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Teacher Support of Co- and Socially-Shared Regulation of Learning in Middle School Mathematics Classrooms

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Social influences on classroom learning have a long research tradition and are critical components of self-regulated learning theories. More recently, researchers have explored the social influences of self-regulated learning in cooperative learning contexts. In these settings, co-regulation of learning and socially-shared regulation of learning strategies have been aligned with self-regulated learning theory. However, without specific training or structure, teachers are not likely to explicitly integrate SRL strategies into their teaching. We use case studies to better understand how Zimmerman's theory of self-regulated learning (2008) and Hadwin's conceptual framework of socially-shared regulation of learning (2018) emerge from teachers' support of student-centered instruction. We purposely selected two proficient teachers for more extensive observations focused on student behaviors in teams. The observation instruments afford us a means of advancing research and practice with respect to how teamwork may elicit self- and socially-shared regulation of learning strategies. Consistent with previous findings, the teachers we observed seem to have made many pedagogical moves to explicitly prompt self- and team monitoring of learning during engagement with course content yet provided fewer opportunities for students to think through the planning and evaluation processes. These findings suggest the cooperative learning model implemented in these classrooms provides support for students' co- and socially-shared regulation of learning.

Keywords: socially-shared regulation of learning, in-service teacher practice, middle school pedagogy, mathematics, co-regulation of learning

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INTRODUCTION

Instructional practices aimed at student engagement and mastery of learning targets are ubiquitous in K-12 classrooms (Moos and Ringdal, 2012; Hattie, 2016). However, the effectiveness of these strategies in supporting students' regulation of learning is still emerging (Dignath and Büttner, 2008; Basileo and Marzano, 2016). Despite an abundance of research identifying self-regulated learning (SRL) strategies as supportive to students' academic achievement (Cleary and Platten, 2013; Dignath and Büttner, 2018) and self-efficacy (Pintrich, 2004; Zimmerman, 2008; Schunk, 2016), some teachers are not likely to explicitly integrate SRL strategies in their instruction without

specific training or structured support (Kramarski and Michalsky, 2015; Spruce and Bol, 2015; Dignath-van Ewijk, 2017). Teachers' limited implementation of SRL is a concern because students' academic achievement and self-efficacy are correlated with teachers' instructional practices and overall effectiveness (Stronge et al., 2011; Basileo and Marzano, 2016). To support teachers' instructional planning and delivery, a more thorough understanding of when and how students use co- and socially-shared regulated learning (SSRL) strategies throughout the learning process is necessary (Hadwin et al., 2018). We use Zimmerman's theory of self-regulated learning (Zimmerman, 2008) and Hadwin's conceptual framework of socially-shared regulation of learning (Hadwin et al., 2018) to identify if and how co-regulated learning and socially-shared regulation strategies emerge from teachers' support of student-centered instruction to address this largely unexamined area.

ZIMMERMAN'S SELF-REGULATION OF LEARNING THEORY

Self-regulation theory is a broad view of behavior as a continuous process of identifying and evaluating progress toward or away from goals through feedback and self-corrective adjustments (Carver and Scheier, 2016). Self-regulation of learning describes the processes employed before, during, and after a learning event as individuals strategically organize and control their thoughts, feelings, and behaviors to achieve their goals (Schunk and Usher, 2013). Information from others or the environment provides feedback, allowing individuals to monitor their progress and adjust their thoughts, feelings, and behavior. This self-evaluation and reflection fuel the regulation and learning cycle, and impact motivation for learning goals (Vohs and Baumeister, 2016).

While others have developed self-regulation of learning models (Boekaerts, 1991, 1996; Winne and Hadwin, 1998; Pintrich, 2000; Efklides, 2011), we use Zimmerman's model (Zimmerman, 2008; **Figure 1**) as the theoretical framework to conceptualize SRL in this brief research report, because it most closely aligns to our line of inquiry and observation instruments. Moreover, much of Zimmerman's theory and research on the application of SRL strategies have been applied to traditional classroom settings (Spruce and Bol, 2015; Panadero, 2017). Other well-accepted models of SRL share common characteristics with Zimmerman's model. Winne and Hadwin (1998) and Pintrich (2000) developed two well-supported SRL models that share several important components (Green and Azevedo, 2007). In these models, the use of temporal phases illustrates the cyclical nature of self-regulation throughout a learning event. SRL models highlight an individual's (meta)cognitive, affective, and behavioral experiences before, during, and after learning events to accomplish academic goals. Lastly, these researchers identify other influences on an individual's motivation and self-beliefs, including social and emotional factors.

