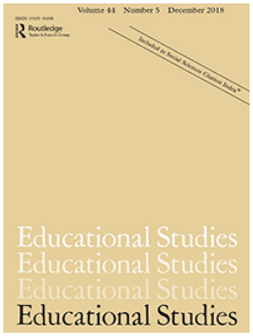

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How teachers' beliefs and demographic variables impact on self-regulated learning instruction

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ABSTRACT

This study examined the relationship between teachers' beliefs regarding self-regulated learning (SRL), together with key demographic variables, including gender, school sector and teaching experience, and their SRL instruction. A survey investigating teachers' beliefs and instructional practices regarding SRL was administered to 873 Hong Kong teachers teaching in primary ($N = 429$) and secondary schools ($N = 444$). The instruments were examined from a Rasch measurement perspective and the results demonstrated satisfactory psychometric properties of the instruments for use with the current sample. The Rasch-calibrated person measures were subsequently subject to hierarchical multiple regression analyses. The results showed that teachers' beliefs about the benefits of SRL and student capacity in implementing SRL were positive and significant predictors of SRL instructional practices. Gender was also a significant predictor of SRL instructional practices, with female teachers demonstrating higher levels of SRL instructional practices. The implications of the findings for teaching practice and teacher education are discussed.

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KEYWORDS
Self-regulated learning; teacher belief; instructional practice; Rasch measurement; demographic variable

Introduction

Self-regulated learning (SRL) is defined as an active process in which students monitor and control their motivation, cognition and behaviour to achieve their learning goals (Pintrich 2004; Zimmerman 2001). Considerable empirical evidence attests to the positive impact of SRL on students' academic performance (e.g. Bol et al. 2016; Cheng 2011; Mega, Ronconi, and De Beni 2014; Winne 2005). According to Cazan (2013), the benefits of SRL on academic performance are due to the fact that students with SRL skills can learn more efficiently by monitoring and adjusting their own learning behaviour. Therefore, SRL plays a key role, not only during schooling, but also in the life-long learning journey (van Beek et al. 2014; Kuo 2010).

From the perspective of Bandura's social cognitive theory, SRL is not a natural outcome of children's development (Bembenutty 2011), but, instead, is a set of teachable skills that can be instilled by education and instruction (Zimmerman and Schunk 2011). Previous studies have shown that students can learn how to self-regulate their learning (Nicol and

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Macfarlane-Dick 2007), and that such learning could be observed in both primary (Dignath, Buettner, and Langfeldt 2008) and secondary students (Dignath and Büttner 2008).

However, it is a demanding requirement of teachers to teach students to become autonomous and metacognitive learners (Nykiel-Herbert 2004). This challenge is especially salient in an examination-oriented education system, such as that of Hong Kong, where strong emphasis is placed on memorisation learning. Despite the generally high success rates of Hong Kong students in international comparative tests (e.g. OECD-PISA), there is general dissatisfaction with the relative inability of Hong Kong students to become independent and self-regulated learners (Ho 2004).

Teachers' role in developing students' SRL

Given the evidence that SRL can be taught to students, the teacher's role in developing students' SRL ability cannot be overemphasised (Azevedo et al. 2008; Cazan 2013). The literature indicates that teachers can use different instructional methods to equip students with self-regulation strategies (Dignath-van Ewijk and van der Werf 2012). Yan (2016) argued that, in addition to providing a learner-centred learning environment to promote learning autonomy, teachers can promote students' SRL by explicitly teaching them particular learning strategies, such as seeking feedback, self-reflection. The instruction of these SRL skills should be included in formal education (Sargeant et al. 2008) and explicit SRL strategy training (e.g. direct instruction) in terms of how to enact SRL can be especially useful (Kistner et al. 2010). Previous studies have demonstrated that educational instruction or training in specific self-regulation strategies, such as goal setting, self-monitoring, self-evaluation, self-reinforcement, have had positive influence on student achievements (Harris et al. 2011; Schunk and Zimmerman 2007).

