Pre-service Teachers' Self-Regulated Learning and their Developing Concepts of SRL

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Abstract

Self-regulated learners manage their thoughts, emotions, and behaviours, and their social and contextual environments to reach their learning goals. Research shows that student teachers can learn to teach in ways that promote students' development of SRL. It has also been shown that there is a relationship between teachers' own SRL and their ability to develop self-regulation in students. This study examined student teachers' developing concepts of SRL as they learned about this complex set of skills, behaviours, and beliefs through both coursework and field observations. This paper investigates the relationship between self-reported SRL of these teachers and their understanding of SRL behaviours and SRL-supportive teaching practices. Participants' self-reported learning strategy scores predicted their performance on an SRL classroom observation assignment while motivation scores were unrelated. These results contribute to our growing knowledge of how to support student teachers in their learning of teaching strategies that support the development of SRL.

Keywords: self-regulated learning; teacher education; teaching strategies; learning strategies; intrinsic motivation

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Introduction

The importance of self-regulated learning (SRL) in academic learning and in contexts outside of school has been demonstrated in the literature (McCaslin & Good, 1996; Perry, 1998, Boekaerts, Pintrich & Zeidner, 2000; Schunk & Zimmerman, 2008). Self-regulated learners are metacognitively, motivationally, and behaviourally engaged in the learning process (Zimmerman & Schunk, 2001). In addition, self-regulated learners are aware of their strengths and limitations in academic situations and they have a range of strategies to use to meet the demands of challenging learning tasks. They believe that they are capable (i.e., have high self-efficacy beliefs), hold an incremental theory of ability, and typically focus on learning goals and personal progress more than performance goals or competing with classmates (Schunk & Zimmerman, 2008). They also attribute successes and failures to factors they can control (e.g., effort and strategy use). Finally, they are flexible and adaptable in monitoring their own learning and applying strategies to learning challenges they face.

Research has shown that teaching behaviours, task design, and classroom interactions influence students' development of self-regulated learning skills. For instance, Perry and her colleagues (Perry, Phillips, & Dowler, 2004; Perry & VandeKamp, 2000) describe classrooms that support children's development of SRL as those where they work on extended, complex learning tasks; make decisions about how they go about learning and about the end products and criteria for evaluating them; can collaborate with peers; and where there are opportunities for peer and self-evaluation. Perry, Phillips, and Hutchinson (2006) also demonstrated that student teachers can, with adequate support, learn to teach in ways that promote SRL, despite earlier assumptions that pre-service teachers were not ready for such complex planning, interactions, and decision making in their classroom practice. Student teachers in Perry et al.'s (2006) study participated in a yearlong program that involved intensive mentoring, coursework, supervised practice, and school-based professional development, all with a particular focus on promoting SRL. However, not all teacher education programs or even all cohorts within the program studied by Perry and colleagues are likely to place this much emphasis on developing teaching practices that support SRL. These authors thus raise the question of how much and what kinds of scaffolding student teachers need in order to learn SRL-supportive teaching practices (Perry et al., 2006; Perry, Hutchinson, & Thauberger, 2008).

Recent literature has also made the connection between teachers' own self-regulated learning and their ability to develop self-regulation in students (Gordon, Dembo, & Hocevar, 2007; Randi, 2004). The purpose of this study was to examine the statistical relationships that may be shown between student teachers' self-reported SRL and their demonstrated understandings about how SRL can be supported in classroom teaching. Specifically, the research question we examined was, *Do teacher education candidates' self-reported Self-Regulated Learning (SRL) scores predict how well they understand SRL as it appears and is supported in classrooms?* This study may provide evidence that will help us to better understand how to scaffold teacher candidates as they learn to teach in SRL-supportive ways.

Theoretical Context and Literature Review

Over the past two decades, research in education has shown that achievement, both in and outside of school, is positively influenced by students' use of self-regulated learning (SRL) skills and behavior to manage learning situations effectively. While there are varying models of self-regulated learning in the education literature, most theoretical formulations hold that when learners self-regulate they manage their abilities and capacities (e.g., thoughts, emotions, and behaviours) and their social and contextual surroundings to reach their goals for learning and achievement (Reeve, Ryan, Deci, & Jang, 2008). In this research, self-regulated learning is conceptualized from a social-cognitive perspective, in which metacognitive knowledge and control, intrinsic motivation, and strategic knowledge and skills are applied to learning situations (Winne & Perry, 2000). The first of these components, metacognitive knowledge and control, is seen as students' awareness of their strengths and weaknesses as learners and the ability to adapt strategies and tactics effectively as they manage challenging tasks. Intrinsic motivation for learning, the second component, involves strong self-efficacy beliefs, a focus on personal progress and deep understanding, and a tendency to attribute outcomes to factors the learner can control. The third component of SRL involves learners being strategic in their approach; these learners can choose from a repertoire of strategies to accomplish challenging tasks, apply them appropriately, monitor their progress against task goals, and adapt and adjust their strategy use as needed.

