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EXAMINING THE ROLE OF SELF-REGULATED LEARNING STRATEGIES IN ENHANCING TEACHER PROFESSIONALISM: INSIGHTS FROM PRIMARY TEACHERS IN NORTHERN THAILAND

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ABSTRACT

As education systems confront rapid and sustained change, teacher professionalism increasingly depends on adaptive learning capacities and self-directed development. This study examines the role of self-regulated learning strategies as a pathway to understanding teachers' professional learning and career development among in-service teachers and investigates the correlation between the teachers' self regulated learning strategies and academic outcomes. Grounded in Zimmerman's self-regulated learning model, the research investigates how cognitive, metacognitive, and motivational strategies contribute to teachers' professional growth and ongoing development. The research involved 314 in-service teachers from schools in Northern Thailand. The Self-Regulated Learning Strategies for Professional Teacher Development Scale (SRL-PTD) was used to collect self-regulated learning strategies data. Descriptive statistics were used to analyze the self-regulated learning strategies performance, and a Spearman's rank correlation coefficient test was conducted to evaluate the association between self-regulated learning strategies performance across the academic outcomes. Also, a one-way ANOVA was conducted to analyze the differences in self-regulatory strategies performance among academic professional groups. The results revealed that all dimensions of self-regulated learning strategies, cognitive regulation strategies, motivational regulation strategies, and behavioral regulation strategies, were reported at a high level, with behavioral regulation strategies showing the highest mean scores. Spearman's rank correlation analysis indicated a significant negative relationship between teachers' professional rank and the use of self-regulated learning strategies. Furthermore, the results revealed that self-regulatory strategy performance was statistically significant across academic professional ranks.

Keywords: ***S*elf-regulation, learning strategies, professional teacher, professional development, learning behavior.**

INTRODUCTION

The continuous professional development (CPD) of teachers is widely recognized as a driving force of educational quality and a crucial foundation for long-term national development (OECD, 2021). As key agents within the educational system, teachers exert a profound influence on students' learning trajectories and overall academic achievement (Darling-Hammond, 2017). In a new era of modern social, technological, and pedagogical transformation, teachers are required to update their knowledge and refine their competencies to include and adopt innovative instructional practices in order to effectively meet evolving educational demands (Avalos, 2011; UNESCO, 2020). Sustained professional learning enables teachers to implement high-quality instruction, differentiate learning experiences, and address diverse learner needs in a timely and meaningful manner (OECD, 2019). Also, teachers are expected to uphold ethical and professional standards, demonstrate integrity and responsibility, and serve as exemplary role models within their communities (UNESCO, 2020). Moreover, the ability to continually adapt to new knowledge, emerging technologies, and shifting societal expectations represents a core dimension of teacher professionalism (Schleicher, 2018). The cultivation of professionalism is underpinned by teachers' ongoing engagement in self-development and proactive pursuit of new knowledge, which supports long-term improvement in teaching quality and promotes students' holistic development (Darling-Hammond et al., 2019).

Self-regulated learning (SRL) provides an important theoretical lens for understanding how teachers develop these professional competencies. SRL refers to the cognitive, motivational, and behavioral processes through which individuals plan, monitor, and regulate their learning (Pintrich, 2000). It is increasingly regarded as a central mechanism that supports lifelong learning and enables educators to focus on their learning goals, evaluate progression, and refine strategies for continuous improvement. Zimmerman's (2000) cyclical model conceptualizes SRL as comprising forethought, performance control, and self-reflection, while Pintrich (2000) emphasizes strategic regulation across cognitive, motivational, and behavioral domains. These multidimensional perspectives are consistent with the broader framework of academic self-regulation. In this study, we synthesize the core of SRL by referring to cognitive, motivational, and behavioral goals (Pintrich, 2000; Wolters et al., 2005). Furthermore, SRL plays a vital role in academic outcomes and professional growth. Hinnant-Crawford et al. (2016) highlight SRL as a critical determinant of learning success, and Hemmler and Ifenthaler (2024) also underscore its relevance to self-regulated learning in continuing education environments. For teachers, strong SRL competencies enable more systematic professional development and more effective engagement with instructional challenges.