Relationship between teachers' beliefs and instructional practices

Teachers' instructional practices are influenced by many factors and one of those is teachers' beliefs. The literature has demonstrated the significant influence of teachers' beliefs on the implementation of school reforms (Yan 2014; Yan and Sin 2014; Gess-Newsome et al. 2003) and, in particular, on teachers' instructional practices (Yan and Cheng 2015; Rubie-Davies 2015; Staub and Stern 2002; Zakaria and Maat 2012). Teachers interpret situations based on their pre-existing beliefs, and adjust their behaviour accordingly (Ertmer 2005; Pajares 1992). Instructional changes are difficult to implement without congruence between those changes and teachers' beliefs about teaching and learning (Gregoire 2003). In particular, empirical studies have demonstrated that teachers with positive beliefs toward SRL are more likely to promote student SRL in their teaching (Lombaerts, Engels, and van Braak 2009). Lombaerts et al. (2009) argued that teacher factors, such as their experiences and beliefs, had more significant influence on their SRL instructional practices than external contextual factors did. However, other studies (e.g. Dignath-van Ewijk and van der Werf 2012; Spruce and Bol 2015) have reported contrasting results; that is, although teachers expressed positive beliefs about SRL, they did not include SRL strategy instruction in their classroom teaching. Dignath-van Ewijk and van der Werf (2012) attributed such misalignment to teachers' lack of thorough understanding of SRL. Spruce and Bol (2015) further posited that teachers were reluctant to apply SRL strategy instruction because they were not convinced of their students' capacity

to implement SRL. Lau (2013) also revealed that some teachers perceived SRL as a challenging task for students, although they believed in the potential benefits of SRL-based instruction. It seems that teachers might hold mixed beliefs toward SRL. The nature of the relationship between teachers' beliefs and instructional practices is complex and, consequently, further investigation is warranted.

Relationship between demographic variables and instructional practices

Teacher demographic variables (e.g. gender, teaching experience, the school sector they are teaching) were investigated concerning their relationship with teachers' instructional practices and, again, the findings were inconsistent. For example, Lombaerts et al. (2009) reported that gender had no significant impact on teachers' SRL instruction. However, previous teaching and educational experiences were found to be teacher characteristics that influenced the teaching of metacognition in classrooms (Lombaerts, Engels, and Vanderfaeillie 2007). In a study of pre-service teachers, Elmas, Demirdöğen, and Geban (2011) revealed a significant association between gender and instructional style. Female pre-service teachers appeared more willing to apply student-centred teaching approaches, such as inquiry-based teaching and constructivist teaching, than were males. It is possible that teacher background variables might affect instructional practices through mediating variables. For example, Şeker and Ader. (2015) found that middle school mathematics teachers were more willing to promote self-regulation in students than were secondary school mathematics teachers. The reason given was that middle school mathematics teachers perceived more pressure from expectations of the principal and parents, and that such pressure was negatively related to promotion of self-regulation. Given the limited number of studies and their inconclusive findings, it is worthwhile to gather more empirical evidence regarding the possible relationships between teacher demographic variables and instructional practices.

The present study

A better understanding of the relationship between teacher beliefs, demographic variables and instruction regarding SRL would be beneficial to research and practice related to classroom teaching, as well as to teacher education. This study, therefore, intends to examine the extent to which teachers' SRL beliefs and demographic variables predict teachers' SRL instructional practices. Two specific research questions were formulated:

(1) What are the relationships between teachers' SRL beliefs and teachers' SRL instructional practices? And
(2) What are the relationships between teacher characteristics (including, gender, school sector and teaching experience) and teachers' SRL instructional practices?