Forethought Phase

The first phase in Zimmerman's model (Zimmerman, 2008) is called the forethought phase, during which individuals employ processes for the preparation of learning. Key concepts and features of the forethought phase are task analysis and examining self-motivation beliefs.

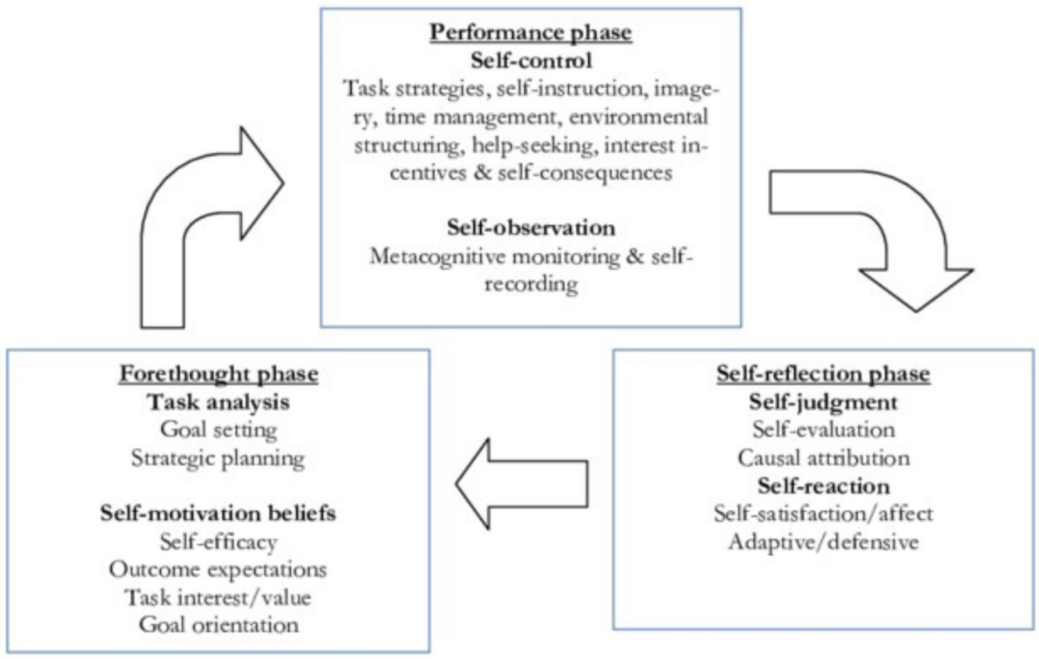

FIGURE 1 | Zimmerman's model of SRL.

Performance Phase

The second phase of the model is referred to as the performance phase. In this phase, individuals are engaged in the deployment and monitoring of strategies to regulate their thoughts, feelings, and behaviors in the execution of academic tasks. Individuals use self-observation and self-control strategies, including metacognitive strategies, to monitor progress and maintain motivation during the performance phase.

Reflection Phase

The third phase in Zimmerman's self-regulated learning model (Zimmerman, 2008) is known as the reflection phase. During this phase, individuals employ self-reflection to judge and evaluate their learning, which can include the learning processes, final products or performances, content knowledge acquisition, and skill mastery. While each phase of self-regulated learning is important, the self-reflection phase influences future academic motivation and one's self-efficacy, both of which predict achievement (Doménech-Betoret et al., 2017).