Self-regulated learning has broader implications not only for social accomplishment, but also for human capital development, teachers' career advancement, and organizational development within educational institutions. Human capital theory states that continuous investment in knowledge, skills, and competencies enhances individual productivity while also contributing to organizational development (Becker, 1993). In educational contexts, teachers who engage in self-regulated learning are more likely to acquire new knowledge, including developing innovative instructional practices for the development of students' competencies. These competencies directly contribute to the development of high-quality human capital, which is widely recognized as a key driver of national competitiveness in knowledge-based societies (OECD, 2021). Moreover, self-regulated teachers tend to establish clear professional goals, engage in continuous reflection, and pursue opportunities for academic and professional growth. These are closely associated with career advancement and the attainment of higher professional positions (Butler et al., 2004; Kramarski & Michalsky, 2010).

Furthermore, self-regulated learning (SRL), at the organizational level, can contribute to organizational learning, educational administration, school effectiveness, and educational leadership. Teachers who continuously reflect on and improve their professional practices not only enhance their own competencies, but also foster a culture of collaboration, knowledge sharing, and continuous learning within schools. Senge (2006) identified self-regulatory behaviors that supported the development of learning organizations that create and apply knowledge to enhance organizational performance. In addition, self-regulated learning strengthens the capacity of educational administrators in strategic planning, goal setting, performance monitoring, and adaptive management, which are

essential for the development of effective school administration (Scheerens, 2016).

Teachers' academic outcomes are represented by measurable indicators of their instructional effectiveness, student-related impact, scholarly productivity, and engagement in continuous professional development (CPD) in educational productivity (Scheerens, 2023). In the present study, teachers' academic outcomes are considered as an academic professional rank, which reflects career advancement and accumulated professional achievement. Academic ranking is widely regarded as an indicator of teacher professionalism, as it reflects sustained professional development, instructional expertise, scholarly engagement, and career advancement (Coldwell, 2017; Kunter et al., 2013). Consequently, it provides a meaningful outcome for examining the long-term influence of self-regulated learning on teachers' professional growth.

Previous studies have shown that self-regulated learning (SRL) contributes to success in learning achievement, lifelong learning, and professional development (Panadero, 2017; Pintrich, 2000; Zimmerman, 2013). However, relatively limited attention has been given to the relationship between SRL and teacher professionalism among in-service teachers. This is particularly significant in the Thai context where professional rank is closely linked to performance appraisal and teacher promotion systems. Also, given the theoretical linkage between SRL and teacher professionalism and career progression, teachers' SRL strategies provide important insights into the mechanisms that shape their academic outcomes. Therefore, this study aimed to examine the role of SRL strategies as a pathway to understanding teachers' professional learning and career development among in-service teachers by providing valuable insights into teachers' professional development and by investigating the correlation between teachers' self-regulated learning strategies and their academic outcomes. SRL strategies can also contribute to the international literature on educational management by highlighting how self-directed professional growth is associated with career progression and professional advancement.

LITERATURE

Self-Regulated Learning: Concepts and Theoretical Foundations

Self-regulated learning (SRL) is a pivotal construct in educational research that reflects a paradigmatic shift toward learners realizing how to strategically manage their own learning style. SRL is generally defined as the degree to which learners plan, monitor, and evaluate their cognition, motivation, and behavior to achieve personally meaningful goals (Panadero, 2017; Pintrich, 2004; Zimmerman, 2013). There is a multidimensional system of strategies and processes that empowers learners to take ownership of their learning.

Contemporary SRL research is shaped by two primary approaches: component models and process models. Component models identify specific strategies deployed by learners, and process models describe the temporal unfolding of SRL. Zimmerman (2013) proposed a process model based on Social Cognitive Theory that comprises three interrelated phases: forethought, performance, and self-reflection. During the forethought phase, learners analyze tasks, set goals, and engage in strategic planning. The performance phase involves the execution of selected strategies and continuous monitoring of progress. The final phase is comprised of self-reflection, evaluating outcomes, appraisal of strategy effectiveness, and adapting plans. Moreover, Zimmerman (2013) emphasizes that these phases are not strictly linear. They can overlap and dynamically influence one another depending on learner needs and contextual conditions.