Due to the complex nature of teacher beliefs toward SRL – positive about the benefits of SRL, while conservative about students' capacity to implement SRL – as revealed in the literature review section, this study attempts to understand teachers' beliefs from two aspects (i.e. perceived benefits of SRL and beliefs about student capacity for implementing SRL), respectively, rather than to present a composite belief toward SRL as previous studies have done. The multi-faceted interpretation of teacher beliefs will enable a more circumspect

depiction of the relationship between teachers' beliefs and their instructional practices regarding SRL.

Methodology

Participants

In the present study, participants were 873 teachers teaching in 10 primary ($N = 429$) and 10 secondary schools ($N = 444$) in Hong Kong. There were 277 males, 590 females (six without gender information). Length of teaching experience ranged from 1 to 34 years ($M = 13.0$, $SD = 8.49$). The participating schools were carefully recruited to cover the range of school bandings, an indicator of student academic achievement levels in Hong Kong, so as to obtain a sample consisting of teachers teaching students with different academic abilities.

Instruments

The 10-item Self-Regulated Learning Teacher Belief Scale (SRLTBS) (Lombaerts et al. 2009) was used to assess teacher beliefs about introducing SRL into their classrooms. Previous studies using SRLTBS interpreted teacher beliefs about implementing SRL as a single latent trait. However, close examination of the SRLTBS suggested that the 10 items might represent two separate, but related, aspects of teacher beliefs about implementing SRL. One aspect concerns teachers' beliefs about student capacity for implementing SRL; exemplar items include: "Pupils should be able to make decisions about the sequence and duration of their learning activities more often". The other aspect reflects teachers' perceived benefits of SRL: including "Self-regulated learning leads to a more efficient collaboration between pupils". The dimensionality of the SRLTBS will be examined in the current study so as to determine whether teacher beliefs about implementing SRL should be treated as a unidimensional construct, or regarded as two inter-related but separate constructs. The original scale was developed with a sample of primary school teachers in Belgium (Lombaerts et al. 2009). In the current study, the original wording was used for primary school teachers, while the term "pupil" was changed to "secondary student" when it was administered to secondary school teachers.

A second instrument, the Self-Regulated Learning Instruction Scale (SRLIS), was developed for this study to assess teachers' SRL instructional practices. The instrument was developed on the basis of a literature review, focus group interviews, expert review and pilot testing. The initial item pool was constructed from available literature, and instruments relevant to SRL teaching and learning, such as the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al. 1991), the Self-directed Learning Scale (Mok et al. 2006), the Self-regulated Learning Inventory for Teachers (Lombaerts, Engels, and Vanderfaeillie 2007), the Teachers' Reported Practices about Self-regulated Learning (Dix 2009). The initial item pool was supplemented by questions which were the outcome of a focus group interview with primary school teachers ($N = 6$), and another with secondary school teachers ($N = 6$). This procedure produced 13 items which were then subjected to review by a panel of three experts in the field of SRL to examine their face and content validity. The 13 items were modified based on the panel's advice and then piloted with a group of primary and secondary teachers ($N = 20$). The participants of the pilot testing were asked to review the items in

terms of clarity, potential ambiguity and bias. They provided suggestions for rewording some items. They were also asked to indicate which items reflected the most frequently-used SRL instruction strategies. The 10 most frequently endorsed items were retained for the main study. Exemplar items are: "I teach students to ask themselves questions to check whether they have understood the course content", "I teach students to identify which topics they don't understand well in their learning". The adoption of a 10-item version of the scale was influenced by practical considerations; this survey was administered as part of a larger project which included other instruments, so that it was preferable to reduce total respondent load. The full version of SRLIS can be accessed from the author by request.

For both the SRLTBS and SRLIS, respondents were asked to rate the items on a six-point Likert-type scale, ranging from Strongly Disagree (1), Disagree (2), Slightly Disagree (3), Slightly Agree (4), Agree (5) to Strongly Agree (6).