Although the positive effects of self-regulated learning are well documented (Perry, 1998; Perry et al., 2004; Boekaerts, et al, 2000), we also know that many learners across a wide range of ages and learning contexts are not self-regulating effectively (Perry, 1998; Zimmerman & Schunk, 2008). Indeed, many students are not taught strategies that could help them to manage their learning, or how to choose and apply them effectively in the right situations. In many classrooms students are given little or no opportunity to evaluate their own learning processes and products, which can provide them with feedback on how they are managing their learning and contribute to their development of metacognitive knowledge. Also, and not surprisingly given the competitive goal structures within many classrooms (Schunk, Pintrich, & Meece, 2007), most students are extrinsically motivated by grades, praise, and social comparisons. For some students, and under certain classroom conditions, external rewards such as grades and teacher praise act as incentives, while for other students in other situations they can lead to failure avoidance and lowered self-esteem, resulting in their choosing easy tasks, procrastinating, or avoiding work altogether (Schunk, 2008). Research has shown, for instance, that specific external events such as opportunities for choice, self-direction, and an optimal level of challenge will enhance students' intrinsic motivation by supporting their sense of autonomy and perceived competence (Perry et al., 2000; 2004; Reeve et al., 2008). Reeve and his colleagues also note that differences in teachers' intentions (i.e., supporting student autonomy vs. controlling their behaviour) can strongly affect students' intrinsic motivation and engagement, even when the teaching behaviours themselves are the same (e.g., setting limits, providing rewards, or offering feedback).

When Perry and VandeKamp (2000) asked teachers about their goals for students, most indicated that they wanted to help students become more independent and effective learners, but were not sure how much support their students needed, or what kinds of support would be most helpful. These authors worked with pre-service teachers and experienced associate teachers who mentored them in efforts to promote teaching practices that would support SRL in elementary school learners. Through intensive coursework, classroom practice, mentorship, and professional development activities throughout a one-year teacher education program, the researchers found that even novice teachers could learn to teach in ways that foster SRL in their students. Perry and VandeKamp's (2000) findings challenged previous conceptions of novice teachers as being unable to focus on complex pedagogical activities while they were learning the basics of behaviour management and content delivery (Alexander, Murphy, & Woods, 1996; Clark & Riecken, 2000; Duffy, 1997; Whitaker, 2000; 2003).

Research by Perry and her colleagues (e.g., Perry et al., 2006; 2008) demonstrated that student teachers can learn to implement some of the sophisticated teaching strategies and skills required for promoting SRL in their classrooms, through the use of extensive, targeted mentorship focused on this goal, along with a high level of continuity between practice and coursework. However, the authors note that further research is needed to determine how much scaffolding, focused reflection, and discussion beginning teachers need in order to learn how to design tasks and interact with young students in ways that promote SRL (Perry et al., 2008).

Randi (2004) emphasized the importance of teachers' own SRL in their ability to effectively perform in their practice, noting that teachers' roles have changed through contemporary professional development, such that they need to be effective learners, not just effective workers. Also, Hwang and Vrongistinos (2002) reported that elementary student teachers' use of SRL strategies was strongly related to their academic achievement. However, contrary to these findings and to most current research on SRL and achievement, a recent study by Shawer (2010) indicated no differences between student teachers in low, average, and high SRL groups on a test of curricular content knowledge and course design skills.

Of particular relevance to the present investigation, Gordon et al. (2007) found that teachers' own self-reported SRL influenced the extent to which they conveyed a mastery goal orientation in their classrooms, and that those with a mastery goal orientation also reported more humanistic control ideologies. The authors note that teachers who hold a humanistic control ideology try to help students learn to manage their behaviour and academic progress by creating a classroom environment that supports student responsibility, strategy use, and appropriate help-seeking (2007) – in these ways, they support students in developing SRL. This research indicates that how teachers learn may be an important mediating factor in the way they teach. The authors also called for more research on how student teachers learn during their teacher education programs and, more specifically, how they can become more self-regulated learners.

