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Understanding the Promotion of Self-Regulated Learning in Upper Secondary Schools: How can Teaching Quality Criteria contribute?

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Abstract

Self-regulated learning (SRL) has gained increasing attention in educational science over the past four decades. Especially within the context of the lifelong learning debate, regulatory strategies play a crucial role, as they are essential not only within schools and classrooms but also in lifelong learning contexts. Concurrently, the discussion on teaching quality holds an equally central position in educational science. However, these two lines of discourse have, so far, been treated largely independently of each other and lack an alignment. In our exploratory study, we applied the three basic dimensions of teaching quality to assess an SRL-promoting learning environment from the perspective of students. We conducted seven focus groups involving a total of N = 49 secondary school students, and the data was analyzed using qualitative content analysis. Our analyses demonstrate that these basic dimensions can contribute to analyze the quality of an SRL environment. However, further adaptation is required as the three dimensions seem still to be interwoven with a more traditional conceptualization of teaching.

Keywords: Self-Regulated Learning; Teaching Quality; Focus Groups; Qualitative Content Analysis; Instructional Development

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1. Introduction

School instruction, as a central pillar for the education of all children and adolescents, serves not only as a means for the systematic, intergenerational transfer of knowledge, skills, abilities, norms, and values but also for fostering individual and collective competence and personality development. In this context, both what students learn and how they learn it are equally relevant. The concept of self-regulated learning (SRL) is particularly significant, as it empowers children and adolescents to intentionally shape their competence and personality development (OECD, 2018). Consequently, exploring strategies to promote SRL lies at the heart of both research and educational practice, making it the central focus of this paper. We aim to contribute to a better understanding of the quality of SRL in classrooms and schools by analyzing an SRL-conducive learning environment through the lens of teaching quality. Drawing from a qualitative study involving 49 upper secondary school students, we employ focus groups to investigate which elements of a learning environment tailored to SRL significantly contribute to its effectiveness.

2. Self-Regulated Learning: Direct Promotion and Indirect Activation in the School Classroom

SRL is a fundamental educational principle for achieving successful student learning (OECD, 2019). The origins of SRL research in educational settings are diverse, with roots tracing back to the 1960s and 1970s. SRL draws from multiple theoretical frameworks and has been analyzed across various contexts, with key contributions from Vygotsky (1962), Flavell (1971), and Bandura (1986), among others. As Panadero (2017) demonstrates in his review article, contemporary SRL models are strongly characterized by either a (meta-)cognitive (Efklides, 2011; Winne & Hadwin, 1998), motivational (Pintrich, 2004; Zimmerman, 2000), or emotional (Boekaerts, 2011) perspective. SRL can be defined as the behavior exhibited by individuals who aim to enhance their knowledge and skills by actively monitoring and regulating their learning activities (Paris & Paris, 2001). Specifically, SRL is understood as a hierarchically organized, temporal, and adaptive process in which learners conduct a task analysis, develop goals, and create plans to solve the task. The achievement of these goals is facilitated using various learning strategies, with motivational and affective factors playing a critical role in initiating and sustaining goal attainment. Learners continuously monitor and reflect on their learning processes and goal achievement through metacognitive strategies. The effective use of self-regulatory strategies depends on the specific tasks and the contextual factors of the learning environment (Greene et al., 2021). Against this backdrop, it becomes clear how important it is to create suitable learning environments where students can actively shape their learning processes. Despite the valuable approaches described above, repeated criticism has lined out that models of SRL have not dedicated enough attention to the interplay between individual learners and their learning environments (Martin, 2007; McCaslin & Good, 1996; Perry & Rahim, 2011). Panadero (2017, p. 22) states that "...with the exception of Hadwin, Järvelä, and Miller's work, not much research has been conducted by the others in exploring how significantly other contexts or the task context affect SRL." Moreover, a systematic definition on the quality of SRL conducive learning environment remains open. This study aims to make an initial contribution toward addressing this gap. The novelty of our research lies not only in investigating how effectively learners perceive an SRL-supportive learning environment but also in systematically identifying and analyzing the quality of such an environment through the lens of teaching quality.

To address these questions, it is valuable to explore the distinction between direct strategy instruction and indirect activation of SRL (Dignath & Veenman, 2020). Promoting SRL involves distinguishing between direct and indirect methods (Dignath-van Ewijk et al., 2013). Direct support involves teachers explicitly teaching self-regulation strategies. Consequently, recent studies increasingly emphasize the teacher's role in promoting SRL in the classroom (e.g., Perry, 2013; Karlen et al., 2020; Veenman, 2017; Vosniadou et al., 2024). For instance, research by Perels and colleagues

(Leidinger & Perels, 2012; Perels et al., 2009; Venitz & Perels, 2019) shows that teachers can significantly enhance students' SRL by using appropriate teaching materials. Moreover, directly training teachers to promote students' SRL has shown to be effective (e.g., Finsterwald et al., 2013; Kistner et al., 2010), with teacher beliefs and self-efficacy playing a crucial role (e.g., Heirweg et al., 2021; Karlen et al., 2020). In this context, the significance of integrating SRL promotion into teacher education programs at an early stage becomes particularly clear (Kramarski, 2018; Kramarski et al., 2013).

In this regard, strategy teaching can be further differentiated into explicit and implicit approaches, with direct strategy instruction classified according to its degree of explicitness (Dignath & Büttner, 2008). Brown and colleagues (1981) distinguish three levels of direct strategy instruction: blind, informed, and explicit self-control training. Research consistently highlights the effectiveness of direct strategy training (Donker et al., 2014). This effectiveness is evident both in the application of cognitive learning strategies (Hattie et al., 1996) and in the integration of cognitive and metacognitive strategies (Schuster et al., 2023; Souvignier & Mokhlesgerami, 2006). Although numerous studies demonstrate the effectiveness of direct strategy instruction, the role of the learning environment in fostering SRL skills is equally significant (Karlen & Hertel, 2024).

A prominent example is the CLIA model (Competence, Learning, Intervention, Assessment), a framework designed to create learning environments that promote sustained knowledge acquisition and the development of students as competent learners and critical thinkers. The CLIA model emphasizes the promotion of self-regulation as a fundamental component of learning (De Corte et al., 2004), with its effectiveness in enhancing various aspects of SRL demonstrated across diverse educational contexts. For example, this learning environment has been shown to enhance elementary school students' mathematical problem-solving skills, beliefs, and attitudes (De Corte et al., 2004), as well as their collaborative learning processes (De Corte, 2012). Furthermore, students have been observed to perform better and engage more intensively in metacognitive regulation strategies within SRL-conducive learning environments (De Corte, 2016; Masui & De Corte, 2005).