Data analysis

The data analysis in this study was undertaken in two steps. The psychometric properties of SRLTBS and SRLIS were firstly examined using Rasch analysis (Rasch 1960) with Winsteps 3.7 (Linacre 2011). The Rasch rating scale model was applied since all items in each instrument used a common set of response options. The SRLTBS was investigated further to determine whether it should be divided into two different but related subscales, i.e. teachers' perceived benefits of SRL (SRL-PB) and teachers' beliefs about student capacity for conducting SRL (SRL-SC). Rasch analysis was selected for its ability to transform ordinal raw data, collected through the Likert-type response options, into interval-level logit scale measures that are more appropriate for conventional statistical analyses requiring linear, interval scale data input (Bond and Fox 2015; Linacre 2006). Rasch analysis is routinely applied to examine the extent to which items in any instrument belong to a unidimensional construct because any objective measurement should, and can, gauge only one latent trait or dimension at a time (Bond and Fox 2015). Once a unidimensional scale is established, person ability estimates and item difficulty estimates can be calibrated on a single latent trait scale. Therefore, the meaning of person abilities and item difficulties can be interpreted in the same measurement framework. The measurement standards of the Rasch model ensure that the results from different contexts can be well communicated and provide a sound basis for constructing objective measurements from raw data. Multiple criteria were used to examine the psychometric properties of the scales, including, step threshold functioning of the rating scale, Rasch person/item reliability, item fit statistics (Infit/Outfit MNSQ) and the amount of variance explained by the Rasch measures.

Subsequent to the Rasch analysis, hierarchical multiple regression analyses were performed on the Rasch-calibrated person measures to investigate the predictive power of SRL beliefs and demographics for teachers' SRL instructional practices. Regression analysis, instead of simply reporting correlation coefficients, was used because regression analysis is able to examine simultaneously the predictive power of each of the variables on teachers' SRL instructional practices, and to compare the proportion of variance explained by each of the different predictors. The independent variables were organised into two blocks in order to investigate the unique contribution of each block of variables to predicting the dependent variable (SRLIS). The key demographic variables (gender, school sector and

teaching experience) were grouped into the first block of predictors; and the SRL beliefs were entered into the second block of predictors.

Results

Psychometric properties of scales from the Rasch measurement perspective

Before addressing the major research questions, the instruments used in this study were examined from the Rasch measurement perspective. Initial Rasch analyses of the SRLTBS and the SRLIS showed that all items in the SRLIS fitted to the Rasch model requirements with Infit/Outfit MNSQ falling into the acceptable range (.75–1.33) as recommended by Wilson (2005). However, two items in SRLTBS, item 1 (Pupils should be able to make decisions about the sequence and duration of their learning activities more often) and item 2 (Pupils should be able to decide when they work on an assignment more often) demonstrated misfit. Based on this result and the examination of item content described in an earlier section, a principal components analysis (PCA) of the Rasch residuals was conducted to examine further the dimensionality of SRLTBS. The results revealed the eigenvalue of the first contrast to be 2.4, indicating that there was probably a "second dimension" in addition to the Rasch dimension, according to Linacre (2006). It was further found that the loadings of one set of items (1, 2, 3, 4 and 9) on the first contrast (.67, .68, .16, .25 and .07, respectively) were substantially different from the loadings of the remaining set of items 5, 6, 7, 8 and 10 (–.34, –.62, –.65, –.65 and –.17, respectively). Judging from the item content, items 1, 2, 3, 4 and 9 reflect teachers' beliefs about student capacity for implementing SRL; while, items 5, 6, 7, 8 and 10 reveal the perceived benefits of SRL by teachers. This quantitative and qualitative examination of the dimensionality of SRLTBS implied a two-dimensional, rather than a unidimensional structure. The 10 SRLTBS items were, therefore, divided into two measurement subscales: the SRL belief of student capacity (SRL-SC) scale with five items (1, 2, 3, 4 and 9), and the SRL belief of perceived benefits (SRL-PB) with five items (5, 6, 7, 8 and 10).