HADWIN'S REGULATION OF LEARNING CONCEPTUAL FRAMEWORK

In the last 10 years, research in the area of self-regulation of learning has expanded theories and models to understand how individuals learn and how to best support the learning and growth process, especially when challenges arise (McCaslin and Good, 1996; Hadwin et al., 2005; Järvelä et al., 2008). An important contribution includes self-regulated learning becoming the impetus for exploring more social forms of regulation such as co-regulation and socially-shared regulation of learning, where shared knowledge construction and collaboration are emphasized over an individual's (meta)cognition, affect, behavior, and motivation (Hadwin and Oshige, 2011; Hadwin et al., 2011; Järvelä and Hadwin, 2013). In the following paragraphs, we describe Hadwin's conceptual frameworks of co-regulated learning and socially-shared regulation of learning.

Co-regulated learning is the term given to describe a relationship between individuals where one person is more knowledgeable or more skilled. Co-regulation of learning occurs within this dynamic as individuals both self-regulate and share regulation of cognition, emotions, behavior, and motivation toward the pursuit of an academic goal (Hadwin et al., 2011). The tension between individuals in this context brings attention to the factors influencing shifts in regulatory ownership from an individual (self-regulation of learning) or the group (socially-shared regulation of learning) (Chan, 2012).

Socially-shared regulated learning refers to the collaborative nature of group work where the group directs the learning by taking metacognitive control of the task together through negotiated, iterative fine-tuning of cognitive, emotional, behavioral, and motivational states as necessary to accomplish an academic goal (Hadwin et al., 2011). In this context, individuals within the group perform interdependently, and regulation of learning shifts from the individual to the group in response to direction from the members within the group, as well as from the whole group (Järvelä and Hadwin, 2013; Panadero and Järvelä, 2015).

Co-regulation of learning and socially-shared regulation of learning extend self-regulated learning theory to include dimensions of regulation of learning influenced by others, which is a common characteristic in traditional classrooms, not only in brick and mortar schools but also in online and distance learning classrooms where groups of students are organized for learning in either partnerships or cooperative learning groups (Chan, 2012; Panadero and Järvelä, 2015). Therefore, to support both face-to-face and online teachers' ability to effectively plan instruction and deliver lessons that support students' regulation of learning, investigation of the social dynamics of self-regulated learning is critical, including co- and socially-shared regulation of learning.

SIGNIFICANCE AND PURPOSE OF STUDY

The aim of this study is to contribute to our understanding of when and how students use self- and socially-shared regulated learning strategies throughout the learning process in order to support teachers' instructional planning and delivery. We use case studies to better understand how Zimmerman's theory of self-regulated learning (Zimmerman, 2008) and Hadwin's conceptual framework of socially-shared regulation of learning (Hadwin et al., 2018) emerge from teachers' support of student-centered instruction. Case studies provide a fine-grain lens to thoroughly examine contextual factors impacting the regulation of learning, and the problem-setting insight they provide to inform future research directions (Hayes and Singh, 2012). We purposely selected two proficient teachers for more extensive observations focused on student behaviors in teams. The observation instrument affords us a means of advancing research and practice with respect to how teamwork may elicit self- and socially-shared regulation of learning strategies. The following research questions and hypothesis are examined in this research:

1. What kinds of teacher behaviors prompt self-regulated learning in students?
2. What kinds of socially-shared regulated learning strategies do students use in teams?

METHODOLOGY

Context and Participants

This mixed-method study was conducted in the context of a larger grant-sponsored reform effort in middle school mathematics classrooms (Nunnery et al., 2016). Grade levels ranged from sixth to eighth grade and subject areas included sixth-grade mathematics, Algebra, and Geometry. The reform relied on a cooperative learning model where students spent the majority of their instructional time working in groups referred to as teams. The teams received points for working together productively and for reporting out responses that included not only the correct answer but an explanation of how they arrived at the answer. The study of SRL and SSRL in this context

was not an explicit part of the program implementation or evaluation activities.

Two case studies were purposively selected to yield greater insight into the connections between self-regulated learning, socially-shared regulation of learning, teachers' instructional practices, and student behaviors. Based on observation data obtained in the grant sponsored evaluation, these two teachers were selected because they were particularly proficient in their application of effective cooperative learning strategies. The first teacher (Ms. B) had over 20 years of experience. In contrast, the second teacher (Ms. R) was new to teaching with only 3 years of experience. Both teachers taught in schools receiving Federal school-wide Title I support with a large percentage of minority students. Title I services exist to supplement education funding for academically at-risk and low socioeconomic students. Participation was voluntary and consent was obtained.