Furthermore, Pintrich (2004) made significant advances in the field by bridging the process-oriented view with a component-based approach. This established a four-domain framework comprising cognition, metacognition, motivation, and behavior. Such a multidimensional perspective proposed a comprehensive theoretical lens for investigating SRL in authentic learning contexts. This allows teachers to capture a complex combination of internal psychological processes and external behavioral actions. Consequently, Pintrich's model has become a pillar for measuring SRL and influencing the development of rigorous assessment protocols and extending the boundaries of SRL measurement in empirical studies (Panadero, 2017).

Learning Strategies Promoting Self-Regulated Learning

Self-regulated learning (SRL) competencies can be purposefully developed through appropriate instructional design. Many scholars have developed and evaluated a diverse range of instructional models aimed at enhancing learners' SRL competencies, ranging from simple interventions to more intensive programs. Research consistently demonstrates that interventions designed to foster SRL significantly improve learners' ability to regulate their own learning. For instance, programs emphasizing the enhancement of metacognitive monitoring, goal setting, self-instruction, self-evaluation, persistence, and learning efficiency all help to achieve positive learning outcomes. (Randi & Corno, 2000; Rubin et al., 2007; Schunk & Zimmerman, 2007). Furthermore, developmental approaches focusing on motivational regulation such as success-oriented self-talk and interest generation (Weinstein et al., 2011) have also proved effective. Collectively, these findings support the premise that SRL is a competency that teachers can learn and be trained in.

Highly effective strategies for promoting SRL involve a combination of explicit strategy instruction and modeling. Dignath and Büttner (2008) and Zimmerman (2000) state that learners require clear explanations and opportunities for hands-on application regarding "how", "when", and "why" to employ cognitive and metacognitive strategies. These should be coupled with think-aloud protocols to retrieve the hidden mental processes of planning and problem-solving that enable learners to effectively adapt these strategies for their own uses (Schunk & Zimmerman, 2007). In teacher education contexts, SRL competency has also been positively linked with professional teacher competence and metacognitive engagement (Karlen et al., 2023).

Beyond direct instruction, scaffolding and formative feedback are also important mechanisms for driving the long-term development of SRL. Scaffolding strategies emphasize providing support during the initial stages and gradually withdrawing it to encourage learners to assume greater responsibility for their own learning (Vandevelde et al., 2012). Meanwhile, high-quality feedback should be prioritized. By identifying what learners have done well and specifying strategic areas for improvement, such feedback stimulates self-reflection and prompts behavioral adjustments in subsequent learning cycles (Hattie & Timperley, 2007; Panadero, 2017).

Self-Regulated Learning and Teacher Professional Development

Across theoretical models and intervention studies, SRL has been widely recognized as a flexible and multidimensional construct. Self-regulated learning presents a significant incentive for effective learning and ongoing professional growth. It encompasses cognitive, metacognitive, motivational, and behavioral regulation processes that function to support goal-directed learning, and it also serves as a robust conceptual foundation for investigating self-regulation among teachers and educators (Zimmerman & Schunk, 2011). These dimensions form a robust conceptual foundation for examining self-regulatory processes amongst teachers and educators (Panadero, 2017; Pintrich, 2004; Zimmerman, 2013). They are fundamental to understanding teachers' learning behaviors, such as instructional planning, professional decision-making, pedagogical reflection, and continued engagement in professional development. Moreover, SRL aligns with international standards of teacher professionalism, which emphasize reflective practice, autonomous learning, and continuous self-improvement (OECD, 2021; UNESCO, 2020).

SRL contributes to the development of professional teachers (TPD), which is closely linked to teacher professional development, a cumulative and ongoing process through which teachers' knowledge, skills, and competencies improve students' learning outcomes. In addition, TPD supports career advancement, professional stability, and long-term retention within the teaching profession (Coldwell, 2017). Day (1999) stated that professional development occurs across all stages of a teacher's career and encompasses cognitive, practical, and emotional dimensions that significantly influence the development of teacher professionalism.

