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How competent do teachers feel instructing self-regulated learning strategies? Development and validation of the teacher self-efficacy scale to implement self-regulated learning

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Abstract
This study describes the development of a self-report instrument: the Teacher Self-Efficacy Scale to implement Self-Regulated Learning (TSES-SRL). The TSES-SRL assesses teachers' perceived ability of implementing SRL as a specific instructional domain. The process of the item and scale development is presented. Exploratory factor analysis suggests a four-factor structure. Next, confirmatory factor analysis was performed and goodness of fit estimates were calculated, indicating an acceptable fit. Further, comparing the TSES-SRL to The Ohio State Teacher Efficacy Scale reveals the domain-specificity of the instrument. Overall, the TSES-SRL is considered a useful instrument to measure teachers' feelings of competence regarding SRL implementation.

Keywords: teacher self-efficacy, self-efficacy, self-regulated learning, measurement, factor analysis

Theoretical framework

Self-regulated learning

During the past decades, the concept of SRL has received growing attention in educational research and practice (Boekaerts, 1997; Bolhuis, 2003), as it is considered a constitutive of academic success (Winne, 1997). Moreover, numerous studies have convincingly indicated the importance of SRL for effective lifelong learning (e.g., Winne, 2005; Zimmerman, 2002) and as an important educational goal (e.g., Bolhuis, 2003).

Research agrees that SRL consists of three main components: metacognition, motivation and cognition (i.e., strategic action) (e.g., Schraw, Crippen, & Hartley, 2006; Vermunt & Verloop, 1999; Zimmerman, 1986, 2002). The metacognitive component refers to skills that enable students to understand and monitor their cognitive processes (Schraw et al., 2006) and covers learning activities such as planning (i.e., the selection of appropriate strategies), monitoring (i.e., checking comprehension by means of self-testing) and evaluation (i.e., judging both the learning process and the final learning outcomes) (Dignath & Büttner, 2008; Vermunt & Verloop, 1999). Self-regulated learners who exercise metacognition are self-conscious and able to use and adapt different learning processes depending on the circumstances in order to attain desired outcomes (Perry, 2013; Vermunt & Verloop, 1999).

Students address the motivational component of SRL when coping with emotions that arise during learning (Vermunt & Verloop, 1999). This refers to beliefs and attitudes that can affect the learning process such as the value they place on personal progress and the willingness to attempt challenging tasks (Perry, 2013; Schraw et al., 2006). Motivating, concentrating, appraising, high attribution and dealing with emotions are examples of motivational learning strategies (Vermunt & Verloop, 1999).

Lastly, the behavioural or the strategic component refers to learning strategies that assist the learner in more effective processing, use and manipulation of information (Cornford, 2002). Learners strategically choose strategies from their personal repertoire (Perry, 2013). This repertoire can include skills such as structuring, memorizing, selecting and concretizing, employed to encode, memorise and recall information and optimize learning (Schraw et al., 2006; Vermunt & Verloop, 1999; Zimmerman, 2002).

In order to become self-regulated learners, students need to master a number of learning strategies that they can apply taking into account the varying contexts and needs of specific learning situations (Kistner, Rakoczy, Otto, Klieme, & Büttner, 2015). These strategies can be embedded in a

common phased structure of the SRL process: processes preceding (i.e., forethought phase), during (i.e., performance phase) and after (i.e., self-reflection phase) the learning act (Lombaerts, Engels, & Athanasou, 2007; Zimmerman, 2000). However, mastering self-regulatory strategies does not develop automatically in all students. Yet, this can be trained by teachers (Boekaerts, 1997; Dignath & Büttner, 2008; Zimmerman, 2002). Moreover, the teacher's role in stimulating and promoting SRL is crucial, as students need a skilful model (Costa-Ferreira & Veiga-Simão, 2012). In this respect, researchers have agreed that the three components of SRL should be an integral part of teachers' daily instructional strategies (Dignath-van Ewijk, Dickhäuser, & Büttner, 2013; Kramarski, Desoete, Bannert, Narciss, & Perry, 2013; Zimmerman, 2002).

As SRL is flexible and adaptable, students tend to construct their own repertoire of SRL strategies (Paris & Paris, 2001; Paris & Winograd, 1999). In this respect, teachers should adapt SRL instruction to the learner and pay attention to the way students interpret and engage with the given instruction (Paris & Winograd, 1999; Perry, 2013). Notwithstanding the differences between students, literature refers to two broad ways in which a teacher can directly instruct learning strategies, namely by means of implicit and explicit direct instruction (Kistner et al., 2010, 2015). Implicit strategy instruction occurs when teachers prompt students for strategic behaviour without addressing the strategic aspect of the behaviour or when teachers act as a role model without informing the learner about the strategic significance of this behaviour (Dignath-van Ewijk, Dickhäuser, & Büttner, 2013). However, teachers describing or modeling a strategy to students does not automatically mean that students will value and use this (Paris & Paris, 2001). Therefore, it is important that teachers also explicitly explain and/or demonstrate why (i.e., declarative knowledge), how (i.e., procedural knowledge) and when (i.e., conditional knowledge) it is important to use this strategy and how this can improve their performance (Kistner et al., 2010, 2015; Paris & Newman, 1990). Students should know that they are in fact learning a new SRL strategy, and should discuss on how to use, monitor and evaluate this (Kistner et al., 2010).