Measures

We adapted an observation instrument used by Spruce and Bol (2015) to reflect how teachers prompted self-regulated learning and socially-shared regulation of learning behaviors among students in cooperative learning groups. The instrument contained items categorized into Planning, Monitoring, and Evaluation phases of Zimmerman's self-regulated learning model (Zimmerman, 2008) that we rated on a five-point scale ranging from "not observed" to "strong application."

In addition, we took detailed field notes to exemplify behaviors or responses corresponding to the phases and subareas identified in the quantitative ratings. The observation instrument used with students mirrored the teacher instrument with minor adaptions to reflect group activities (i.e., team recording among students vs. self or team recording prompted by teachers). The observation criteria are presented in **Tables 1**, **2** for teachers and students, respectively. We aligned these criteria to exemplars of how teachers prompted socially-shared regulation of learning within their teams, and the observation criteria are aligned with our findings to be addressed in a subsequent section.

Procedures

We conducted a total of 15 observations across 2 weeks for approximately 90 min each as allotted in block periods. In Ms. B's classroom, we observed each of two classes (6th-grade mathematics) four times each for a total of eight observations. In Ms. R.'s classroom, we observed five different classes, two of which were observed twice (8th-grade Geometry). The other classes were 7–8th-grade Algebra and another 8th-grade Geometry class. In total, we observed Ms. R.'s classes seven times. Two researchers attended each observation. In total, we spent nearly 23 h jointly observing these teachers' classrooms.

To establish reliability, both researchers observed teachers and then students together. The Intraclass Correlation Coefficient was 0.92 for teacher and 0.83 for student observations. After establishing reliability, one observer recorded teacher behavior and the second randomly selected a student team to observe. The researcher observing students attempted to select different groups each day but ultimately spent the entire 90 min with one group. The class sizes ranged from 12 to 25, with an average enrollment of nearly 20. Teams had three to six members, with an average group size of five. The lessons varied depending on the course. In 6th-grade mathematics, the topics included operations related to integers, decimals, and fractions. Some topics in more advanced courses bridged algebra and geometry and included factoring trinomials, solving quadratic equations, and graphing parabolas.

TABLE 1 | Teacher observation scores and example behaviors ($n = 15$).

SRL phase/item	Mean	St.Dev	SSRL examples
Forethought and planning	2.24	0.52	
Setting task goals	2.37	0.92	Connects to future leaning goals
Seeking information and strategies needed	2.09	0.30	Consider strategies
Setting time and resource allotment	2.18	0.40	Prepares for explanations
Self/team instruction	2.55	0.69	Uses different strategies for problem-solving
Attention focusing	2.09	1.22	Prepares to stay on task
Self/team recording	2.18	1.25	Directs to compare, record points
Performance and monitoring	3.34	0.40	
Clarifying understanding of task/content	3.82	0.40	Models reflection on understanding
Evaluation of progress toward goals	2.64	1.02	Questions to check progress
Self/team instruction	3.91	0.30	Prompts to check with team
Attention focusing	3.09	1.59	Prompts to observe and listen
Self/team recording	3.37	0.67	Records points for on-task behaviors
Use of specific task strategies	3.09	1.14	Models strategy on board
Assessment of task understanding	3.45	0.52	Checks confidence in understanding
Reflection and evaluation	2.02	0.45	
Progress toward task goals	2.64	1.12	Assesses for progress improvement.
Strategy use- those that succeeded and failed	3.45	0.69	Identifies common mistakes
Actions to be repeated or modified for subsequent related tasks	2.82	0.98	Prompts explanation of and adaption of successful strategies
Determining self/team-satisfaction (based on performance)	0.91	1.14	Reflects on responses and how to improve
Causal attribution	0.27	0.47	Cues, reinforces positive attributions

RESULTS

Teacher Observations

We found that teachers prompted self-regulated learning among teams in various ways. As noted, students were seated in groups the entire period; the desks were physically and permanently arranged in groups. The teachers were mostly circulating among

TABLE 2 | Student observation scores and example behaviors.