The Rasch rating scale model was subsequently applied to the SRL-SC, SRL-PB and SRLIS separately. The response category functioning of each rating scale was first investigated. Linacre (2006) claimed that the threshold calibrations of the rating scale response options should increase monotonically. In other words, a higher measure on the items should represent a higher level of the latent trait under measurement. It can be seen from Table 1 that the category functioning of the rating scale for all three scales satisfied this requirement. The Infit and Outfit MNSQ for all items of each of the three scales fall into the acceptable range of .75–1.33, indicating good fit to the Rasch model. The Rasch person/item reliabilities for all scales ranged from .82 to .99. The variance in the observed data explained by the Rasch measures ranged between 59% and 70%. The results summarised in Table 1 demonstrated satisfactory psychometric properties of the three scales for use with the current sample.

Table 1. Psychometric properties of the three SRL measurement scales.

Scale	No. of items	Rasch person/ item reliability	Variance explained by measures (%)	Step thresholds (logits)				
				Step 1	Step 2	Step 3	Step 4	Step 5
SRL-SC	5	.82/.93	59.9	−4.85	−2.07	−.24	2.14	5.02
SRL-PB	5	.86/.99	69.2	−5.88	−3.43	−1.16	2.81	7.66
SRLIS	10	.90/.97	59.1	−5.89	−3.13	−.94	2.73	7.23

Descriptive analysis

Descriptive statistics were calculated for Rasch-calibrated teacher measures (in logits) on the three scales, including SRL-SC, SRL-PB and SRLIS. The means, standard deviations and *t* tests of teacher measures across gender and school sector are presented in Table 2.

In the Rasch analysis, the scale origin – a conventionally allocated starting point on the Rasch scale – is set to the mean of the item difficulties, i.e. zero logits. Therefore, a positive person measure (in logits) indicates a greater level of latent trait. It can be seen from Table 2 that, overall, teachers had high mean measures on each of the three scales, indicating that teachers, on average, held positive beliefs in terms of students' capacity to implement SRL, and the benefits associated with SRL; teachers also claimed to teach SRL strategies in their classroom instructions. The *t*-test results showed that female teachers had significantly higher ($p < .01$) measures on SRLIS than did males, and primary teachers had significantly higher ($p < .01$) measures on SRL-PB than did secondary teachers.

Regression

To address the two main research questions, i.e. to examine the extent to which teachers' SRL beliefs and teacher characteristics predict teachers' SRL instructional practices, hierarchical multiple regression analyses were conducted. Teachers' SRL instructional practice was treated as the dependent variable, with SRL-PB and SRL-SC as potential predictors, along with other teacher characteristics including gender, school sector and teaching experience.

During the regression analyses, the correlation coefficients between the key variables, and collinearity statistics (i.e. variance inflation factor, VIF) were examined to scrutinise for potential risk of multicollinearity. Correlations between predictors above .8 (Field 2009) and VIF higher than 10 (Menard 1995) were regarded as a signal of multicollinearity. Table 3 reports the correlation coefficient between SRL-SC and SRL-PB as .716 ($p < .01$), lower than .8. The VIF for these two predictors in the regression analysis (2.122 for SRL-SC and 2.139 for SRL-PB, respectively) were smaller than 10. In other words, there was no evidence of multicollinearity in this case.

The results of hierarchical multiple regression analyses, presented in Table 4, estimate the contribution of the demographic variables (gender, school sector and teaching experience) and SRL-based beliefs (SRL-SC and SRL-PB) to teachers' SRL instructional practices (SRLIS). Demographic variables were entered into the model at step one, and SRL-based beliefs were entered into the model at step two.

Table 2. The means, standard deviations and *t*-test results for teacher measures on the three scales.