Considering the relationship between SRL and TPD, self-regulatory ability can be a key factor in enabling teachers to participate effectively in professional development activities. Teachers with strong self-regulation can set their developmental goals exactly, monitor their progress, and continuously reflect on and improve their professional

practices (Kramarski & Michalsky, 2010). These teacher characteristics are an important element of SRL, and they are a foundational competency in supporting teachers' lifelong learning and sustained progression toward professional excellence.

Professional Learning and Educational Management

Professional Learning Theory posits that teachers' professional growth is a continuous and lifelong process driven by active engagement in learning, reflection, collaboration, and the application of new knowledge to professional practice (Day, 1999; Webster-Wright, 2009). It emphasizes the continuous learning embedded in a teacher's daily work and professional experience. Ongoing professional learning enables teachers to expand their knowledge, refine their instructional competencies, strengthen reflective practices, and enhance their capacity to respond to changing educational demands. These developmental processes can also contribute to career advancement. Furthermore, from the perspective of educational administration, professional learning functions as a strategic mechanism for strengthening organizational capacity and cultivating a culture of continuous improvement (Senge, 2006). School administrators play a crucial role in creating learning-oriented environments that promote collaboration, knowledge sharing, and professional growth among teachers. Accordingly, teachers who actively engage in professional learning tend to accumulate the knowledge, skills, and empirical evidence of professional competence required for progression to higher academic ranks. Moreover, professional learning serves not only as a pathway to individual professional growth, but also as a key driver of school effectiveness, organizational learning, and sustainable educational development.

METHODS

Research Design

This study was carried out using quantitative methods to examine the role of self-regulated learning (SRL) strategies as a pathway for understanding teachers' professional learning and career development among in-service teachers and investigates the correlation between teachers' self-regulated learning strategies and their students' academic outcomes.

Participants

The sample consisted of 314 in-service teachers from schools in Northern Thailand. The sample was randomized by using a multi-stage sampling technique. In the first stage, 20 schools in the northern region were selected through simple random sampling. In the second stage, 20 teachers from each selected school were randomly selected to make up a total of 400 teachers. A total of 314 completed responses were returned and included in the analysis. The sample included 81 males (25.80%) and 233 females (74.20%). Among the respondents, 22.61% (n=71) were teaching in a small school, 47.13 % (n=148) were teaching in a medium-sized school, 26.11 % (n=82) were teaching in a large school, and 4.14 % (n=13) were teaching in an extra-large school. Moreover, most participants had 1 to 5 years of teaching experience, 39.49% (n=124), and 21.97% (n=69) had 5 to 10 years of teaching experience. Finally, the professional ranking indicated that nearly half of the teachers did not hold an academic rank (49.36%; n=155), while 35.67% held a professional rank and 14.97% (n = 47) were at a senior professional level.

Data Collection Tools

The Self-Regulated Learning Strategies for Professional Teacher Development Scale (SRL-PTD) was employed in this study. We adapted and constructed a scale that measured content validity, high content validity, and good internal reliability.

The Self-Regulated Learning Strategies for Professional Teacher Development Scale (SRL-PTD) included 2 sections that comprised the self-regulated learning strategies section and the demographic section. In the SRL-PTD scale, participants were asked questions to reflect their level of self-regulatory strategies in three domains, which were the cognitive, motivational, and behavioral domains in learning, with ten items for each domain. The scale used a 5-point rating scale, ranking from 1= lowest level of self-regulatory strategies and behaviors to 5= highest level of