As a first step in discovering how much support is enough to help student teachers apply concepts of SRL in their own teaching practice, it may be useful to identify factors that influence their understanding of what SRL is and how teachers and classroom tasks can help students to develop it. The present study was designed to examine the relationship between student teachers' own self-reported SRL skills and their performance on a measure of SRL knowledge. Teacher

education candidates completed the Motivated Strategies for Learning Questionnaire (MSLQ, Pintrich, Smith, Garcia, & McKeachie, 1993) as an assessment of their own SRL. They then learned about SRL through readings, lecture, and class discussions. They applied their developing concepts of SRL by observing teacher and student behaviours known to be representative of SRL in classroom settings and summarizing their observations in a written report. The rubric developed to assess teacher candidates' observation reports was used as a measure of their SRL knowledge. Gaining a better understanding of the relationship between student teachers' intrinsic motivation, metacognitive learning strategies (as measured in the MSLQ), and their effectiveness in conceptualizing SRL in elementary classroom contexts (as measured through the observation report rubric) may help to identify ways to better prepare them for fostering SRL in their own classrooms. This study also provides evidence that may help to clarify the contradictory findings related to SRL and achievement in student teacher populations.

Methods

Study Context and Participants

The study took place in the context of a nine-month, post-degree Bachelor of Education program where the concepts related to SRL were addressed through a single unit of instruction in a Learning and Child Development course. The teacher education program is based on a professional development school (PDS) model, in which teacher education candidates are placed in the same schools for the entire academic year. The course takes place in two five-week blocks, separated by a two-week block practicum. Throughout the blocks of time when university classes are held, teacher candidates also spend 1.5 days per week (referred to as field experience days) in their professional development school (PDS) sites.

The sample for the study consisted of 108 teacher education candidates at a Canadian university. There were 27 males and 81 females in total, with 7 males and 45 females in a primary/junior (P/J) program and 20 males and 36 females in a junior/intermediate (J/I) program. Participants were students in four sections of the Learning and Child Development course, two of which were taught by Buzza. Students were informed that their participation was voluntary and that refusal would have no bearing on their evaluation in the course. Names and other identifying information were removed from course materials collected from participants before they were added to the data set.

Measures

Demographic survey. Participants completed a demographic survey, which provided data on their gender, level of academic preparation, and years of teaching-related work experience. One survey question also asked them how many courses in psychology they had taken previously. The purpose of this question was to explore potential relationships between prior

knowledge in psychology, self-reported SRL, and understanding of SRL as applied in classroom settings.

Motivated Strategies for Learning Questionnaire (MSLQ). The MSLQ is an 81-item paper-and-pencil self-report measure comprised of six Motivation subscales and nine Learning Strategies subscales. It was selected as a measure of SRL in part because it contains subscales that allow examination of specific motivational and strategic components and their potential relationships to outcomes on an assignment that reflects an understanding of SRL. The MSLQ has been extensively validated and used in previous research literature (Pintrich et al., 1993). It was demonstrated to be internally consistent in our sample, with an alpha coefficient of .90 for the total score, .80 for the Motivation Scales, and .89 for the Learning Strategies scales. Reliability coefficients for the subscale scores ranged from .50 to .88.

SRL observation rubric. Teacher candidates' understanding of SRL was assessed using a rubric for a major course assignment. The assignment provided practice in conceptualizing how teaching can promote SRL by asking teacher candidates to observe three classroom learning activities in the schools where they were assigned for field experience. For each observation they were required to take running notes and then summarize their notes to identify situations where SRL components of student choice, control over challenge, opportunities for self-evaluation, making use of peer support, and making use of teacher support were observed. Perry and colleagues identified these specific features of classrooms and tasks as important in supporting students' development of SRL (Perry, 1998; Perry et al., 2004; Perry & VandeKamp, 2000). Along with their observation summaries, teacher candidates submitted a report of their observations addressing the following requirements: (a) a summary of the instructional tasks, activities, and interactions they observed and the classroom context in which they took place; (b) a description of teaching behaviours they believed would promote SRL in students; (c) a description of learner behaviours they observed that appeared to reflect SRL; and (d) a description of how they could envision using what they had learned about SRL in their own teaching, such as how they might design and support learners' management of complex learning tasks, or how they could enhance students' intrinsic motivation.