A similar proposal was developed by Perry (Perry, 2013; Perry et al., 2018; Perry et al., 2020) highlighting various aspects of a classroom environment that emphasize SRL. This framework categorizes classroom elements conducive to SRL into four main groups: Supportive Structures for SRL, Student Autonomy and Influence, Facilitating, Guiding, and Co-Regulating, and Functioning as a Community. These macro categories are further divided into several micro categories that reflect specific actions teachers take in the classroom. Teachers provide SRL-supportive structures (1) by offering various activities, routines, and participation structures that support both individual and collaborative learning while ensuring inclusivity for diverse student needs and abilities. These structures include tasks, instructions, familiar routines, as well as visual prompts. For example, task setting involves diverse, advanced learning objectives achieved through real-world, extended, and multifaceted tasks. These tasks foster deep cognitive engagement and metacognition while offering flexibility in learning approaches and representations. In this context, Perry et al. (2020) collaborated with teachers to create diverse tasks and evaluation methods that support SRL. Their findings show that SRL-focused instruction promotes deep learning, positive emotions, and enhanced student achievement. Student influence and autonomy (2) are fostered by acknowledging learners' perspectives and experiences, providing opportunities to take control of their learning. Various forms of self-assessment, along with involvement in decision-making, are crucial to this process. In autonomy-enhancing learning environments, students experience more positive emotions about their learning process. They exhibit increased autonomous motivation (De Naeghel et al., 2016), greater engagement, reduced amotivation (Cheon & Reeve, 2015), and a tendency to seek out more challenging tasks (Su & Reeve, 2011). Support, scaffolding, and co-regulation (3) describe how teachers and peers can act key as key learning supports for students. SRL-conducive learning environments feature metacognitive and motivational dialogue, modeling, demonstrations, and differentiated, reciprocal feedback. The importance of the social context has been demonstrated several times, for example, regarding scaffolding through teachers and peers (van Leeuwen & Janssen,

2019; Molenaar et al., 2014; Salonen et al., 2005) or collaborative learning (Hadwin et al., 2018; Järvenoja et al., 2018; McCaslin & Vriesema, 2018; Panadero et al., 2015; Vriesema & McCaslin, 2020). Creating a community of learners (4) refers to fostering a sense of belonging and group cohesion through participation structures. When a classroom cultivates a positive climate marked by recognition of individuality, mutual support, shared knowledge, and respectful communication, it effectively operates as a community. Research indicates that fostering a learning community benefits SRL by encouraging students to actively seek help and peer support (Perry & Drummond, 2002).

From the perspective of school and instructional development, a central question is how schools and teachers can foster students' SRL. Building on previous research into the indirect activation of SRL, it is crucial to examine which aspects of instruction students find effective and how they perceive specific design features of the learning environment as conducive to SRL. While De Corte and Perry have contributed to conceptualizing learning environments conducive to SRL, a systematic evaluation of their quality remains outstanding (Dignath & Veenman, 2020; Muijs et al., 2014).

3. Teaching Quality

Research on teaching's impact on student learning, often termed “teaching quality” or “teaching effectiveness” (Seidel & Shavelson, 2007), has a longstanding tradition. Research on effective teaching encompasses two fundamental objectives. First, it seeks to deconstruct complex teaching processes to identify core instructional characteristics. Second, these characteristics are designed to encapsulate the essential elements of teaching that enable students to achieve their learning objectives (Praetorius et al., 2020). This approach is further informed by two fundamental dimensions of instructional design: the “deep” structure and the “surface” structure (Klieme et al., 2009). Surface structures include organizational forms, social formats, and teaching methods (e.g., class groups, project work, group work, etc.). Deep structures refer to teaching-learning processes, encompassing learning content examination, teacher-student interaction, and the overall professionalism of teaching and learning (Seidel & Shavelson, 2007). Effective teaching is primarily identified through analyzing deep structures that underlie the different methods and formats teachers use (Oser & Baeriswyl, 2001). Studies have identified criteria for teaching quality, such as a supportive classroom climate, meaningful discourse, effective task engagement scaffolding, explicit strategy instruction, and clear achievement expectations. These criteria were initially outlined by Brophy and Good (1986) and later expanded upon by Brophy (2010), grouping them into primary categories within models such as the QUAIT-model by Slavin (1994) and the CLASS-model by Pianta and colleagues (2008). Given that teaching serves multiple objectives, such as student knowledge acquisition, fostering student interest, and enhancing student social skills (Brophy, 1999), a diverse range of models for evaluating teaching quality and effectiveness exists (e.g., Ferguson & Danielson, 2014; Klieme et al., 2009; Slavin, 1987, 1994). Despite differences in focus, abstraction, and domain specificity, models generally agree on core characteristics of teaching quality, such as time on task or classroom management (Praetorius et al., 2018).

In the German-speaking academic context, the model of the three basic dimensions of teaching quality, as proposed by Klieme and colleagues (2009), has gained prominence. This model consists of three core dimensions: (1) classroom management, (2) cognitive activation, and (3) student support. The model distinguishes between characteristics that enhance motivation and those that improve academic performance. An optimal classroom environment that fosters both motivation and performance seamlessly integrates all three dimensions. Classroom management, as defined by Praetorius et al. (2018), involves effective handling and prevention of disruptions, efficient use of time, monitoring, teacher presence, clear rules, and established routines. Cognitive activation involves engaging students with challenging tasks, connecting to prior knowledge, and encouraging diverse

problem-solving strategies. It also emphasizes moving away from uni-directional, teacher-focused instruction toward interactive, co-constructive learning, incorporating Socratic methods, and fostering students' metacognitive processes. The supportive class climate dimension centers on students' perceptions of competence, autonomy, and social inclusion. Extensive empirical research has been conducted on the basic dimensions of teaching quality. Research shows that cognitive activation improves academic performance, while student support significantly boosts students' interest in the subject matter (e.g., Klieme & Rakoczy, 2003). Classroom management has the most significant impact on student learning across all subjects (e.g., Praetorius et al., 2014). This is likely because effective classroom management maximizes students' learning time (Seidel & Shavelson, 2007).

In summary, teaching quality refers to the set of measurable teaching attributes that directly correlate with students' progress toward achieving educational objectives (Klieme, 2019). The three basic dimensions are conceptualized as generic factors of teaching quality that apply across disciplines, making them independent of subject-specific content. It is reasonable to assume that these criteria also provide a framework for analyzing successful SRL. Therefore, it is crucial to investigate how students perceive the quality of learning environments designed to foster SRL and which instructional features they regard as relevant and effective in this context.