self-regulatory strategies and behaviors (e.g. self-regulatory strategies in the cognitive domain "I link newly acquired knowledge with my prior knowledge to strengthen the quality of my teaching practices"; in the motivation domain "I continually remind myself of the importance of striving for accomplishment in my academic ranking" and in the behavior domain "I seek consultation whenever I need help in understanding the task requirements"). The higher the score, the greater the level of self-regulatory strategies and behaviors in learning. Content validity was indicated by the index of item-objective congruence (IOC) across the three components, as evaluated by three experts, which ranged from .67 to 1.00. All values exceeded the determined criterion of 0.50. Cronbach's alpha reliability coefficient was 0.82 (α = 0.82), which indicated high reliability. Regarding the subscale, Cronbach's alpha reliability coefficient for cognitive regulation strategies was 0.76 (α = 0.76). Cronbach's alpha reliability coefficient for the motivational regulation strategies subscale was 0.86 (α = 0.86) and Cronbach's alpha reliability coefficient for behavioral regulation strategies was 0.83 (α = 0.83). Five demographic questions were presented in a checklist format that asked participants to complete the necessary information. These questions were about gender, the size of the school, the curriculum level, the education level, teaching experience, and academic professional rank.

Data Collection

A cross-sectional study was performed. The SRL-PTD scale was administered using an online cross-sectional study format. Participants were asked to complete the scale after receiving information about the study. The study details and informed consent information were presented on the first page, and only those who agreed to participate proceeded to complete the entire scale. Participants received assurances of voluntary participation and that confidential data would be treated in the same way as research data. The researchers collected all the data.

Data Analysis

The data analysis and descriptive statistics were used to examine the level and range of scores, mean (*M*), standard deviation (*SD*), and Cronbach's alpha reliability coefficient (α). A Spearman's rank correlation coefficient test was conducted to establish the association between the two variables. A one-way ANOVA was conducted to examine the mean differences in the performance of the self-regulatory strategies across the three groups (none-academic ranking, professional, and senior professional). Subsequently, Bonferroni post hoc tests were performed to identify which specific group means differed significantly from one another.

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Chiang Mai Rajabhat University (Decision No. IRBCMRU 2024/472.22.10).

RESULTS

The descriptive statistics of teachers' self-regulatory strategies for learning can be categorized into cognitive, motivational, and behavioral regulation dimensions, which are presented below with the corresponding scores. The minimum and maximum scores, mean (*M*), and standard deviation (*SD*) for each strategy, along with the overall performance level and prioritization ranking, are presented in Table 1. Teachers demonstrated a high level of self-regulation across all components. Among the regulation strategies, self-reinforcement had the highest score, with the first prioritization (*M* = 4.37, *SD* = 0.36). Environmental structuring had a high score at the second prioritization (*M* = 4.25, *SD* = 0.32), and time and environmental management had the next highest score at the third prioritization (*M* = 4.29, *SD* = 0.38). These were identified as the highest-priority strategies, indicating strong behavioral and motivational self-management. Help-seeking (*M* = 4.21, *SD* = 0.30) and Mastery self-talk (*M* = 4.20, *SD* = 0.30) were also prominent. Overall, the results suggest that teachers in this study consistently employed a wide range of self-regulatory strategies at a high level to support their professional learning and instructional development.

Table 1

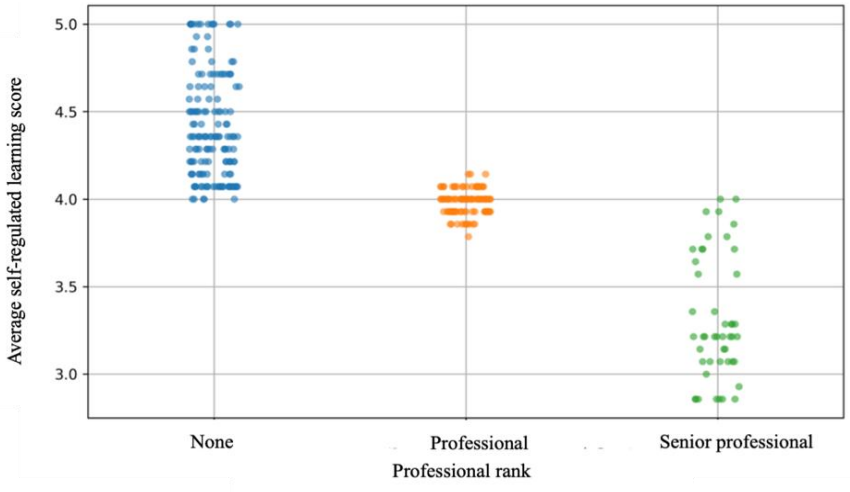
Means, Standard Deviations, and Level of Self-Regulatory Strategies with The Prioritization