	SRL-SC		SRL-PB		SRLIS	
	M	SD	M	SD	M	SD
Overall ($N = 873$)	1.00	1.97	2.40	2.92	3.07	2.43
Male ($N = 277$)	.87	2.03	2.16	3.00	2.72	2.49
Female ($N = 590$)	1.06	1.93	2.51	2.87	3.24	2.38
t-test	$t = 1.34; p = .18$		$t = 1.62; p = .11$		$t = 2.92; p = .004$	
Primary teachers ($N = 429$)	.91	1.90	2.71	2.79	3.18	2.40
Secondary teachers ($N = 444$)	1.10	2.04	2.10	3.01	2.96	2.46
t-test	$t = -1.46; p = .15$		$t = 3.13; p = .002$		$t = 1.34; p = .18$	

Note: All measures are in interval measurement scale logits.

Table 3. Correlation coefficients between the key variables.

Variable	1	2	3
1. SRL-SC	–		
2. SRL-PB	.716**	–	
3. SRLIS	.515**	.640**	–

**$p < .01$.

Table 4. Multiple regression analysis of predictor for SRL instructional practice.

	Regression coefficients			Model summary			
Predictors	β	B	S.E.	R	R^2	Adjust R^2	R^2 Change
Step 1				.113	.013	.009	.013*
Gender	.089*	.460	.182				
School sector	−.021	−.103	.170				
Teaching experience	−.050	−.014	.010				
Step 2				.646	.417	.414	.404**
Gender	.070*	.362	.140				
School sector	.025	.119	.134				
Teaching experience	−.008	−.002	.008				
SRL-SC	.109**	.135	.047				
SRL-PB	.558**	.463	.032				

*$p < .05$.;
**$p < .01$.

Table 4 shows that, in step one, $R^2 = .013$, $F_{change}(3, 856) = 3.717$, $p < .05$. Gender (1 = male; 2 = female) was a positive and significant predictor ($\beta = .089$, $p < .05$), while school sector (1 = primary; 2 = secondary) ($\beta = -.021$) and teaching experience ($\beta = -.050$) were not significant predictors. In step two, after adding SRL-SC and SRL-PB, $R^2 = .417$, $F_{change}(2, 854) = 296.532$, $p < .01$, gender remained a significant positive predictor ($\beta = .070$, $p < .05$). Both SRL-SC ($\beta = .109$, $p < .01$) and SRL-PB ($\beta = .558$, $p < .01$) appeared as positive and significant predictors of SRLIS. Thus, female teachers demonstrated significantly higher levels of SRLIS; teachers with higher levels of SRL-SC and SRL-PB were significantly more likely to implement SRLIS. However, SRL-PB ($\beta = .558$) had substantially stronger predictive power than did SRL-SC ($\beta = .109$).

Discussion

This study aimed at examining the extent to which Hong Kong teachers' SRL beliefs and demographic variables explain their SRL instructional practices. In examining the psychometric quality of the instruments used in this study, Rasch analysis results indicated that the SRLIS satisfied the unidimensionality requirement and that all items demonstrated acceptable fit to the Rasch model. As for the SRLTBS, a two-dimensional, rather than a unidimensional, structure was revealed. One dimension incorporated teacher belief about student capacity in implementing SRL (SRL-SC), and the other reflected their perceived benefits associated with SRL (SRL-PB). These hints of multidimensionality of the SRLTBS can be traced back to its development. Lombaerts et al. (2009) applied Rasch analysis to examine the psychometric properties of the scale and identified two items from the SRL-SC (Pupils have the capacity to determine what they want to learn; Each pupil should be given the opportunity to regulate his/her own learning) as showing misfit. The scale developer kept these

two misfitting items since "the misfitting items were for both theoretical as construct-related reasons of importance in the scale" (Lombaerts et al. 2009, p. 89). This theory-driven viewpoint is justifiable and echoed in this study. In this study, however, instead of keeping those misfitting items in the scale, and inappropriately treating the scale as unidimensional, the empirical evidence in this study supports separating the SRLTBS scale into two subscales.