4. Analyzing a SRL Learning Environment from the Perspective of Teaching Quality

Research on successful SRL has revealed the high importance of both the individual development of the students and the development of the learning environment for successful teaching. Moreover, their interaction is of particular interest (Dignath-van Ewijk et al., 2013). As Dignath and Veenman (2020, p. 523) pointed out, "…researchers investigating teachers' SRL practice should consider results from generic teaching effectiveness research" and aim to clarify the extent to which specific instructional dimensions contribute to an understanding of effective SRL. Therefore, we suggest a systematic quality analysis of an SRL-enhancing learning environment in using the three basic dimensions of teaching quality common in research on learning and instruction. This approach is innovative, as studies on teaching quality typically do not specifically target a particular teaching concept, such as SRL, while research on SRL only indirectly addresses the basic dimensions of effective teaching, if at all. By linking these dimensions to SRL, there is potential for expanding our understanding of effective instruction. Addressing these questions could make a lasting contribution to the development and evaluation of SRL-promoting learning environments, while also enhancing overall teaching quality.

5. The Present Study

The importance of SRL at the upper secondary school level of education is particularly evident due to its crucial role in the sustained acquisition of knowledge and skills. Moreover, it holds significant relevance for postsecondary education (Vosniadou, 2020), as students need to be prepared for successful higher education completion, which necessitates the mastery of appropriate self-regulatory strategies (Jansen et al., 2019; Kitsantas et al., 2008; Nandagopal & Ericsson, 2012; Peverly et al., 2003). Teachers lay the foundation for learners to control, shape, and develop their own learning by intentionally designing SRL-conducive learning environments (De Corte, 2004; Perry, 2013). However, despite SRL being a central focus of classroom research for the past four decades (Panadero, 2017), questions about the specific qualities of SRL-conducive learning environments remain open (Dignath & Veenman, 2020; Muijs et al., 2014). Thus, there is a clear need for a systematic definition of the quality aspects of an SRL-conducive learning environment. This paper aims to address this gap by exploring the following question:

What aspects of the three basic dimensions do upper secondary school students describe in a learning environment conducive to self-regulated learning?

In addressing this broad question, our study is exploratory in nature and aims to identify the potential benefits of analyzing the quality of SRL-enhancing learning environments through the lens of the three basic dimensions of teaching quality. Thus, we align two important yet distinct discourses in educational research as, to date, there has been little systematic effort to describe the quality characteristics of learning environments that promote SRL.

6. Methodology and Data Basis

6.1 Study Context

This study was conducted in Switzerland, focusing on students in upper secondary school. In Switzerland, upper secondary school typically spans three to five years, catering to students aged 14 to 19, similar to other European upper secondary systems. Our research involved examining one class each at the beginning, middle, and end of this educational phase. However, this was not a longitudinal study; instead, we conducted a cross-sectional analysis of different cohorts at various points in their upper secondary education.

Our partner school, Gymnasium Hofwil, initiated discussions about fostering SRL during an internal teacher workshop involving all staff members. The discussions arose from the school's dissatisfaction with its current narrow structure and students' learning outcomes, alongside debates among teaching staff about the need for self-regulation and the prerequisites for successful learning in upper secondary education. The school drew inspiration from a comparable institution that had successfully implemented SRL as part of its school development process.

The sounding board within the school, comprising teachers, students, and school leaders, recognized the need for a more objective and multi-informant evaluation. After several rounds of internal feedback and evaluation, the school principal contacted one of the researchers to request an external, formative evaluation of the newly implemented teaching structure. This initiated a collaboration between the school and researchers from the University of Bern. Using the macro and micro categories of SRL-conducive learning environments developed by Perry and colleagues (Perry et al., 2018), the upper secondary school and the researchers collaboratively evaluated and refined the teaching structure in a participatory manner (Perry et al., 2020). To accomplish this, we applied three fundamental principles—separation of learning phases and assessment phases, fewer subjects per learning phase, and individual learning time—to Perry's framework (Table 1).

Table 1

Assignment of macro and micro categories of SRL conducive learning environment according to Perry et al. (2018)

Macro categories	Micro categories	Instructional setting in our study
Supportive Structures for SRL	Tasks/Activities	Fewer subjects per phase / Individual learning time
	Expectations/Instructions	Learning and assessment phases
	Familiar Routines and Participation Structures	Learning and assessment phases
	Visual Prompts	Fewer subjects per phase / Individual learning time
Student Autonomy and Influence	Involvement in Decision Making/Meaningful Choices	Individual learning time
	Control over Challenge	Fewer subjects per phase
	Self-Assessment	Learning and assessment phases
Facilitating, Guiding, and Co-Regulating	Modeling/Demonstrating	Fewer subjects per phase
	Questioning	Fewer subjects per phase
	Feedback	Learning and assessment phases / Fewer subjects per phase
	Metacognitive Language	Fewer subjects per phase
	Motivational Messages	Fewer subjects per phase
Functioning as a Community	Co-Constructing Knowledge	Individual learning time
	Positive/Non-Threatening Communication	Individual learning time
	Supporting/Celebrating One Another's Learning	Individual learning time
	Accommodations for Individual Differences	Individual learning time

Firstly, the school year was divided into learning and assessment phases, and the framework timetable was transformed into an annual schedule. To establish an SRL-supportive learning environment, learning objectives and assignments were presented to students at the beginning of each phase. This ensured that students clearly understood what was expected of them and how to organize and plan their learning. To promote students' autonomy and influence, also a routine was established within the phases. After every five weeks of learning, an assessment phase was held, allowing students to demonstrate what they had learned and engage in self-assessment of their progress. This approach enabled learners to develop consistent learning routines and effective strategies for achieving learning objectives. Accordingly, there were no assessments during the learning phases; students focused solely on learning subject content during joint lessons and working independently on assignments during individual learning. In the assessment phase, which lasted one week, summative examinations were conducted to assess the students' level of knowledge and development.

Secondly, only 3-4 subjects were taught simultaneously in each learning phase (fewer subjects per phase). Traditionally, the weekly timetable remains the same every week. This structure was modified so that subjects were scheduled at specific times with greater intensity, ensuring that all subjects (e.g., languages, science, math) were still covered but with more hours per subject during each phase. Although this changed the distribution of lessons throughout the school year, the school's educational administration requirements were still met. The adapted learning environment was designed to facilitate deeper immersion in subjects while heavily supporting, guiding, and co-regulating in the classroom. With fewer subjects per phase, teachers met students more often, allowing them to use various forms of feedback (formative, summative, prognostic) during the learning phase, which supported the students in their learning in a more targeted way. At the same time, teachers used metacognitive language and supported students by setting learning goals at the beginning of each learning phase and by teaching specific metacognitive strategies. To further promote metacognitive strategies, students were encouraged to maintain learning journals. Teachers acted as role models by using strategies such as mind mapping or in-class discussions to address task challenges together, creating SRL-supportive structures.