Self-regulatory strategies performance	Min	Max	M	SD	Level	Prioritization
Cognitive Regulation Strategies						
Rehearsal Strategy	3	5	4.13	0.51	high	-
Elaboration Strategy	3	5	3.94	0.44	high	-
Organization Strategy	3	5	4.11	0.50	high	-
Metacognitive Self-Regulation Strategy	4	5	4.16	0.67	high	-
Motivational Regulation Strategies						
Mastery Self-Talk Strategy	3	5	4.20	0.61	high	5
Knowledge-Building Elaboration Strategy	3	5	4.09	0.51	high	-
Interest Enhancement Strategy	3	5	3.80	0.79	high	-
Comparative Self-Talk Strategy	2	5	4.13	0.81	high	-
External Motivation Self-Talk Strategy	2	5	3.58	0.82	high	-
Self-Reinforcement Strategy	4	5	4.37	0.48	high	1
Environmental Structuring Strategy	4	5	4.25	0.51	high	3
Behavioral Regulation Strategies						
Effort Regulation Strategy	2	5	4.01	0.69	high	-
Time and Environmental Management Strategy	3	5	4.29	0.61	high	2
Help-Seeking Strategy	3	5	4.21	0.58	high	4

The sample involved in-service teachers from schools in Northern Thailand at various levels of academic rank. Most participants were categorized as not holding an academic rank. Regarding their correlation, Spearman's rank correlation analysis was conducted to examine the association between academic professional rank and the average self-regulated learning strategy score. The Results revealed a strong significant correlation ($\rho = -0.72$, $p < .05$) that indicated in-service teachers at lower ranks reported greater engagement in self-regulated learning than their higher-ranked counterparts (see Figure 1).

Figure 1

Correlation Between Academic Professional Rank and Average Self-Regulated Learning Score



As shown in Table 2, Spearman's rank-order correlation analysis revealed statistically significant negative correlations between academic rank and all self-regulatory learning strategy subscales. The strongest associations were in motivational regulation strategies, particularly comparative self-talk (ρ = -0.66, p <.05), mastery self-talk (ρ = -0.59, p <.05), and interest enhancement (ρ = -0.57, p <.05), indicating that lower-ranked teachers tend to engage more actively in these regulatory behaviors. While cognitive and behavioral regulation strategies also showed moderate correlations, help-seeking strategy demonstrated the weakest relationship (ρ = -0.11, p <.05), suggesting it may be less influenced by rank.

Table 2

Spearman's Rank Correlation Between Academic Professional Rank And Self-Regulatory Strategies Subscale

Self-regulatory strategies	Spearman's rho
Cognitive Regulation Strategies	
Rehearsal Strategy	-0.44*
Elaboration Strategy	-0.47*
Organization Strategy	-0.33*
Metacognitive Self-Regulation Strategy	-0.51*
Motivational Regulation Strategies	
Mastery Self-Talk Strategy	-0.59*
Knowledge-Building Elaboration Strategy	-0.38*
Interest Enhancement Strategy	-0.57*
Comparative Self-Talk Strategy	-0.66*
External Motivation Self-Talk Strategy	-0.52*
Self-Reinforcement Strategy	-0.29*
Environmental Structuring Strategy	-0.33*
Behavioral Regulation Strategies	
Effort Regulation Strategy	-0.42*
Time and Environmental Management Strategy	-0.47*
Help-Seeking Strategy	-0.11*

A one-way ANOVA was conducted to examine the differences in the performance of self-regulatory strategies across academic rank. The results revealed that self-regulatory strategies had statistically significant differences across academic rank, $F(2,311) = 318.37$, $p < .001$. The effect size was large ($\eta^2 = 0.37$) (see Table 3). A post hoc Scheffe test indicated that the self-regulatory strategies scores of the teachers who did not hold an academic rank ($M = 4.40$, $SD = 0.29$) were statistically significantly higher than those of teachers who held an academic rank ($M = 4.01$, $SD = 0.09$) and those who held a senior rank ($M = 3.53$, $SD = 0.37$) (see Table 4).