SRL phase/item	Mean	St.Dev	SSRL examples
Forethought and planning	0.94	0.56	
Setting task goals for team	0.39	0.65	Connects to future learning goals
Seeking information and strategies needed from peers	1.15	1.52	Collaborates on strategies needed to solve problems
Setting time and resource allotment	2.15	1.21	Selects team roles (e.g., recorder, reporter)
Team instruction	0.39	0.96	Structures format and strategies
Attention focusing	0.46	1.13	Prompts on-task behavior
Team recording	1.08	1.26	Records team points
Performance and monitoring			
Clarifying understanding of task/content	3.85	0.38	Asks and gives help
Evaluation of progress toward goals	2.31	1.55	Checks and compares work
Team instruction	3.54	0.66	Uses questions and modeling
Attention focusing	3.31	1.18	Prompts to stay on task
Team recording	1.69	1.25	Prepares to report out and scores point
Modeling or instruction of specific task strategies	3.54	0.66	Models and explains strategies
Assessment of task understanding within team	2.38	1.32	Checks and questions
Reflection and evaluation	1.45	0.85	
Progress toward task goals	1.08	1.19	Checks understanding and task completion
Strategy use- those that succeeded and failed	0.85	1.46	Identifies successful strategies and mistakes
Actions to be repeated or modified for subsequent related tasks	0.77	1.48	Detects errors and how to correct
Determining self/team-satisfaction (based on performance)	2.69	1.44	Celebrates success
Causal attribution	1.85	1.82	Voices positive self-statements

the teams to ask questions and check progress. However, there were times, particularly at the beginning of the period where some direct instruction occurred in the midst of teamwork. For example, the teacher would model a problem-solving strategy on the board and would then direct students to practice this strategy in their teams. **Table 1** presents the descriptive statistics for the self-regulated learning phases and subphases with corresponding exemplars on how it may have promoted socially-shared regulated learning. The most frequently observed behaviors were categorized as Performance and Monitoring ($M = 3.34$ on a scale of 1–4). Behaviors related to the Forethought and Planning phase were less common ($M = 2.24$), and the lowest mean value was obtained for Reflection and Evaluation items ($M = 2.02$) and included asking students to reflect on strategy effectiveness or identify common mistakes. Each of these phases and subareas will be discussed next. Determination of how behaviors fell into phases was at least partially determined by when the behavior occurred during the instructional cycle. Although some behaviors might be considered as co-regulation rather than socially-shared regulation, the response of team members helps support the latter categorization. For example, there was common planning, solving and monitoring solutions, and team reflection about how they performed on a task.

In the forethought phase, teachers set the stage for learning by connecting daily objectives to future learning. Ms. B noted, "Next year, you will need to understand how solving algebraic equations would link to Geometry." This conveyed a sense of how the content would build from elementary to more advanced math in higher grades. In response, one girl in the group stated that they were also moving to square roots, and her teammate jokingly warned her not to "jinx it." The humorous comment reflects meta-motivational or meta-emotional responses emerging from the collaborative learning processes (Järvelä and Hadwin, 2013). Teachers would often direct teams to first consider the strategies to be used and how the team might use different strategies to solve the same problem. The team members discussed the strategies they would need, such as differentiating between positive and negative numbers. As an example of attention focusing, Ms. B directed students to understand that when they came in the door, the conversation is math conversation, "You need to be on time and on task." The expectation was that math conversation dominated group talk. A designated team recorder could expect to receive points (tokens or "bucks") in reward of on-task behavior or completed work. When students turned in a homework assignment, Ms. R directed them as follows, "First I want you to record it, so you get credit for it. Then put your papers in the center and see if there are any that are different." Identification of "different" would spark questions among team members. These behaviors in the forethought phase seem to best represent task analysis, especially strategic planning.

