, we draw upon the systems-ecological perspective by Bronfenbrenner [29,30] to present a visual, circular, and nested structure that encapsulates the beliefs and practices of the six case study teachers who supported students' SRL. The model is presented as an *ecosystem* of SRL-in-context, from the teachers' perspectives, where each part is dependent on and affected by other parts. We believe that a better understanding of teachers' behaviors is possible by focusing on the forces that operate within and outside the system. Thus, family, school, and peer group act as a type of social ecosystem for the teachers to support students' SRL. These systems and sub-systems share a dynamic and mutually dependent relationship, in which each part is dependent on and affected by the other parts (see Figure 1), as also highlighted by the teachers (e.g., "So, it has to do with the individual, as well as their home life, as well as their school life. It's a huge circle." T2).

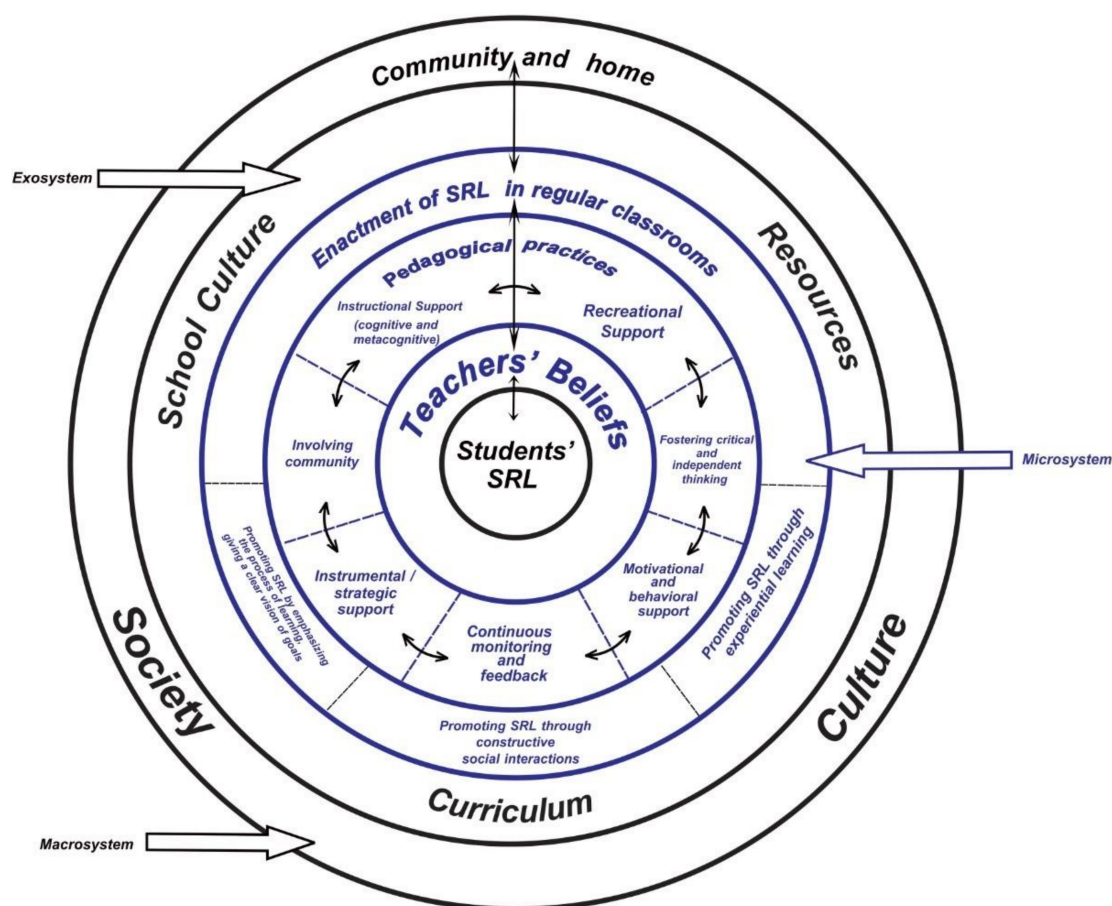


Figure 1. An integrative, ecological model of SRL-in-context from the teachers' perspectives.