Table 3

Means, Standard Deviations, A One-Way ANOVA In Self-Regulatory Strategies Performance

Academic professional rank groups	Self-regulatory strategies performance		One-way ANOVA					
	M	*SD*		*SS*	*MS*	*F*	*p*	η^2
None	4.40	.29	Between group	41.35	20.67	318.37	<.001	.37
Professional	4.01	.09						

Senior Professional	3.53	.37	Within group	20.19	0.07
Total	4.11	.44			

Note. SS, Sums of Squares; MS, Mean Squares.

Table 4

A Pairwise Comparisons for Self-Regulatory Strategies Performance Among Academic Professional Rank Group Using Scheffe Post Hoc Test

Academic professional rank groups	Self-regulatory strategies performance	Mean difference	*p*
None	Professional	.39	<.00
	Senior professional	1.05	<.00
Professional	None	-.39	<.00
	Senior professional	.66	<.00

DISCUSSION

These cognitive, motivational, and behavioral dimensions indicate that in-service teachers in this study revealed a robust self-regulatory profile. Their ability to regulate knowledge or thought, emotions, motivation, and behaviors reflect a high level of professional maturity and aligns closely with the competencies expected of teachers. These findings further underscore the importance of self-regulated learning in supporting teachers' learning and career development, which includes supporting continuous professional development and enhancing instructional quality. Furthermore, the comparative self-talk strategy in the motivational regulation strategies dimension has the highest score. This result shows motivational regulation strategies are related to careers that promote conceptual and empirical work (Karlen et al., 2020). Motivation is a core aspect of teachers' self-regulation learning competences, which shape instruction practices and professional growth. Also, studies in teacher education emphasize that equipping teachers with motivationally grounded self-regulation learning strategies contributes to sustainable professional development (Rodriguez-Gomez et al., 2024). Moreover, these results extend existing SRL research by examining self-regulated learning within the context of in-service teaching and professional career progression, while previous studies have predominantly focused on students, preservice teachers, or academic outcomes (Panadero, 2017; Zimmerman, 2013).

Spearman's rank correlation between teachers' academic rank and their use of self-regulated learning strategies showed a strong negative correlation. This result agrees with previous findings which suggested a positive relationship between professional experience and self-regulation (Karlen et al., 2023). Moreover, this highlights the dynamic nature of professional learning and demonstrates that self-regulated learning may peak during earlier phases of a teacher's career when professional ambitions are at their highest. According to Zimmerman's (2002) theory, self-regulated learning is an adaptive process that is related and influenced by both context and motivation.

Thus, in-service teachers who do not hold an academic rank tended to score higher on self-regulation learning strategies than those at a higher academic rank. Early career teachers who are not yet formally ranked are actively engaging in self-regulated learning to compensate for limited formal recognition or to proactively advance in their careers. Furthermore, one possible interpretation is that in-service teachers who do not have a professional rank are more motivated to engage in skill development, reflective learning, and self-monitoring as part of their growth trajectory. On the other hand, in-service teachers at higher ranks may rely more on accumulated experience and established routines, which may decrease the need for active regulation of their learning. Moreover, the findings of significant negative correlations offer new insights into how self-regulatory processes vary across teachers' career stages and contribute to the growing body of research linking teacher learning behaviors with career advancement

and professional outcomes. Furthermore, these results suggest that SRL may function differently across career stages and that higher professional status is not necessarily accompanied by stronger self-regulatory behaviors.