Thirdly, 30% of instructional time was allocated to individual learning time to establish supportive structures for SRL and increase student autonomy and influence (individual learning time). This allowed students to plan and decide independently when, with which tools, and in which social context they would complete their tasks, enhancing their involvement in decision-making. This approach aimed to enhance students' engagement with the subject matter and foster explicit self-regulation through the completion of more complex tasks. Students could delve deeper into subjects at their own pace and according to their needs, promoting a classroom community where individual differences were valued. Knowledge was co-constructed as teachers acted as learning coaches, guiding students through their learning processes. In case of challenges or questions, students were encouraged to contact the teachers but had to decide for themselves when and in what respect they needed support. The sense of community was further enhanced by offering various types of learning spaces. Some spaces were designated for quiet, individual work, while others were intended for discussions and collaborative group work. This arrangement fostered lively discussions, shared learning experiences, and mutual support. Students had opportunities to share insights and questions, give positive feedback, and offer mutual explanations. Since some students excelled in certain subjects while others excelled in different areas, they could assist each other during individual learning time.

6.2 Case Selection

The dataset comprises a total of seven group discussions. The sample includes 49 students, consisting of 29 females and 20 males, from three different school classes (9th, 11th, and 13th Grades) where the SRL-supportive learning environment was implemented. Accordingly, students aged 14 to 19 were interviewed. To address our research question, we intentionally selected student group

discussions as our primary method, as learners are central to educational and instructional efforts (Scherer et al., 2016; Wisniewski et al., 2020). To gain a comprehensive understanding of the learning environment across all grade levels, students with varying levels of experience were purposefully selected according to a predetermined qualitative sampling plan (Patton, 2015). This involved examining one class at the beginning, middle, and end of upper secondary school. The participant selection was exhaustive and homogeneous within school classes, encompassing potentially all students within a class. However, between school classes, the selection was heuristic and heterogeneous, intentionally including specific classes in the sample. To facilitate year-specific analyses, group discussions were conducted within individual classes (Lamnek, 2005).

6.3 Data Collection and Data Analysis

The seven group discussions followed a semi-structured guide and were conducted in a conversational setting to replicate an everyday school environment as closely as possible (Onwuegbuzie et al., 2009). Each discussion involved five to nine participants. Before the group discussions, participants were informed about the study and provided their consent for participation and data usage. The discussions were recorded and lasted between 55 and 80 minutes (mean duration = 70 minutes). The audio recordings were transcribed using F4/F5 software, following established guidelines (Kuckartz & Rädiker, 2019). Verbatim transcription was employed, with minor language and punctuation corrections for readability. To maintain student anonymity, each participant was assigned a unique code. These codes prevented the identification of individual participants in the discussions but allowed for individual attribution (e.g., S1).

The collected data were analyzed using a structured qualitative content analysis approach with MAXQDA 20. Initially, a category system was deductively developed from existing theory. This category system was then inductively tested and expanded using the collected data (Kuckartz & Rädiker, 2019). The categories were based on the category system of Praetorius et al. (2018) and were slightly modified through translation into German. The category system was organized into three main categories: *class management, cognitive activation, and student support*, mirroring the three basic dimensions of teaching quality (Klieme et al., 2009). Table 2 provides an example of the category system, describing one sub-category along with its definition and an anchor example. Sense units were defined as coding units, allowing not only single sentences but also entire paragraphs to be assigned to the same code. To ensure inter-subjective comprehensibility, the codings were collectively discussed and compared using an interview as an illustrative example (Kuckartz & Rädiker, 2019; Mayring, 2015). Furthermore, interrater reliability was calculated, demonstrating an acceptable level of agreement, with a Cohen's Kappa value of 0.67 (McDonald et al., 2019).

Table 2

Excerpt from the Category System

	Subcategory	**Definition**	**Anchor Example**
Classroom Management	Rule Clarity and Routines	Clarity and structure in classroom procedures; rules must be defined and handled equally by all.	"I think it's important that the assignments are clear. And that you really know what you have to do and by when you have to do something."
Cognitive Activation	Activation of and Link to Previous Knowledge	Building on students' existing knowledge, linking of different topics.	"It is also very difficult to always find the entry point. Because if you repeat something now to get back into it a bit, half of the phase is already over again and then you should actually be much further along and have started a new topic."
Student Support	Differentiation and Adaptive Support	Individualization of assignments, e.g. different levels of difficulty and assistance; more advanced assignments for faster students; support for students who experience difficulties.	"In the beginning, there were more teachers, and I had them explain it to me a few times, and then it actually worked. But you do need two or three weeks to find your way in."

7. Results

A total of 503 codes were assigned to the three main categories: classroom management (n=160), cognitive activation (n=168), and student support (n=175), which were somewhat evenly distributed among the basic dimensions of teaching quality. The findings are presented and interpreted in relation to the three core characteristics of the studied learning environment: "Separation of learning and assessment phase", "Fewer subjects per learning phase", and "Individual learning time".

The categorization and analysis of the interview material were conducted within the context of the three basic dimensions. When categorizing students' statements into these dimensions, the unique aspects of the SRL-conducive learning environment were explicitly considered, leading to adjustments in the subcategories. The results are further explored with respect to each class level only when differences between the class levels were identified; otherwise, they represent an overall perspective based on the statements of all learners. For readability, student quotes were edited to remove repetition, pauses, or filler words.

7.1 Separation of Learning and Assessment Phase

Table 3 summarizes the results regarding the separation of the learning and assessment phases. The following sections present the results for the three main categories in more detail, clarified through concise interview statements.

Table 3

Summary of results on separation of learning and assessment phase

Classroom Management ➢ Lesson organization is vital for students' SRL ➢ The structure of the lessons needs to have a certain degree of flexibility ➢ The learning environment encourages students to independently organize their learning, necessitating rules and structures
Cognitive Activation ➢ Learning environment activates and stimulates students' cognitive and metacognitive processes ➢ Block schedules support SRL processes ➢ Separating of school and exam weeks enables better time management and focused exam preparation ➢ Learning environment allows for in-depth and focused engagement with learning materials, reduces stress, and improves performance
Student Support ➢ Access to teachers is important for addressing questions and clarifications, especially during intensive learning periods ➢ The impact of student support is influenced by the amount of subject matter and the pace of lessons ➢ A balanced workload is necessary, as overwhelming demand or too little material can lead to boredom and reduced motivation ➢ Reduced performance stress in this learning environment allows for more focused and in-depth learning, enhancing overall performance

In the context of separating the learning and assessment phases, it becomes clear that the organization of lessons plays a crucial role in *classroom management* across all grades, which in turn supports students' SRL. Simultaneously, the two primary categories of classroom management and SRL demonstrate significant interdependencies in this context. The learning environment encourages students to independently organize their learning processes as much as possible, necessitating appropriate rules and structures. The idea that students have to attend fewer classes is generally viewed positively, but concerns arise regarding the organization of lessons. For example, students' questions about upcoming exams may sometimes go unanswered immediately by their teachers.