Figure 1 illustrates that the process of supporting students' SRL is mainly dependent on teachers' beliefs and practices which forms the *microsystem* or the immediate environment in the SRL-in-context model. It has further sub-systems or layers, as highlighted in blue in Figure 1. The innermost layer highlights teachers' beliefs and values. Teachers' beliefs are critical to motivate themselves to support SRL in their classrooms through effective practices. This motivation further passes on to the students and engages them in SRL. T3 argued:

"I think, you could do anything if the teacher is motivated. If the teacher—you know, it just spreads. You know, if you're happy, they're happy, if you're motivated, yeah, most of the times they're motivated." (T3)

The middle layer of the microsystem represents SRL-supportive practices of the six teachers. Participant observations conducted in the classrooms of the six teachers confirmed that they effectively

utilized these practices to support students' SRL [26]. This happened when the teachers provided students with instructional support (e.g., demonstrating procedures, adjusting instructions, scaffolding, developing learning through instructional sequences as illustrated in Table 5; turns 1-18), motivational and behavioral support (e.g., ensuring success, building confidence, offering rewards and choice, creating interest and excitement, defining spaces in the classroom, promoting positive peer-interactions as illustrated in Table 5; turns 1-18 and Table 6, turn 19), recreational support (e.g., engaging students in educational games, free play, creative and physical activities), and instrumental/strategic support (e.g., teaching strategies, modeling and scaffolding SRL behaviors as illustrated in Tables 5 and 6). Teachers also demonstrated evidence of fostering critical and independent thinking by using cognitive prompts, reviewing and consolidating learning, resolving conflicts, brainstorming, questioning, developing connections, and building learning through multiple tasks (e.g., Tables 5 and 6). They also supported students' learning by providing them with continuous monitoring and feedback and involving the community as a tool to support students' SRL.

Table 6. Informal conversation with the teacher (T1).

Turn No	Speaker	Informal Conversation [Emphasis Added]	Predominant Category
19	T	S1 did not understand addition the way I was teaching it. So, I taught him in a totally <i>different way</i> and you saw him today – So the others would do [addition] straight in their heads, he couldn't. So, he needed very much the <i>concrete materials</i> and things. He needed the <i>demonstration</i> ; he needed the <i>objects</i> in front of him. So, he is still a little <i>tentative</i> , he is not as <i>confident</i> as the others, but he has certainly <i>improved</i> .	Motivational, instructional, instrumental/strategic support

The outermost layer of the microsystem, as highlighted in the SRL-in-context model emphasizes that the teachers developed and executed their own ways of supporting students' SRL. Examples include: Supporting students' SRL through social interactions (T5) [15], or through emphasizing the process of learning, giving a clear vision of goals (T6) [14]. Consistently, we argue that there is no single, linear way of supporting students' SRL in classrooms. Rather, teachers may find their own ways that are consistent with their beliefs, work at their own pace, and according to their own teaching-learning situations to promote SRL.

Nevertheless, teachers' efforts to support students' SRL operate within an environment of multiple systems and subsystems where each part is dependent on and affected by other parts, as shown in the SRL-in-context model (see Figure 1). Thus, the microsystem of mutual accommodation between teachers and students exists within an *exosystem* (curriculum, resources, and school culture). The exosystem includes subsystems that affect students' development of, and engagement in, SRL by exerting influences on the teachers (i.e., the microsystem). The teachers were cognizant of this influence, for example, T3 stated: "I find it frustrating, I guess more than challenging, when, for example, computers go down . . . you've planning in place and then, you know, something happens." Similarly, T4 said: "Finding time to do all things for everybody . . . to do the best thing for the child . . . to do the best thing for the school . . . to do the best thing for the Education Department . . . and sometimes these can conflict". T1 thought that "there needs to be a lot more problem-solving and higher order thinking stuff putting into the curriculum" to support students' SRL. Whereas, T5 highlighted her struggle with time and "availability of resources" in promoting students' SRL. Overall, teachers' comments suggest that the curriculum requirements, availability of resources, and the school environment influence their efforts to promote SRL, which in turn, affects students' development of, and engagement in, SRL.

Both microsystem and exosystem, as highlighted in the SRL-in-context model function within a larger setting called a *macrosystem* [29,30]. This is the larger culture or society in which both

microsystems and exosystems exist (e.g., home and parents, community, society, or culture) (Figure 1, Macrosystem). All the teachers emphasized that these factors have a profound influence on students' SRL (e.g., see quotes in Table 1). Consistently, we argue that it is important to view teachers' efforts to promote SRL in the context of the relationships between and among these systems. These interactions/relationships between systems and subsystems are referred to as *mesosystems* [29]. These mesosystems often have the potential to influence the development of SRL in classrooms. We believe that teachers' goals of supporting students' SRL can be effectively achieved if the mutually dependent systems co-existing in this dynamic process "are characterized by mutual trust, a positive orientation, and goal consensus" [35] (p. 538).