The rubric for assessing the SRL assignment contained five criteria: *Observation Summar*y, *Teacher Behaviours* that Promote SRL, *Learner Behaviours* that demonstrate SRL, *Application* to Teaching Practice, and Professional Writing Standards. The Professional Writing Standards criterion was not included in the analysis for this study as it was not directly relevant to the research question or to teacher candidates' understanding of SRL. While there were four performance levels on the rubric, Levels 1 and 2 were collapsed for the purposes of our analyses because Level 1 was either rarely or never assigned to any of the criteria.

Research Design, Data Collection Activities, and SRL Instruction

We examined hypothesized relationships between teacher candidates' self-reported SRL and their understanding of how SRL appears and is supported in classroom practice, using correlational and analysis of variance statistical tests. Teacher candidates in four sections of approximately 35 students each were introduced to the study during their first Learning and

Child Development class, and signed consent forms if they agreed to participate. Participants in the study then completed the demographic survey and the MSLQ.

Teacher candidates were informed about the SRL Observation assignment during the first class session, when the course syllabus was reviewed. They were then assigned to read an article by Perry and VandeKamp (2000) as part of the coursework associated with the topic of *complex cognitive processes in learning,* which occurred in Week 7 of the 10-week course. They were expected to read the chapter on this topic in their course textbook (Woolfolk, Winne, Perry, & Shapka, 2010), which included a section discussing SRL. Finally, teacher candidates participated in lecture, discussion, and application activities during a three-hour class session. They had covered a unit on motivation earlier in the course.

Following their readings, class discussions and activities related to SRL, teacher candidates were asked to complete their structured observations at convenient and appropriate times during their field experience days. To ensure that they had a reasonable understanding of what they were looking for in their observations, teacher candidates were required to bring to class at least one of their three sets of observation notes, including categorized summary notes two weeks before the final report was due. The instructor checked over the observation notes on the same day and returned them with verbal feedback related to any questions about possible misunderstanding of the task. The SRL Observation report was submitted during the final week of the course.

Scoring of SRL Observation Rubrics

The SRL Observation rubric total scores were converted to a percentage score for purposes of these analyses. The rubrics for the Junior/Intermediate classes were scored such that percentage scores were obtained for each rubric criterion. The assignments for the Primary/Junior classes were scored categorically, so that level 1, 2, 3, or 4 were selected on each rubric criterion. As noted earlier, Levels 1 and 2 were collapsed for the present analyses because Level 1 was either rarely or never assigned to any of the criteria. Criteria scores were averaged to obtain a total SRL Observation score and, in the Primary/Junior classes, converted to a mark out of 35, which was the weight of the assignment in the course grade.

Results

Table 1 shows the means and related descriptive statistics for the MSLQ total and subscale scores and the SRL Observation rubric total cores.

Table 1. Descriptive Statistics for MSLQ Total and Subscale Scores (on a 7-point scale) (N = 124) and for SRL Observation rubric Total Scores (N = 117)

Scale	Min.	Max.	*M*	*SD*
MSLQ Total	3.22	5.95	4.94	.49
Motivation Scales	3.33	6.22	5.03	.53
Intrinsic Goal Orientation	1.00	6.75	5.07	.96
Extrinsic Goal Orientation	1.50	7.00	4.75	1.19
Task Value	1.50	7.00	5.49	.83
Control of Learning Beliefs	3.50	7.00	5.37	.77
Self-Efficacy for Learning & Performance	3.25	7.00	5.39	.78
Test Anxiety	1.00	7.00	4.10	1.40
Learning Strategies Scales	2.98	6.14	4.84	.62
Rehearsal	2.00	7.00	5.17	.96
Elaboration	2.83	7.00	5.37	.93
Organization	1.75	7.00	5.24	1.11
Critical Thinking	1.75	7.00	4.48	1.24
Metacognitive Self-regulation	2.75	6.17	4.48	77
Time & Study Environment	2.38	7.00	5.26	.90
Effort Regulation	2.25	7.00	5.45	.99
Peer Learning	1.00	7.00	3.88	1.21
Help Seeking	1.50	7.00	4.26	1.23
SRL Rubric (Total)	.43	1.00	.79	.13

Evaluation of the SRL Observation rubric

The main interest in this study was to examine the relationships between pre-service teachers' self-reported SRL and their ability to understand and observe SRL in practice. The SRL Observation assignment was designed to provide them with an opportunity to demonstrate their learning of these aspects of SRL by describing teaching behaviours known to promote SRL, observing learners' SRL behaviours, and suggesting how they might apply SRL concepts in their own teaching practice.