"I've noticed that, especially during these more intensive learning weeks, questions often arise. In such cases, it's quite practical to be able to approach a teacher for clarification. If you've

already prepared a summary the week before, that's not a problem. However, during the exam week itself, you have to rely on organizing solutions among yourselves." (Student_13_2_3)[1]

This demonstrates that students were not only tasked with planning their learning processes over an extended period due to the altered lesson structure, but they also needed to motivate and regulate themselves. Challenges arose when students were assigned an excessive number of diverse tasks.

In the context of *cognitive activation*, the SRL-conducive learning environment effectively stimulates students' cognitive and metacognitive processes. The separation of school and exam weeks, for instance, is mostly positively evaluated, as it enables students to manage their time more effectively, handle learning materials, and focus on exam preparations and studying. The introduction of block schedules provides structural support for SRL processes, allowing more time for reviewing the learning materials before exams.

From the students' perspective, the assessment of the impact on *student support* depended on the amount of subject matter covered. In particular, the pace of lessons played a crucial role: too much demand quickly led to overwhelm, while too little learning material caused boredom and reduced motivation. This situation was further complicated by variations in how teachers conducted their lessons. However, the pressure to perform was significantly alleviated in this teaching environment as students could engage with different learning materials in a more focused and in-depth manner. Consequently, this reduction in stress appeared to enhance overall performance across various subjects.

"Yes, it's just more manageable in a way when you can concentrate on one week, and, of course, it leads to much less stress." (Student_13_2_6)

This means that students were primarily empowered to make individual choices, as they could independently organize their learning and working time for the most part. This flexible structure strengthened their SRL and allowed them to experience a greater sense of autonomy over extended periods.

7.2 Fewer Subjects per Learning Phase

Table 4 summarizes the results regarding fewer subjects per learning phase. The following sections present the results for the three main categories in more detail, clarified through concise interview statements.

[1] Students' statements are labeled by grade_interview_number of student.

Table 4

Summary of results on fewer subjects per learning phase

Classroom Management ➢ Well-organized lessons with minimal interruptions aid SRL and concentration ➢ Teaching structure should adapt based on subject content, prerequisites, and student interests to enhance motivation
Cognitive Activation ➢ Reducing the number of subjects allows for longer durations per subject, promoting deeper learning ➢ The effectiveness of SRL depends on the specific subject and students' familiarity with it (e.g., ease in German vs. challenges in Mathematics) ➢ In-depth tasks (e.g., reading books) help manage interruptions and promote sustained learning
Student Support ➢ Reducing the number of subjects adjusts the lesson pace to support SRL ➢ Student perspectives on performance pressure varies: some students miss the competitiveness, while others find the reduced subjects alleviate pressure and are beneficial ➢ High-achieving classmates and study groups support SRL by aiding comprehension and motivation through interactive learning and collaboration

Given the significance of reducing the number of subjects per learning phase as a key element in creating a lesson structure conducive to SRL, alongside the continued importance of teacher instruction, it can be concluded that well-organized lessons support SRL in *classroom management*. Minimizing interruptions during lessons is highly valued – fewer interruptions and subject changes promote greater concentration and offer more opportunities to delve deeper into subject content. Teaching longer blocks of the same subject allows students to explore individual topics in greater depth, allowing them to build on existing knowledge. However, the reduction of subjects per learning phase should depend on subject-specific content, recognizing that students have varying prerequisites and interests. A more flexible teaching structure has the potential to enhance students' learning motivation.

In terms of *cognitive activation*, as previously mentioned, students were able to engage with the learning content more intensively due to the reduction in subjects, allowing for a longer learning duration per subject. However, the success of students' SRL was largely dependent on the subject matter itself. The effectiveness of SRL varied based on both the specific subject and the students' familiarity with it. Specifically, students' statements regarding different subjects revealed the following: In German, they found it easier to connect with their prior knowledge or reactivate it. This ease was attributed to German being their native language. However, perceptions of lesson structure varied when it came to mathematics. Learners highlighted that the possibilities for SRL were influenced by their performance in the subject.

"It might vary on an individual basis. For instance, I was never strong in math, so I can't pinpoint whether it was due to the interruptions or simply the subject itself, but, in any case, it made my learning a bit more challenging." (Student_13_2_2)

In mathematics, establishing connections between the different learning phases posed a significant challenge for students. Short repetition periods were evidently insufficient to reactivate previously acquired knowledge. This issue was particularly noticeable in the upper grades for foreign languages, where the condensed nature of lessons seemed to reduce their relevance for students. The learning environment designed to promote SRL encouraged more in-depth learning, with less emphasis on memorization, by assigning demanding tasks such as reading and engaging with books. This, in turn, appeared to help learners better manage interruptions better during the individual learning phases. It is evident that, while promoting SRL is the intended goal of the developed learning environment, students must already possess the ability to apply self-regulatory strategies to effectively learn in this instructional setting.

Regarding *student support*, students noted that the pace of the lessons was adjusted through the reduction of subjects allowing SRL to take place. However, an ambivalent picture emerged among the learners regarding the pressure to perform.

"In all honesty, I somewhat miss the competitiveness and performance pressure due to having only four subjects." (Student_9_1_8)

This quote clearly illustrates that some students associated the reduction in subjects with reduced performance pressure, which lead to a sense of underchallenge. Conversely, other students viewed the reduction of subjects as a relief, as it provided a moderately positive level of performance pressure.

"I believe it's somewhat related to how each person handles performance pressure. When you receive everything at the beginning of a phase, like two German books, two English books, all the math and biology materials, and the learning objectives, you start thinking, "Okay..." — you feel like you should be able to handle at least three-quarters of it. So, it does stress me out a bit at times, but in a positive way" (Student_9_1_6)

Collaboration with high-achieving classmates was perceived as beneficial for SRL, as it helped learners grasp connections within specific subjects. Studying together had a motivating impact. Through interactive discussions and mutual explanations, learning material was more thoroughly internalized and interconnected.

7.3 Individual Learning Time

Table 5 summarizes the results regarding individual learning time (IL). The following sections present the results for the three main categories in more detail, clarified through concise interview statements.