The negative association between academic rank and self-regulated learning suggests that teachers in lower academic ranks reported greater engagement in self-regulated learning than their higher-ranked counterparts. Although this finding may appear counterintuitive, several explanations are plausible. First, early-career and non-ranked teachers may be more strongly motivated to engage in self-regulated learning because they are actively pursuing professional advancement, competency development, and promotion opportunities (Coldwell, 2017; Day, 1999). In contrast, teachers who have already attained higher professional ranks may experience a career plateau effect whereby motivation for intensive learning declines once their desired career milestones have been achieved (Bardwick, 1986). Second, experienced teachers may rely more heavily on accumulated professional knowledge and established instructional routines, reducing their perceived need to employ explicit self-regulation strategies during professional learning activities (Tsui, 2013). Third, professional learning needs are likely to differ across career stages. Less experienced teachers often focus on acquiring pedagogical knowledge and developing instructional competencies, whereas senior teachers may engage in more specialized or context-specific activities that are less visible through traditional self-regulated learning measures (Day & Gu, 2007; Opfer & Pedder, 2011). Finally, the observed relationship may partially reflect measurement effects, as self-reporting SRL instruments tend to capture overt motivational and behavioral learning strategies that may be more salient among teachers actively seeking professional growth and promotion (Panadero, 2017; Zimmerman, 2013). Taken together, these findings suggest that the negative association should not be interpreted as indicating lower professionalism among higher-ranked teachers. Rather, it may reflect differences in professional learning needs and varying reliance on accumulated expertise across career stages.

Early-career teachers demonstrated particularly strong engagement in motivational and behavioral regulation strategies, indicating a high level of professional learning readiness that educational leaders can leverage through targeted support and development opportunities. From an educational management perspective, self-regulated learning should be recognized as a strategic resource for strengthening teacher workforce sustainability and professional growth.

CONCLUSION

In-service teachers demonstrated consistently high levels of self-regulated learning strategies across cognitive, motivational, and behavioral domains, with behavioral regulation being the most prominent. Self-regulated learning strategies were negatively associated with academic rank, particularly for motivational strategies, indicating that early-career or non-ranked teachers engaged more actively in self-regulated learning than their senior counterparts. Furthermore, the self-regulatory strategies of the teachers who did not hold an academic rank were statistically significantly higher than those of teachers in other academic ranks.

RECOMMENDATIONS AND PRACTICAL IMPLICATIONS

Based on these findings, teacher development initiatives should prioritize cultivating self-regulated learning competencies, particularly among early-career teachers seeking professional growth and career advancement. At the same time, experienced teachers may benefit from mentoring and coaching roles that encourage continued engagement in self-directed learning and reflective practice. From an educational management perspective, educational authorities should establish supportive structures such as mentoring programs, professional learning communities, coaching systems, and initiatives in reflective professional development for promoting continuous learning. Such efforts may help sustain teacher motivation, strengthen workforce sustainability, support long-term professional career development, and foster learning-oriented organizational cultures that contribute to the effectiveness of teaching.

Furthermore, integrating self-regulated learning into teacher appraisal systems may provide a more developmental approach to performance evaluation. Given that teachers with higher levels of SRL demonstrate greater engagement in professional learning and continuous improvement, school leaders could incorporate indicators such as reflective practice, professional goal attainment, and participation in learning activities into appraisal frameworks for the evaluation of work performance. Such measures would shift teacher evaluation toward a growth-oriented system. This approach may be particularly valuable in promoting continuous professional development among teachers at all career stages, including experienced educators whose motivation for self-directed learning may decline over time. Regional education authorities should design professional development programs that explicitly cultivate self-regulated learning competencies and also establish career progression frameworks that sustain motivation and learning across different professional stages. Furthermore, institutional policies should also recognize self-regulated learning as a core element of teacher training.

FUTURE RESEARCH

This study expands an understanding of teacher development by showing how important motivational regulation is for sustaining teachers' ongoing learning. To better support teachers throughout their careers, professional development programs should include explicit and practical training in self-regulated learning strategies, especially for more senior teachers. Training should encourage reflective practice, build awareness of motivational processes, and strengthen lifelong learning skills. Future research should consider employing longitudinal and qualitative approaches to examine how the use of self-regulated learning strategies evolves across career stages. Furthermore, institutional contexts or support systems may have an influence on these self-regulation trajectories over time.

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