The rubric used to assess the SRL Observation assignment was developed and refined over several iterations of the course, but was not previously analysed to determine its statistical properties. To evaluate this measure, a two-way Chi Square test was conducted on the frequencies of teacher candidates' assessments falling in the various levels (1, 2, or 3) on each criterion within the rubric. This provided estimates of how well the frequencies of scores in each cell matched predicted outcomes and the strength of associations among them. The contingency table used for the Chi Square test was therefore 4 X 3, with levels reflected in three columns (see

Table 2). A Chi Square statistic of 13.55 (p = .04, df = 6) was obtained. This result shows that the actual frequencies for scoring at the various levels on the rubric criteria were fairly well predicted by expected frequencies. The strength of the associations among the frequencies for the criteria and performance level variables was weak, however, as shown by a Cramer's V of 0.12.

Table 2. Frequency Contingency Table for SRL Observation Rubric Criteria

Criteria	Level 1/2	Level 3	Level 4
Observation Summary	17	57	44
Teacher Behaviour	20	52	46
Learner Behaviour	22	66	30
Application	30	61	27

Note. Chi Square =13.55 Cramer's V = 0.12, df = 6, p = .04

Relationships between Demographic Variables, SRL scores, and SRL Observation scores

As a first step in examining relationships among variables within our sample, Pearson correlations were calculated between several demographic variables, MSLQ scales, and SRL total scores. These results appear in Table 3. The demographic variables were as follows: *Gender* (male/female); *Grad Year* (high school graduation year, within five-year ranges); *Program* (primary/junior vs. junior/intermediate teacher education program); *Psych Courses* (number of psychology courses taken previously); *Academic Level* (Bachelor's/Master's/Doctorate); *Work h/year* (weekly hours working for pay during teacher education program).

Table 3. Pearson Correlations between Demographic Variables, MSLQ Scales, and SRL Assignment Scores (N = 115)

Variable	1	2	3	4	5	6	7	8	9	10
1. SRL Rubric	---									
2. MSLQ M	.06	---								
3. MSLQ LS	.19*	.41**	---							
4. MSLQ Total	.16	.70**	.91**	---						
5. Gender	.19*	.18*	.19*	.21**	---					
6. Grad Year	-.10	-.17	-.23**	-.26**	-.02	---				
7. Program	.00	.02	.00	.02	-.30**	-.05	---			
8. Psych. Courses	-.10	-.08	-.13	-.11	.16	.21*	-25**	---		
9. Academic Level	.02	.12	.22**	.26**	-.10	-.19*	.11	-.08	---	
10. Work hr/year	-.18	-.03	-.05	-.07	-.03	.06	-.10	.07	-.03	---

Note. MSLQ M = motivation subscale total score; MSLQ LS = learning strategies subscale total score; Program = 1 (Primary/Junior) or 2 (Junior/Intermediate); Psych. Courses = number of psychology courses taken previously; Work h/year = hours worked for pay during current academic year.
* $p \leq .05$, ** $p \leq .01$.

All of the MSLQ scales (MSLQ Total, Motivation and Learning Strategies) appeared to be related positively to gender (where 1 = males and 2 = females) and negatively with grad year (where higher numbers were assigned to more recent graduates entering the program). Overall performance on the SRL Observation assignment (labelled SRL Rubric) was not predicted by any of the demographic variables.

Relationships between Self-Reported SRL and Observing SRL in Classrooms

Next, we examined correlations between the MSLQ scales and the total SRL Observation rubric score. The results of this analysis show relationships among the MSLQ scales in the context of our sample and also predictions of teacher candidates' performance on the SRL Observation assignment from MSLQ scores. The total MSLQ scores and SRL Observation rubric (total) scores did not show a statistically significant correlation ($r = .15$, $p = .12$). However, while not a strong relationship, the MSLQ Learning Strategies subscale was correlated with the total SRL Observation scores ($r = .19$, $p < .02$). As shown in Table 4, this relationship appeared to be attributed mostly to two individual Learning Strategy scales that showed statistically significant correlations with the SRL Observation rubric scores: *Organization* ($r = .26$, $p < .01$) and *Time*

and Study Environment ($r = .27$, $p < .01$). Scores on the MSLQ Motivation scales did not predict the SRL Observation rubric scores.