Table 5

Summary of results on individual learning time

Classroom Management ➢ Clarity of rules and routines is crucial for individual learning time in classroom management, but differing interpretations by teachers can hinder students' SRL ➢ Teachers should provide clear, well-defined assignments for IL to ensure structured learning ➢ Allowing students to choose between group and individual work based on their preferences enhances effectiveness of learning ➢ Different classes show distinctions in the structure of individual learning time. Younger students often find it inflexible and lacking support, while older students value the autonomy it offers
Cognitive Activation ➢ The lesson structure often fails to explore students' thought processes, leading to unclear solution paths in exams ➢ Students generally find tasks during individual learning time to be balanced. Older students, in particular, are engaged in reflective processes ➢ IL fosters co-constructive learning and a strong sense of social connectedness through group work, though distractions can sometimes make it stressful ➢ IL supports metacognitive processes, especially when coach roles are clear. Effective IL requires students to have SRL skills
Student Support ➢ Students engage in group learning through reciprocal interactions, gradually learning to actively utilize this opportunity. Especially older students value collaborative learning and co-regulation ➢ Subject-related support is seen as essential for individual learning, with structured interactions with teachers helpful for content-related questions, while process-oriented support from coaches is welcomed for extracurricular issues ➢ Unclear assignments and restricted choices can be demotivating for students in the learning environment, emphasizing the need for clear guidelines and teacher support ➢ Feedback on individual learning time during lessons varies in effectiveness

In the realm of *classroom management*, the clarity of rules and routines is a pivotal factor for IL, during which students are expected to engage in independent learning during class hours. Varying interpretations of these rules by different teachers were seen as highly detrimental, as students could only benefit from IL sessions for their SRL if they were appropriately structured by the teachers.

"I would also question how specific these implementation rules are because teachers approach it so differently. Some teachers assign new tasks every week, expecting them to be completed by a particular lesson and then discussed in class. On the other hand, there are teachers who provide assignments for the entire phase, requiring students to work on them alongside regular lessons." (Student_11_2_5)

Teachers interpreted the timeframes and content of IL differently, prompting students to continually adjust their learning approaches based to each teacher's specifications. Through the lens of IL, notable distinctions between the three classes became evident. The gradual reduction in the structuring of IL was accompanied by a more pronounced organization of learning processes by the students. This instructional approach required clear initial guidance in the form of well-defined assignments. IL received mixed feedback from younger students, with the primary criticism revolving around its perceived inflexible structure, which did not align with their preferred learning context. They also expressed concern that, without teacher oversight and monitoring, they felt insufficiently supported, leading to reduced motivation to complete their assignments.

"I believe you need a lot of self-discipline to ensure you actually accomplish tasks during IL." (Student_9_1_5)

Conversely, older learners valued the increased autonomy they had during IL, which provided them new opportunities to structure their learning process and prepare more flexibly for graduation. However, an ambivalent evaluation by the students remains evident, though the criticism takes on a different tone compared to younger learners. Effective time management appears to occur only when upper secondary students are not overly controlled and are given ample freedom to independently select their learning time and environment. This is further emphasized by students' growing recognition of the importance of IL over time and their increasing ability to use it more efficiently.

"Well, I also believe that everyone has different learning paces. Some need more time than six lessons per week, while others require less. You can't compel someone to study for six lessons or any specific duration. Additionally, when it comes to group assignments, like the geography one you mentioned earlier, students might voluntarily gather at school. It's convenient to meet after school since everyone is already here. I don't think it necessarily requires an official, mandatory lesson to facilitate such discussions. Students can organize it themselves. Moreover, if you have something to study and need to ask a teacher a question, you might willingly stay at school." (Student_13_1_1)

Regarding *cognitive activation*, the analyses indicate a lesson structure that does not fully explore students' thought processes. This is reflected in the learners' perceptions of examinations for example, where they often felt the solution path was unclear, particularly when teachers failed to recognize their struggle to grasp the lesson content. However, overall, the tasks assigned during IL were deemed balanced by the students. For simpler tasks, students could use their remaining time to complete additional assignments or seek assistance from classmates, especially in younger grades. The lesson structure encouraged older students to engage in reflective processes about the level of task difficulty, especially in preparation for graduation exams. Furthermore, co-constructive learning among upper secondary students was fostered, particularly when IL was used for collaborative group work. Learning in groups provided students with opportunities to develop SRL by learning from one another.

"Well, not getting help directly, but you observe what other classmates are doing, sit down with them, compare notes, discuss tasks together, and solve them collectively, which in itself is a form of support." (Student_9_2_3)

Many students, regardless of their grade level, reported a strong sense of social connectedness through group learning. However, challenges arose in specific situations, particularly when distractions diverted their attention from the intended tasks and objectives. In such cases, group work was more likely to be perceived as time-consuming and stressful. IL was viewed as supportive of metacognitive processes by the learners, particularly when they engaged reflectively with the learning content or when the roles of the coaches were clarified and deemed helpful. For IL to be effective, it was crucial for students to possess a repertoire of self-regulation strategies and have knowledge about SRL.

In terms of *student support*, students had the opportunity to engage in group learning through reciprocal interactions, gradually learning how to actively utilize this approach. However, when IL was perceived as coercive, it occasionally conflicted with other student needs.

"In the beginning, it was more common for us to sit together in groups. We had a designated area for that, like an island where we would learn together. However, over time, it evolved to the point where if you wanted to study together, you could, but you could also study effectively on your own. Additionally, we were permitted to use other rooms, which I found beneficial if you preferred studying alone." (Student_13_2_5)

Primarily, students in higher grades mentioned that, with the freedom to work independently in groups, they organized themselves accordingly and had a positive experience with collaborative learning. This led to learning alongside each other and active co-regulation over time. Consequently, students had the opportunity to shape their learning processes individually. This suggests that learners were given the option to self-organize for group work when necessary. Furthermore, students sought cooperation with classmates, especially when they needed help in a particular subject, highlighting the importance of group work within a subject context. From the students' perspective, structured interactions between teachers and students were particularly helpful when addressing content-related questions. Subject-related support was considered more essential for individual learning, whereas process-oriented support (such as extracurricular issues, talent area organization, or school and leisure time) provided by assigned coaches was highly welcomed.

"It might be better to have a subject teacher available for each subject once or twice a week, allowing students to work independently, and if they have questions, they can simply ask the teacher in person." (Student_9_2_1)

Students' dependence on a differentiated lesson structure and adaptive teacher support became evident in instances where unclear assignments resulted in overwhelming demands. Similarly, the SRL environment had a demotivating impact when students' choices were restricted. This limitation affected both assignment selection and completion, as well as participation in IL, especially during marginal or intermediate hours. Students expressed mixed views regarding the connection between IL and lessons. In some instances, lessons provided opportunities for constructive feedback on tasks students had completed during IL. However, in cases where feedback was absent or insufficient, the content of the various teaching settings appeared related in terms of subject matter but lacked alignment in their didactical approaches.