During the performance phase, the teachers used various strategies to encourage monitoring. These teachers tracked progress toward goals by circulating through the teams to check on students' work. They often wanted to know what the team members were saying to one another. To clarify the task or content understanding, both teachers used modeling and questioning. Ms. B said, "Let me ask you a question. What kind of fraction is this? Could you change it? If reduced what would it become?" Though students were consistently encouraged to ask a teammate, the teacher might stop and clarify when teamwork needed some correction. After modeling how to solve the addition of integers, Ms. B. encouraged students to "think first, then talk to your team." Perhaps because Ms. R. taught Geometry, she relied heavily on drawing or diagramming strategies and encouraged students to do the same. To reinforce on-task behaviors, the teachers would commonly award points to a team whose members were working together well or provided a sound explanation of how the problem was solved, not simply reporting the correct answer. The recorder would collect these tokens in a container located on the table. Both teachers clarified that the reason for receiving the awards was that they were working well-together and were providing good explanations. This is an example of directed and rewarded attention focusing.

Ms. R. explicitly prompted attention focusing, "You learn more when you look and listen. Check to see that your team is looking and listening." Assessment of understanding occurred within teams and the teachers would ask students to confirm this. Ms. B incorporated a confidence check where students were asked to hold up anywhere from one to five fingers to represent different levels of understanding. These teachers signaled aspects of socially shared control and observation that transferred to student behaviors.

Attention-focusing was engaged in less frequently than most other types of subprocesses in both the planning and monitoring phases. This was due to effective classroom management techniques based on positive reinforcement. That is not to say that everyone behaved well all of the time. In Ms. B.'s class, a boy became angry because he was told by a teammate that his answer was incorrect when he was certain it was correct. After arguing for a bit, the boy got up from his seat and left his team, moving to another part of the room. The teacher ignored his behavior as he continued to watch his team from this vantage point. After a few minutes, the team's interactions lured him back where he re-engaged with his teammates. Soon afterward, Ms. B. came to check on the team and reinforced their work. The boy remained with his team for the rest of the period. These teachers' classrooms were characterized by positive reinforcement and efficient regulatory routines.

Turning to the reflection and evaluation phase, the most frequently observed teacher behavior was determining how the use of various strategies succeeded or failed, followed by what actions should be repeated or adapted. The identification of successful strategies fueled the next planning phase. Ms. R. asked, "What is the most common mistake someone might make with that problem? Discuss this and a better way to do it with your team." Class periods often concluded with a brief assessment ("quick check" in Ms. B.'s classes) in order to evaluate student and team progress. Determining team or self-satisfaction or causal attributions were relatively rare. Ms. R. told one team member she was a "good teacher" after listening to her explain how to solve a problem to a teammate. The teacher remarks, though less common, likely served as vicarious reinforcement for student teams.

Student Observations

Students frequently engaged in shared regulation behaviors within their teams. Some examples of socially-shared regulation of learning classified by the self-regulated learning phase and strategy appear in **Table 2**. As was the case when coding teachers' responses, we noted when socially-shared regulation strategies occurred as the students' engaged in the lessons. Socially-shared regulation of learning behaviors that set the stage for learning at the beginning of the class period were considered planning; whereas those that occurred at the middle or end of the period were coded as monitoring and evaluation, respectively. We identified exemplars of student responses corresponding to socially-shared regulation of learning because they were situated in team contexts with engaged learners.

In the forethought phase, planning behaviors among students were rare. The structure of the assigned task and teacher prompting led them to plan time and resource allotments. For one task, team members had to write out one solution together on a whiteboard. They decided roles in terms of who would be writing and who would be reporting out on each part of the multifaceted problem. And as noted, the teacher prompted a connection to learning by linking the present to future content and maintaining a running record of team points earned. The decision to plan learning strategies was also prompted by the teacher, but the students collaborated on the strategies needed. At the introduction of a new geometry problem, one girl asked, "Are we doing this together? Then why aren't we all talking?" These questions initiated team interactions and illustrate how routine these interactions had become.

Again, behaviors in the performance and monitoring categories were observed most frequently ($M = 2.94$). Within their teams, students were clarifying and explaining content, answering questions, and modeling how to solve problems. An example for clarification of understanding occurred when one girl asked another for help on how to solve the problem. In response, a second girl looked over her work and explained her error. For team instruction, the members were involved by comparing solutions and asking whether others in the group "got it?" To promote attention focusing, one boy used questions to get them to be on-task. When pointing to the common team problem, he asked, "Who is doing that?" To model instruction, a boy reminded a teammate to check their hand-drawn graphs by entering the same factors on the calculator. The evaluation of task goals was illustrated by the checking, correcting, and clarifying steps in arriving at a solution. Afterward, one boy exclaimed, "See, I was right." Team members demonstrated socially shared control and observations.