It was anticipated that teacher candidates' scores on some of the MSLQ subscales would be related differentially to more specific outcomes on the SRL assignment. For example, the two rubric criteria that are related to identifying and describing *teacher behaviours* that promote SRL and *learner behaviours* that demonstrate SRL were seen as the most direct test of understanding SRL concepts, because for these parts of the assignment, theoretical or abstract explanations would not suffice. These more specific relationships were examined next.

Different scoring of the SRL Observation assignment by the two instructors teaching the Learning and Child Development course prevented us from using all of the data in analyses involving the criteria scores. As described above, for the Junior/Intermediate classes, percentage scores were assigned to each criterion in the SRL Observation rubric. The assignments for the Primary/Junior classes were scored categorically and then averaged to obtain a total score for the assignment and converted to a mark out of 35 (which was the weight of the assignment in the course grade). Because percentage scores for the individual criteria were available only for the Junior/Intermediate classes, the remaining analyses were conducted with this portion of the sample only ($N = 63$).

Table 5 shows correlations between the MSLQ Total scale, Motivation subscale, Learning Strategies subscale, and the criteria and total scores for the SRL Observation rubric. These results indicate positive relationships between the Learning Strategies scales on the MSLQ and the SRL assignment, as indicated from the larger sample correlations (Table 4). Also, the Learning Strategies scales were related to the SRL rubric criteria of *Teacher Behaviours* and *Learner Behaviours*. Lower correlations between both of the other SRL rubric criteria and Learning Strategies scales did not reach statistical significance, but were in the expected direction.

To further explore the relationships between Learning Strategy (LS) scales and SRL Observation scores we conducted a one-way ANOVA using High Learning Strategy (High-LS) and Low Learning Strategy (Low-LS) groups as predictors and SRL Observation rubric total scores as the dependent variable. High- and Low-LS groups were obtained using upper and lower quartiles as cut-offs from the total sample ($N = 124$). This analysis did not produce a statistically significant F-statistic but a positive trend was shown ($F = 2.95$, $p = .09$). This trend could indicate that particularly high and particularly low scores on the Learning Strategies components of SRL differentiate between teacher candidates who demonstrate strong SRL understanding and those who do not. Additional analyses involving specific SRL assignment criteria were ruled out given the small sample size that would be required.

Table 4. Correlation Matrix for MSLQ Subscales and SRL Observation Rubric

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. **MST**	---																		
2. **MOT**	.70**	---																	
3. MVI	.59**	.54**	---																
4. MVE	.26**	.61**	-.07	---															
5. MVT	.69**	.72**	.59**	.24**	---														
6. MEC	.10	.33**	.02	.07	.09	---													
7. MES	.41**	.36**	.30**	.03	.31**	.25**	---												
8. MAT	.28**	.57**	.01	.38**	.20*	-.07	-.29**	---											
9. **LST**	.92**	.41**	.42**	.10	.48**	-.06	.24**	.17*	---										
10. LCR	.35**	.21**	-.06	.26**	.16*	.02	-.03	.20*	.43**	---									
11. LCE	.69**	.33**	.37**	-.06	.40*	.09	.46**	-.00	.65**	.14	---								
12. LCO	.65**	.31**	.34**	.04	.34**	-.05	.08	.21**	.73**	.32**	.53**	---							
13. LCC	.57**	.25**	.52**	-.03	.29**	-.06	.39**	-.12	.57**	.04	.44**	.26**	---						
14. LCM	.69**	.20*	.46**	-.13	.36**	-.07	.11	-.00	.70**	.24**	.54**	.48**	.47**	---					
15. LRT	.57**	.26**	.25**	.06	.35**	.10	.16*	.02	.57**	.20*	.28**	.38**	.16*	.34**	---				
16. LRE	.50**	.21*	.22**	-.02	.37**	.10	.15	-.03	.50**	.07	.28**	.25**	.16*	.39**	.57**	---			
17. LRP	.49**	.23**	.14	.12	.18*	-.13	.06	.26**	.65**	.30**	.24**	.44**	.24**	.25**	.18*	.06	---		
18. LRH	.43**	.22**	.06	.23**	.22*	-.24**	-.04	.31**	.57**	.16*	.15*	.28**	.22**	.21**	.11	.07	.62**	---	
19. **SRL**	.16*	.06	.08	-.01	.13	-.02	-.12	.09	.19*	.05	.11	.26**	-.00	.09	.27**	.09	.10	.09	---