4. Discussion

Teachers' beliefs and intentions about students' SRL are crucial in determining their classroom practices [25]. However, SRL-related perspectives and practices of teachers are rarely explored in SRL research. This might be because SRL is generally viewed and described in terms of individual's characteristics, abilities and skills (e.g., cognitive-behavioral and cognitive-developmental perspectives). However, with the advancement in the field of SRL, newer perspectives (e.g., social cognitive) explored how instructional processes, such as modeling may affect students' SRL. More recently, research on SRL has entered into an era of operation, which explores the operation of self-regulation processes as employed by learners [1]. It captures the dynamic and cyclical nature of self-regulation as an event that is subject to continuous changes. In this paper, we explored the operation of SRL-in-context from the teachers' perspectives, to emphasize their role in supporting students' SRL.

We presented an integrative, ecological model of SRL-in-context, to understand and highlight the teachers' perspectives in supporting students' SRL (see Figure 1). Based on Bronfenbrenner's system-ecological perspective [29,30], the model is informed by integrating the six teachers' beliefs and practices at its core. While teachers hold a central position in promoting students' SRL, the SRL-in-context model further suggests that the process operates within a complex structure of nested and mutually dependent systems. Nevertheless, we believe that teachers' efforts to promote SRL can be reinforced if the subsystems operating within the process are built on mutual goals.

The six teachers who participated in our study viewed SRL as a dynamic cyclical process which is in line with the recent emphasis in SRL research [1]. However, importantly, the teachers highlighted the centrality of their own role in supporting students' SRL. This emphasis coincides with researchers who stress that teachers are the agents who can introduce and reinforce students' learning experiences [21]. However, there are several other factors that the case study teachers believed to have an influence on their efforts to promote SRL. These include, for example, students' abilities and willingness to engage in SRL, classroom environment, resources, curriculum, home and family background, parents, culture, and community. Inspired by Bronfenbrenner's ideas [29,30], we arranged these factors in a nested structure, where each part is dependent on and affected by other parts. This arrangement is in line with the teachers' perspectives and practices related to SRL in classrooms. For example, the teachers emphasized that the process of supporting students' SRL is a combination of several factors (e.g., "the combination of, you know, it's the home and the school and the camps where the children go and groups they mix with too") that "all just leads on and goes around in a big circle." Similarly, teachers enacted SRL-supportive beliefs and practices in different ways that were congruent with their students' needs, classroom contexts and situations in which they find themselves [14,15]. In this way, SRL-supportive approaches of these teachers were not only shaped by their beliefs, but other factors, such as classroom contexts, home, and parents also influenced the ways in which they supported students' SRL.

The goal of the integrative, ecological model of SRL-in-context is to put the teachers' perspectives at the forefront. It informs the pre- and in-service primary school teachers' understandings about how to support students' SRL in classrooms. Specifically, the model emphasizes, at the microsystem, that teachers' beliefs and practices interact with each other, as well as with their surrounding contexts

(e.g., classroom environment, students) to achieve SRL. For example, a supportive, responsive, resourceful, relaxed, and non-judgmental classroom environment is known to promote SRL [31]. While the case study teachers also acknowledged the significance of classroom environment in promoting students' SRL, they influenced it in discrete ways. For example, T1 set up work *spaces* specified to different tasks throughout her classroom to support students' SRL [26]. She emphasized: "Space is probably the biggest thing you need. Define spaces . . . not necessarily the child's workspace, but a space that is specified to one task." On the other hand, T5's classroom featured the arrangement of desks in groups to facilitate social interactions among students [15]. T5 stressed: "It [classroom] should look like groups. It should look like flexibility of groups. It should look like people being able to move from one group to another depending on their needs." This shows that teachers' beliefs influence the ways in which the physical and social environment of the classrooms were set up. Again, effective classroom environments fostering SRL can be achieved in different ways, featuring varied expectations, rules, practices, and interactions.

These interactions are further shaped by the curriculum, resources, and school culture that exert a reciprocal influence on the teacher and his/her practices in the classroom. These influences are consistent with the dynamic interactions in the exosystem of Bronfenbrenner's system-ecological perspective [29,30]. Finally, the macrosystem (e.g., home, community, society) affects and is affected by the exo- and microsystem in which teachers support students' SRL. All these subsystems are interrelated and mutually dependent. This implies that, together, these can strengthen or weaken teachers' efforts to promote students' SRL.