Behaviors in the reflection and evaluation phase ($M = 1.45$) were less frequent and mostly targeted self or team satisfaction with their progress and causal attributions related to effort and liking math. In terms of self-satisfaction, a girl who was originally having difficulty with a problem compared her initial steps and solution with a teammate. After she realized that she had done it correctly she performed a dance move in celebration. Similarly, satisfaction was linked to positive attributions when a boy exclaimed, "I love math, man," and then "I am working pretty good," while bouncing in his chair. One could make the case that this was also a team celebration because the work was a team effort, and the celebrations and exclamations were received with smiles and accepted as normal reactions by students and teachers alike. These kinds of responses also illustrate the development of meta-motivational and meta-emotional reactions in team settings (Järvelä and Hadwin, 2013).

SIGNIFICANCE

We concluded that the particular aspects of self-regulated learning that appeared to be most salient were related to monitoring. This pattern was mirrored in previous research (Spruce and Bol, 2015) where teacher prompting was more frequently observed in classroom instruction. The teachers seemed to have made many pedagogical moves to prompt self-

and team monitoring of learning, yet opportunities for students to think through planning and evaluation processes were less frequently prompted than monitoring strategies. Students also engaged in shared monitoring behaviors most frequently and least frequently in planning behaviors.

Part of the explanation for seeing more monitoring behaviors could be related to the time allotted to each phase during the learning cycle. In other words, teachers and students displayed more prompts for monitoring and more monitoring behaviors, because they spent the most time in this SRL phase. Results of teacher observations demonstrate instructional strategies supporting students' socially-shared regulation of learning by engaging in "math talk," as well as using tokens as reinforcers of attention and engagement. Teachers supported students' socially-shared regulation of learning during the monitoring phase by having students compare and contrast their homework assignments for correct and incorrect problem-solving strategies. Furthermore, students were encouraged to co-regulated learning by "looking and listening" to instruction within their teams. A related explanation is that planning and evaluation (or reflection) required more teacher direction because these strategies were less familiar to students or less likely to occur organically (e.g., goal setting).

Sometimes the distinction between co-and socially shared regulation was blurry. That is, when teachers or other students prompted regulation, it could be classified as co-regulation. The regulatory activities were guided and shaped by the teachers and team members. Teachers employed a prescribed structure to support team collaboration. In other cases, the interactions were indicative of socially-shared regulation of learning. There were instances of shared team goals, planning, monitoring, and reflection. Self-regulation, co-regulation, and shared regulation of learning are not isolated entities but lie on a continuum, and students move back and forth among the types of regulation strategies (Järvelä and Hadwin, 2013).

Our study would have been improved by using videotaped lessons where time stamps would afford sequential analyses of phases, as well as sequential analyses of teacher behaviors mapped onto student behaviors. However, we could not obtain permission for the videotaping of students from either our Institutional Review Board (IRB) or the office governing research in the school district.

One might argue that what we observed is simply good teaching. We would argue that good teaching is inextricably linked to good regulation of learning. Other researchers (e.g., Butler et al., 2006) have found that though teachers may prompt SRL in their students, they may not understand or explain it in sophisticated ways. Perhaps this is somewhat advantageous in the sense that the self-regulated learning terminology used by theorists and researchers would be intractable for middle school students (Molenaar and Jarvela, 2014). In these two cases, the teachers were effectively but implicitly sparking socially-shared regulation of learning among teams of students. Kistner et al. (2010) also observed classrooms and concluded that teachers' promotion of SRL was frequently implicit rather than explicit in nature. The present findings suggest the cooperative learning model implemented in these classrooms may support the development of co- and socially-shared regulation of learning in ways that more traditional instruction does not.

DATA AVAILABILITY STATEMENT

All datasets generated for this study are included in the article/supplementary material.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Old Dominion University Darden College of Education Institutional Review Board. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

MQ contributed research and development of the article's abstract, literature review, and discussion. LB contributed research data and development of the article's methods section. All authors worked collaboratively during the research and article development phases of this project.

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