Note. MST = MSLQ total score, MOT = Motivation total, LST = Learning Strategies total, SRL = SRL Observation Rubric % score. All other acronyms are presented in Appendix A. * $p \leq .05$, **$p \leq .05$

Table 5. Pearson Correlations between MSLQ scales and SRL Assignment Criteria for Junior/Intermediate Sample (N = 63)

Variable	1	2	3	4	5	6	7	8
MSLQ TOT	--							
MSLQ MOT	.70*	--						
MSLQ LS	.92*	.44*	--					
Observation Summary	.19	.07	.18	--				
Teacher Behaviour	.19	-.04	.26*	.64*	--			
Learner Behaviour	.20*	.11	.23*	.67*	.82*	--		
Application	.13	.03	.18	.37*	.57*	.64*	--	
SRL Rubric (total)	.15	.00	.22*	.73*	.85*	.90*	.70*	--

Note. 1-tailed * $p \leq .05$.

Discussion

The present study took place in a context where teacher education candidates were provided with somewhat limited instruction and practice related to SRL and then their conceptual and applied knowledge of these constructs and behaviours was assessed. Instead of 10 months of SRL-focused practice teaching and professional mentorship as occurred in the Perry et al. (2006) study, these teacher candidates studied SRL as one topic within a Learning and Child Development course and then conducted and reported on a series of classroom observations. In this context we examined the relationship between student teachers' own reported SRL and their ability to effectively observe and describe SRL in classroom settings, both in terms of teacher behaviours that support SRL and students' SRL behaviours.

The question of whether teacher education candidates' self-reported SRL is related to their achievement was not addressed here. However, in exploring possible relationships among SRL component variables as measured through the MSLQ and teacher candidates' demonstrated SRL knowledge, our results showed evidence of some predictive relationships. The Learning Strategies MSLQ scores predicted understanding of SRL concepts as indicated by the Observation rubric. Also, the statistically reliable correlations between self-reported SRL and more specific performance criteria on the SRL assignment that were found in the Junior/Intermediate sample provided evidence of a predictive relationship between learning strategies and understanding of SRL. On the other hand, the lack of apparent relationship between the Motivation scales on the MSLQ and performance on the SRL Observation assignment was interesting. The mean for Motivation scales appeared slightly higher and the standard deviations lower than for the Learning Strategy scales (see Table 1). It could be that, because our sample consists of post-degree professional students who have met stringent and competitive admission standards of the teacher education program, their motivation levels are

consistently quite high. This factor may attenuate observed relationships between motivation and other variables.

The ultimate goal in teaching pre-service teachers about SRL is to promote their development of teaching practices that support SRL in their students. One question of interest that is suggested by the present study is whether these results indicate potential benefits from added support for student teachers in developing their own SRL over the course of their professional program. It is not known whether such support will increase the likelihood that they will teach in ways that support SRL; however, helping them to better understand and recognize SRL in classroom practice is a first step toward this goal.

Given the motivational strengths and orientations that incoming teacher candidates demonstrate, providing scaffolding for their development and use of effective learning strategies may be more important than addressing motivational aspects of their approach to learning. This conclusion is also supported by the relationship found here between teacher candidates' scores on the MSLQ learning strategy scales and their performance on the SRL Observation assignment. As an example, teacher candidates in this sample learned about and discussed various kinds of learning strategies that can help young students to increase school achievement within their Learning and Child Development course. It would be quite possible to provide them with targeted practice in using these strategies for their own learning, which might offer the dual benefits of increasing their academic performance and their SRL. By experiencing enhanced academic success themselves through the use of specific learning strategies (e.g., rehearsal, organization, time management, and metacognitive strategies such as self-questioning and self-evaluation), teacher candidates will be better prepared to promote the development of strategic learning and SRL in their students.