"I believe it's important for self-assessment to integrate Individual Learning Time (IL) into the lessons to some extent. Not necessarily discussing it directly, but laying a foundation in IL, for instance, and then revisiting it after some time has passed. This way, you can build upon it in class and have a discussion to ensure that you've learned the material correctly and that your focus during IL was on the right topics." (Student_9_2_5)

8. Discussion

Despite SRL being a central focus of classroom research for the past four decades (Panadero, 2017) and the significant emphasis placed on the learning context, a lack of systematic alignment between research on SRL and teaching quality exists, both from theoretical and empirical perspectives (Dignath & Veenman, 2020; Dignath-van Ewijk et al., 2013). Questions regarding the specific qualities of SRL-conducive learning environments remain unanswered (Muijs et al., 2014; Dignath & Veenman, 2020). In the presented study, we investigated a learning environment conducive to SRL at the upper secondary level. The objective of this instructional setting was to empower students to engage in more SRL by implementing a distinct separation between learning phases and assessment phases, reducing the number of subjects per learning phase, and allowing for individualized learning time (Perry et al., 2004, 2018, 2020). Our study is unique to date as it represents the first systematic

attempt to analyze an SRL-conducive learning environment through the lens of the three basic dimensions of teaching quality. Our analysis revealed that these three dimensions–classroom management, cognitive activation and student support– are also relevant for a learning environment intentionally designed to foster SRL, even if they require partial reinterpretation.

8.1 The Generic Nature of SRL-Promoting Learning Environments

The results suggest SRL-supportive learning environments can largely be assessed based on the three basic dimensions. However, further specification of the generic nature of these dimensions for SRL-supportive instruction is necessary. Our analyses showed that almost all categories of Perry's framework model could be reconstructed, indicating that the three basic dimensions could be effectively mapped within the SRL-promoting learning environment of our study.

Traditionally, the focus of classroom management has been on identifying and reinforcing desirable behavior and preventing undesirable behavior through clear rules and the establishment of routines (Hattie, 2009; Hochweber et al., 2014; Praetorius et al., 2018; Seidel & Shavelson, 2007). Notably, classroom management is primarily embedded within the supportive structures for SRL, as familiar routines, participation structures, expectations, instructions, and tasks play a central role in all three elements of the learning environment. Although classroom management is considered generic for teaching (Charalambous & Praetorius, 2020), our study reveals that some generic aspects must be specified in terms of content to meet the requirements of an effective SRL-promoting learning environment. For example, the results indicate that the focus in SRL-promoting learning environments shifts toward supporting learners in managing their learning processes (De Corte et al., 2004; Perry, 2013). In this context, the effective handling and prevention of interruptions remain relevant (Praetorius et al., 2018), although the definition of a disruption in the classroom needs reinterpretation. Activities perceived as disruptive in traditional learning environments (e.g., a spontaneous exchange with a peer) can be seen as productive learning processes in SRL learning environments, requiring flexible time management by teachers to allow students to work and reflect independently (Dignath & Veenman, 2020; Dignath-van Ewijk et al., 2013).

Cognitive activation plays an important role in a learning environment conducive to SRL and is distributed across all three macro-categories (Perry et al., 2018). For students to be cognitively engaged in an SRL-promoting environment, it is essential not only to provide challenging tasks (Künsting et al., 2016; Praetorius et al., 2014) and activate prior knowledge (Decristan et al., 2015), but also to create opportunities for in-depth exploration of the subject matter. Our results indicate that cognitive activation in SRL-promoting learning environments must be expanded to allow students to engage with a subject over an extended period, enabling them to grasp the content more thoroughly (Veenman, 2013, 2017). The school's practice of the separation of learning and assessment phases also proves to be beneficial. It encourages learners to apply relevant SRL skills during learning, as highlighted in other studies (Bernacki, 2017; Järvelä & Bannert, 2021; McCardle & Hadwin, 2015; Moos & Azevedo, 2008; Winne, 2019).

Equally important is the support of students in their learning processes as a basic dimension of effective teaching. This includes critical elements such as lesson pacing (Baumert et al., 2010; Kunter et al., 2005; Praetorius et al., 2012), subject content (Charalambous & Kyriakides, 2017; Klette & Blikstad-Balas, 2018; Praetorius et al., 2020), and feedback (Lipowsky et al., 2009; Praetorius et al., 2014). However, a closer look at our results reveals some differences. For example, students confirmed the specific role of co-regulated learning in SRL-promoting learning environments (Hadwin et al., 2018; Järvenoja et al., 2018; McCaslin & Vriesema, 2018; Panadero et al., 2015; Vriesema & McCaslin, 2020) when they reported that collaboration with high-performing classmates and structured interactions with teachers were crucial for their learning progress. This finding highlights the importance of understanding a class as a community in an SRL-promoting learning environment (Perry et al., 2020). Learners were able to rely on their classmates as a social resource when faced with

incomprehensible tasks or inadequate feedback, while also practicing help-seeking as an important SRL strategy (Karabenick & Gonida, 2017).

8.2 Teacher Support and Student Behavior in SRL-Promoting Learning Environments

Another key finding of our study is the limitation of analyzing an SRL-supportive learning environment through the lens of the three basic dimensions, particularly when examining students' specific learning behaviors. These limitations become evident when relationships between SRL and the basic dimensions are observed, as this approach identifies critical elements within the learning environment. For example, students often emphasize the organizational aspects of the learning environment over their individual learning experiences. This observation underscores a shortcoming in the three basic dimensions, as it does not explicitly account for motivational and emotional aspects of SRL, lacking categories to address these factors. But, even indications of emotional and motivational aspects of students' SRL were minimal and rarely emerged during the interviews. This finding aligns with earlier studies, which have consistently noted the subordinate role of motivational and emotional factors in the context of SRL (Azevedo & Feyzi-Behnagh, 2011; Azevedo et al., 2017; Gurtner et al., 2012; Peetsma et al., 2017).

While students appreciate the open spaces for learning, these open spaces also present substantial challenges. Students either lack the appropriate self-regulatory strategies to effectively utilize the provided freedom, or the organization of the learning environment exhibits deficiencies. In the first scenario, it becomes evident that the promotion of SRL can only be sustainably effective when direct and indirect forms of support complement each other (Dignath & Veenman, 2020; Schuster et al., 2023; Vosniadou et al., 2024). In the second scenario, it underscores the critical role teachers play in instructional design (Heirweg et al., 2021; Perels et al., 2009; Perry, 2013; Veenman, 2017). The learning environment is perceived as problematic when it is inflexible and unsuitable for students, leading to high levels of external regulation, which corresponds to the concept of the autonomy antinomy (Helsper, 2002): Students desire more creative freedom to engage in SRL. Initially, the simultaneous demand for more teacher support may seem contradictory, but upon closer examination, it highlights the context- and subject-specific nature of SRL and its dependence on external regulation by teachers and peers to facilitate learning.