In sum, the model highlights teachers' role as effective agents who can bring SRL into their classrooms. It encompasses a series of interconnected and mutually dependent systems in supporting students' SRL by highlighting the teachers' perspectives. This includes the microsystem (teachers' beliefs and practices), exosystem (school culture, resources, and curriculum), and macrosystem (home and community, culture, society). However, caution must be observed before applying it in the wider context. While different subsystems are incorporated into the model, we believe that the social and cultural aspects (macrosystem) and the ways these affect the underlying process (microsystem) require greater elaboration. For example, how does the institutional, societal and cultural aspects exert their influence on the teacher, and his/her beliefs and practices in supporting students' SRL? Herein, the aim of the study was limited to emphasizing the role of the teacher in supporting students' SRL.

4.1. Limitations

The small number of primary school teachers who participated in the study limited the extent to which the SRL-in-context model may be generalized. Nevertheless, it integrates detailed yet varied perspectives of primary school teachers. While the model offers a visual description that helps us to understand the teachers' role in promoting students' SRL, it is confined to the perspectives, practices, and approaches of primary school teachers. However, the goal of the study was to show how the six case study findings can be understood in the context of Bronfenbrenner's system-ecological perspective. The authors invite readers to make generalizations by thinking about the likely transferability of the model in their unique contexts.

4.2. Future Research

Our research has made important contributions to SRL literature. It examined and situated primary school teachers' role in supporting students' SRL by presenting an integrative, ecological model of SRL-in-context. However, there are unresolved queries that need further investigation. For example, it would be worthwhile to conduct extended investigations of the social processes involved within SRL, and the ways through which teachers support SRL in diverse educational (e.g., middle and high school) and cultural (e.g., contexts where SRL is less emphasized) contexts, curriculum, and students with high support needs (e.g., gifted students, or those with disability needs). Further

investigations could explore how each of these areas requires different settings and processes and what this may entail for teachers who aim to support SRL.

By undertaking research on how the school culture and society affect teachers' efforts to support SRL, we may gain a better understanding of the underlying processes. This would lead to suggestions which could further elaborate on teachers' role in supporting students' SRL. One direction for studying SRL in cross-cultural contexts could be to include a wide range of cultural groups or to generate indigenous models of SRL from the teachers' perspectives, in varied contexts [47]. This could be done by examining SRL in contexts that do not support the process, then training teachers to support SRL, and examining the process by employing exploratory research designs.

5. Conclusions

This paper develops insights into the primary school teachers' role in supporting students' SRL by presenting an integrative, ecological model of SRL-in-context. The six teachers who participated in our research reflected on their own beliefs and practices, and were also observed in their classrooms to uncover the ways through which they promoted SRL [14,15,28]. Overall, the teachers stressed multiple factors that influence their efforts to promote SRL. These include their own beliefs, abilities and motivational levels, the environment in which they find themselves, curriculum, students' home and family background and community. On the other hand, effective practices employed by the teachers to support students' SRL include: Providing instructional, motivational, behavioral, instrumental/strategic, and recreational support, fostering critical and independent thinking, continuous monitoring and feedback, and involving the community. As we put together different components within a nested structure, it was apparent that teachers tend to devise their own SRL-supportive approaches which are in line with their beliefs, practices, and environments in which they work. In doing so, they are also influenced by certain factors that are outside of their immediate context, including school, home, parents, and community.

Our research complements, as well as extends the literature on SRL-supportive practices by focusing on teachers' beliefs and understandings about SRL, the various ways they adopt SRL-supportive practices in classrooms, and how their beliefs about teaching and learning shape those practices as enacted. Consistently, the SRL-in-context model situates teachers' beliefs and practices to achieve SRL within a nested structure of different yet interrelated factors, such as classroom environment, school, home, and parents. The model has implications for both theory and practice.

The SRL-in-context model suggests that teachers are the SRL authority and in a practical position to execute it. The pedagogical practices highlighted in the model may serve as guidelines for pre- and in-service teachers who are keen to support students' SRL. However, while these descriptions provide an overview of sufficient conditions that support SRL, we do not treat them as essential practices. Rather, we believe that teachers can modify and adjust these practices in diverse ways, using a different blend of strategies according to specific contexts and situations.

Similarly, the model acknowledges the fact that primary school teachers can take up quite different practices, in line with their unique beliefs and understandings, that nonetheless reflect important principles shown to be supportive of SRL. This implies that teachers can combine general accounts of teaching effectiveness with classroom practices that support students' SRL in accordance with their personal beliefs and contexts. This finding has potential implication for teacher education and professional development programs that recognize teachers as professionals who can promote students' SRL in real-life classrooms. In this way, the model provides a useful framework for pre- and in-service teachers to inform their SRL-supportive approaches.

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