There are two key implications concerning the instrumentation focus. First, a new instrument was developed for assessing teachers' SRL instructional practices. Second, although responses to SRLTBS has been interpreted as a single composite score in the SRL literature, this study recommended separating that into two sub-scores based on empirical data. Such differentiation will serve to inform interpretations of survey data using SRLTBS in future investigations. For example, for some teachers who have low belief about SRL, doubts exist about students' capacity in completing SRL tasks, while others might just disagree that SRL is beneficial to learning. The conventional interpretations of SRLTBS as a single composite score cannot provide such rich information. Speculatively, the lack of empirical consensus in previous studies regarding the relationship between teachers' SRL beliefs and instructional practices, as revealed in the above literature review, might be explained by the combination of the scores from two aspects of the SRLTBS. Using the same SRLTBS, Lombaerts et al. (2009) found that teachers' SRL beliefs were significant in influencing their SRL instructional practices. However, Spruce and Bol (2015) reported that teachers might not apply SRL instruction, although they held positive SRL beliefs. In their follow-up interviews with teachers, Spruce and Bol (2015) found that lack of confidence in their students' capacity to implement SRL tasks was one of the reasons behind teachers' reluctance to apply SRL strategy instruction. One might reasonably wonder whether the conclusion would be different if the survey data collected with SRLTBS had been interpreted in two sub-scores, i.e. one for the belief about student capacity in implementing SRL, and the other for the benefits associated with SRL.

The *t*-test results demonstrated that female teachers had significantly higher ($p < .01$) SRLIS measures than did their male colleagues. In other words, female teachers claimed to use more SRL instruction in their classes. This finding echoes, to some extent, that of the Wilkesmann and Lauer (2015) study which found that female professors at universities were more willing to apply student-focused teaching approach than were males. Students had more control in terms of what and how to learn in courses taught by female professors. Elmas, Demirdöğen, and Geban (2011) also reported a significant association, favouring females, between gender and student-centred teaching approaches among pre-service teachers. The explanation for that gender difference might be attributed to the conventionally accepted social roles for males and females. Elmas, Demirdöğen, and Geban (2011) argued that males were more comfortable in a lecturing role and preferred being authoritative, consistent with their social role.

This study found that primary teachers had significantly higher ($p < .01$) measures on SRL-PB than did secondary teachers, indicating that primary teachers perceived more benefits for students associated with SRL than their secondary colleagues saw. Spruce and Bol (2015) speculated that grade level might have impact on teachers' beliefs and instructional practices regarding SRL, but did not hazard an explanation. One possible reason might be attributed to a key contextual factor; in particular, the examination pressures faced by teachers and students. In Hong Kong, there are no public examinations for primary school students. All primary students will be allocated a secondary school place through the Secondary School Places Allocation System on completion of primary schooling. However, all secondary

students are required take a high-stakes external examination (the Hong Kong Diploma in Secondary Education, HKDSE) at the end of Secondary 6 in order to win a university place. In other words, secondary students, as well as their teachers, face much more examination pressure than do primary students and their teachers. In a recent study, Yan (2016) found that, Hong Kong Secondary 6 students, facing the HKDSE, and Secondary 3 students, facing high-stakes internal assessments, were more reluctant to conduct self-assessment than were their peers in other grades and primary students. The reason speculated by Yan (2016) might also apply to this study: high-stakes assessment can result in excessive pressure on students and teachers and, therefore, promote surface learning approaches, such as rote memorisation, which are perceived by students and teachers as efficient, and, on the other hand, inhibit deeper learning approaches, such as self-assessment or SRL, which are more time-consuming. This phenomenon is not unique to Hong Kong; Şeker and Ader. (2015) reported that the pressure caused by school contextual characteristics, such as expectations of parents and the principal, and time constraints, had negative impacts on Turkish teachers' practices in promoting SRL in students. This finding should remind educational stakeholders that a learning environment with minimal examination pressure might be a crucial pre-condition to promoting SRL in students.