Our study is pioneering in drawing clear parallels between the discussion on the quality of teaching and the promotion of SRL. Similar to the debate on the distinction between generic and subject-specific teaching quality (e.g., Praetorius et al., 2018; Charalambous & Praetorius, 2020), research on the promotion of SRL also distinguishes between SRL as a stable personality (trait) and as context-dependent, task-related behavior (state) of learners (e.g., Matthews et al., 2000; Winne & Perry, 2000).

8.3 Distinctions in SRL between Different Grade Levels

Differences between grade levels become apparent, particularly concerning individual learning time. For instance, students in Grade 13 demonstrate a greater ability to adapt their SRL to the lesson structure over time, resulting in more effective learning. In contrast, 9th-Grade students express a desire for greater autonomy in shaping their SRL. Comparing these findings reveals that the gradual reduction of external regulation by teachers is positively perceived by students, as it allows them to take on greater responsibility for their own learning (Corno, 2008; Karlen et al., 2023). With an increasing number of choices available to individuals, new SRL opportunities emerge, and students assume greater responsibility for their learning. Consequently, the learning environment initially causes learners to experience a certain level of overload, but over time, they learn to navigate the open spaces and the altered lesson structure effectively. This development is characterized by a shift toward more effective learning in terms of planning and organization, and these changes are observable within a learning environment explicitly designed to support SRL.

9. Implications & Future Steps

The findings from this study can have significant implications for both theory and practice in the realm of SRL and teaching quality.

9.1 Theoretical Implications

Our findings underscore the necessity of refining SRL theory to integrate the specific nuances of the three basic dimensions in SRL-promoting environments. This contributes to the theoretical landscape by expanding existing SRL models to include these critical factors, addressing gaps identified by previous research (Dignath & Veenman, 2020; Dignath-van Ewijk et al., 2013). Our study contributes to the ongoing discourse on teaching quality by highlighting the distinction between generic and SRL-specific teaching practices (Praetorius et al., 2018). Our research underscores that promoting SRL requires tailored instructional strategies, thereby advancing the debate on effective teaching.

Our study also affirms the essential role of co-regulated learning, emphasizing the importance of social interactions and structured peer collaboration for SRL (Hadwin et al., 2018; Järvenoja et al., 2018). This finding enhances SRL theory by integrating social dimensions more explicitly, aligning with Perry et al.'s (2020) concept of the classroom as a community.

Additionally, our results call for a theoretical refinement to include motivational and emotional factors when constructing an SRL-supportive learning environment (Azevedo et al., 2017). This holistic approach is crucial, as it captures the full spectrum of influences on learners' SRL. Consequently, future research should give more attention to motivational and emotional factors and their role in the design of SRL-promoting learning environments.

9.2 Practical Implications

Practically, our study highlights the urgent need for enhanced teacher training and professional development to foster SRL (Kramarski, 2018; Kramarski et al., 2013). Teachers should be equipped to design and manage SRL-promoting environments effectively, balancing autonomy with support, and redefining classroom disruptions to recognize productive learning processes. In this regard, curriculum design should incorporate structures that facilitate distinct learning and assessment phases, promoting deeper engagement with content and the more effective application of SRL skills (Perry et al., 2018).

Simultaneously, our study also contributes to a nuanced understanding of the promotion of SRL, which has practical consequences. For the sustainable promotion of SRL, SRL learning environments should include the direct teaching of SRL strategies by teachers (Karlen et al., 2020; Vosniadou et al., 2024), as students can quickly become overwhelmed if they lack SRL skills.

Regarding classroom management, our findings indicate that establishing clear routines and expectations while maintaining flexibility is crucial for creating an SRL-supportive learning environment (Hochweber et al., 2014; Praetorius et al., 2018). Moreover, revising assessment methods to align with SRL principles is another key implication. Our results demonstrate that separating learning and assessment phases combined with continuous, formative feedback are essential steps to support SRL development (Bernacki, 2017; Järvelä & Bannert, 2021).

Finally, acknowledging and addressing the diverse SRL needs of students at different grade levels is essential. Teachers should progressively reduce external regulation and grant more autonomy as students become increasingly capable of managing their own learning.

9.3 Limitations

In our study, all three basic dimensions were successfully identified, although not all of their subcategories were specifically categorized. However, our study has certain limitations. The first limitation concerns our focus on students as the primary unit of study. While it was a deliberate choice to analyze the students' perspective to address the question at hand (Scherer et al., 2016; Wisniewski et al., 2020), it is important to acknowledge that our assessment of the didactic setting's design is presented exclusively from this perspective. This highlights a key insight in the context of systematically linking SRL and teaching quality: while discussions on teaching quality often originate from the teacher's standpoint, research on SRL predominantly adopts the students' viewpoint.

A second limitation arises from our somewhat narrow definition of successful teaching in this study. Berliner (2005) combines two approaches to "good teaching" (normative standards and professional action) and "effective teaching" (achievement of learning goals in terms of students' skills, abilities, and knowledge) into a comprehensive perspective of "quality teaching". In this context, we have assumed three basic dimensions of quality teaching, whereas elsewhere, five basic dimensions are defined, with motivation, for instance, explicitly recognized as one of them (Wisniewski & Zierer, 2020). A more expansive perspective, such as the MAIN-TEACH model (Charalambous & Praetorius, 2020), would be valuable for future analyses.

10. Conclusion

In summary, it is evident from students' responses how crucial it is for teachers to skillfully design and guide their students. In the case under examination, the weaknesses of this learning environment, as perceived by students, became apparent whenever there was a disconnect between its interpretation and implementation by teachers. From this perspective, the question of implementation quality and, consequently, the quality of the school itself becomes relevant when assessing teaching quality (Muijs et al., 2014). Furthermore, this study emphasizes the importance of considering SRL from two interconnected perspectives: how students learn and how teachers teach, including how they learn to teach SRL. This dual viewpoint underscores the relationship between teaching practices and the school context, highlighting the need to dismantle existing structures and the significance of an ongoing commitment to school development. A deeper understanding of these dynamics can cultivate environments where both students and teachers continuously grow and improve.

Keypoints

- The study aimed to assess the quality of an SRL-promoting learning environment based on the three basic dimensions.
- The quality of SRL-enhancing learning environments can be assessed and analyzed through the three basic dimensions, albeit not comprehensively.
- Differences in SRL adaptability were noted among grade levels, with older students demonstrating higher adaptability. Teachers play a pivotal role in guiding and supporting students' SRL.

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