Another consideration for teacher preparation is that, even though self-reported motivation components of SRL were not related to teacher candidates' performance on the SRL Observation assignment, they nonetheless need to learn how to support intrinsic motivation in their students. The fact that they succeeded in a competitive admissions process and are thus highly motivated learners does not mean they are aware of classroom strategies for supporting motivational beliefs that support SRL. Learning to support young learners' sense of autonomy and perceived competence by providing opportunities for choice, self-direction, and appropriate levels of challenge (Reeve et al., 2008) cannot be expected to come naturally just because teacher candidates are, themselves, motivated learners. It may be especially important for teacher candidates to understand that intentionally supporting student autonomy is important for enhancing their intrinsic motivation and engagement (Reeve et al., 2008). Also, it may not be easy for them to develop this kind of approach, given that managing student behaviour is a primary issue for most pre-service teachers (Whitaker, 2003). However, as Perry et al. (2006) found, teacher candidates' understanding and development of more complex learning tasks may be one way they can learn to promote student engagement in meaningful decision-making and self-reflection (p. 253). Through developing these kinds of skills, beginning teachers may learn to support students' autonomy as learners and, thus, their intrinsic motivation. When their students are actively engaged in challenging learning tasks, their off-task behaviour may be

reduced, therefore also allowing these novice teachers to shift some of their attention from behaviour management to student learning.

As demonstrated by Perry et al. (2006), helping beginning teachers to develop skills and approaches that will support SRL in their classrooms may be provided through extensive mentorship on the part of experienced teachers and SRL-focused coursework that is integrated with field experiences. At the same time, not all teacher preparation programs offer these intensive opportunities to learn about and implement SRL practices. Our findings point to some potential areas for further research involving pre-service teacher preparation. For instance, learning and practice opportunities that are focused on aspects of instruction such as designing complex learning tasks, opportunities for self-evaluation and other forms of student autonomy can be included in any teacher education program, regardless of its format. However, teacher candidates must also come to understand how these practices contribute to their students' development of SRL over time, including recognition of their value in developing strategic, confident and intrinsically-motivated learners. Given that many teacher candidates are highly motivated academically themselves, reflecting in depth on how their own learning and success has been influenced by the teaching practices they have experienced may help them to understand these aspects of SRL support. Examining links between novice teachers' own motivational beliefs and strategic learning behaviours and how they view these characteristics in their students may suggest the kinds of pre-service learning experiences that will be most beneficial for them. Research involving building SRL-supportive components into existing teacher education programs is needed to help determine, as suggested by Perry and her colleagues (2008), how much and what kinds of scaffolding novice teachers need in order to reach these goals.

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Appendix A

Table A1.

MSLQ Item Variable Codes

Code	Scale Type	Component	Subscale	Item Cohort
MVI	Motivation (M)	Value (V)	Intrinsic Goal Orientation (I)	1, 16, 22, 24
MVE	Motivation (M)	Value (V)	Extrinsic Goal Orientation (E)	7, 11, 13, 30
MVT	Motivation (M)	Value (V)	Task Value (T)	4, 10, 17, 23, 26, 27
MEC	Motivation (M)	Expectancy (E)	Control Beliefs (C)	2, 9, 18, 25
MES	Motivation (M)	Expectancy (E)	Self-Efficacy for Learning & Performance (S)	5, 6, 12, 15, 20, 21, 29, 31
MAT	Motivation (M)	Affective (A)	Test Anxiety (T)	3, 8, 14, 19, 28
LCR	Learning (L)	Cognitive & Metacognitive (C)	Rehearsal (R)	39, 46, 59, 72
LCE	Learning (L)	Cognitive & Metacognitive (C)	Elaboration (E)	53, 62, 64, 67, 69, 81
LCO	Learning (L)	Cognitive & Metacognitive (C)	Organization (O)	32, 42, 49, 63
LCC	Learning (L)	Cognitive & Metacognitive (C)	Critical Thinking (C)	38, 47, 51, 66, 71
LCM	Learning (L)	Cognitive & Metacognitive (C)	Metacognitive Self-regulation (M)	33, 36, 41, 44, 54, 55, 56, 57,61, 76, 78 , 79
LRT	Learning (L)	Resource Management Strategies (R)	Time & Study Environment (T)	35, 43, 52, 65, 70, 73, 77, 80
LRE	Learning (L)	Resource Management Strategies (R)	Effort Regulation (E)	37, 48, 60, 74
LRP	Learning (L)	Resource Management Strategies (R)	Peer Learning (P)	34, 45, 50
LRH	Learning (L)	Resource Management Strategies (R)	Help Seeking (H)	40, 58, 68, 75