Regression analyses showed a strong and positive correlation between teachers' SRL beliefs, both on benefits of SRL and students' capacities, and instructional practices. This finding is congruent with those of previous studies that highlighted the crucial role of teacher beliefs in promoting SRL in their classrooms (Lombaerts et al. 2009). Spruce and Bol (2015) reported that teachers held positive beliefs about SRL but their application of SRL strategies in the classroom was generally low because they had little confidence in students' SRL capacity. Lau (2013) also reported that teachers believed in the positive impact of SRL-based instruction, but some of them thought that SRL was difficult for students, especially for those with lower levels of ability and motivation. In this study, the results found that Hong Kong teachers not only had positive beliefs about the role of SRL in learning, but also held positive beliefs concerning students' ability in implementing SRL, although the predictive power of the beliefs concerning the benefits of SRL appeared stronger than that of the belief in students' capacities for implementing SRL. It is reasonable to argue that both the positive beliefs in the benefits of SRL and the confidence in student ability to carry out SRL are crucial for promoting teachers' SRL instructional practices. Teachers' positive beliefs on these two aspects led to a high level of willingness to incorporate SRL strategies into their classroom instruction.

Given the benefits associated with SRL rehearsed in earlier sections, there seems little doubt that SRL instruction in schools should be promoted. The strong relationship between teacher beliefs and instruction regarding SRL revealed in this and previous studies has implications for teacher education programmes. That is, teacher education programmes should not only transmit subject-based and pedagogical knowledge, but also nurture teachers' positive SRL beliefs. Positive beliefs about SRL could be developed directly by altering teachers' conceptions of the benefits of SRL, or indirectly by rehearsing the empirical evidence of student improvement associated with SRL instruction. Teachers are pragmatic and inclined to do what works and abandon what does not work (Mohamed 2006). With positive evidence of learning outcomes, teachers were found to be more likely to adopt new instructional approaches (Avalos 2011; Lau 2013). Although some studies argued that pre-service teachers find SRL expertise difficult to acquire (e.g. Kramarski and Michalsky 2010; Perry, Hutchinson,

and Thauberger 2007), and the effectiveness of teacher training programmes in adjusting teaching beliefs might be in question (Kettle and Sellars 1996), some evidence exists to support incorporating SRL training in teacher education programmes. For example, Kramarski and Revach (2009) reported that teachers with SRL training were more likely to teach SRL strategies in their classrooms, and demonstrated more positive SRL beliefs than did teachers without SRL training. In addition to the short-term effects, Lombaerts et al. (2009) pointed out that SRL elements in current teacher education programmes influenced the SRL beliefs and instruction in the long run by affecting teacher-education students' own SRL expertise and experiences.

Limitations and future research directions

Several limitations of the current study should be considered in future studies. First, the measures of teachers' beliefs and instructional practices were all generated from self-report instruments which might involve response biases. Future investigations might make use of less subjective data, such as direct classroom observation and link teachers' SRL beliefs with observation of their actual classroom practices.

Second, SRL instruction is a complicated set of behaviours that might be influenced by many variables. This study shed light on one part of that whole picture by focusing on the relationships between teachers' characteristics, beliefs – in particular, teachers' perceived benefits of SRL and beliefs on students' capacity in SRL – and instructional practices regarding SRL. Other variables influencing SRL instruction, such as teachers' self-efficacy (Kramarski and Revach 2009) and the contextual factors (Lombaerts et al. 2009), should also be considered for future studies.

Third, this study emphasised the importance of SRL strategy instruction in teacher practice. However, a constructive learning environment, in addition to SRL strategy instruction, is also crucial to develop students' ability in SRL (Sungur and Senler 2009). Future studies should investigate teachers' efforts and effectiveness in creating such learning environments where teachers provide challenge tasks, yet maintain supportive and non-threatening atmosphere, in order to promote student SRL.

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