Another way in how teachers can foster SRL is a more indirect way by creating a powerful learning environment that enables students to contribute actively to their learning process (Kistner et al., 2010; Paris & Paris, 2001; Perry et al., 2004). According to Perry and colleagues, important features of a powerful learning environment (and accordingly of high-SRL classroom practices) provide students opportunities to: (1) engage in complex, meaningful activities that extend over multiple lessons; (2) make choices about what to work on, where, and with whom; (3) control challenges by deciding, for example, how much to write, at what pace, and with what level of support; and (4) be involved in setting evaluation criteria and reviewing and reflection on their learning (Perry, 1998; Perry & VandeKamp, 2000; Perry, VandeKamp, Mercer, & Nordby, 2002; Perry et al., 2004). Perry (2013), however, adds that the tasks and instructional and social support should not be treated as static entities by the teachers. Rather, teachers need to constantly pay attention to how students work and react in order to give different students different opportunities to cultivate SRL strategies.

Despite the prominent role assigned to teachers in the research literature, teachers only rarely integrate SRL in their classroom because they face difficulties with implementing theory into practice (Kistner et al., 2010; Spruce & Bol, 2014). They mostly instruct SRL in a rather implicit way (Kistner et al., 2010) and instruct very few metacognitive strategies (Dignath-van Ewijk et al., 2013). Considering that direct explicit instruction is positively correlated with performance gains in students (Kistner et al., 2010), and the role of metacognition is referred to as the most important skill in SRL (Muijs et al., 2014; Schraw et al., 2006), it is of utmost importance that teachers do learn how to instruct all components of SRL more explicitly. In addition, the learning environment is equally meaningful since

it indirectly helps to create opportunities to practice the application of strategies (Paris & Paris, 2001). Therefore, teachers' promotion of SRL should involve both direct and indirect instruction (Dignath-van Ewijk et al., 2013). More specifically, Perry (2013) beliefs that high SRL classrooms should additionally have a teacher that also offers explicit instruction, extensive scaffolding and the explicit support and structure needed in order to increase the likelihood that students will eventually use the SRL strategies they learn.

Gaining insight into how competent teachers feel implementing both direct (i.e., explicit and implicit) and indirect instruction (i.e., creating a powerful learning environment) could provide the current research field with valuable information to explain the rather limited occurrence or nonappearance of class practices that promote SRL, as research indicates that teachers' feelings of competence are linked to their actual classroom behaviour (Bandura, 1997). In this respect, lacking the feeling of competence to effectively activate students' SRL can be a significant barrier to actual SRL classroom realizations (Peeters et al., 2014). According to Bandura (1977), self-efficacy is defined as the judgement of one's own feeling of competence to reach a certain goal. Therefore, self-efficacy can be regarded as the cognitive assessment of one's ability to perform and bring about desired outcomes (Choi, 2005).

Teacher self-efficacy

A way to investigate teachers' feeling of competence in implementing self-regulated learning is by examining their self-efficacy beliefs.

The concepts *teacher efficacy* and *teacher self-efficacy beliefs* have been used interchangeably in the international education-related research literature (Dellinger, Bobbett, Olivier, & Ellett, 2008). In the present study, we will use Bandura's (1977) original definition, based on social cognitive theory, and define teachers' self-efficacy as "teachers' individual beliefs about their own abilities to successful perform specific teaching and learning tasks within the context of their own classrooms" (Dellinger et al., 2008, p. 751). This definition implies that a teacher's beliefs about his/her own abilities can vary according to specific tasks, the level of quality, and across different situations (Dellinger et al., 2008). When introducing this definition, we will always refer to the term "teacher self-efficacy" and not "teacher efficacy".

The importance of teachers' self-efficacy is threefold. First, teachers' self-efficacy beliefs affect teachers' emotions on the job. According to Skaalvik and Skaalvik (2007, 2010), it is positively related to job satisfaction and negatively to teacher burnout. Second, teachers' self-efficacy is further strongly related to teacher behaviour and the adoption of new practices and innovations in schools (Bandura, 1997; Berman & Mclaughlin, 1978; Skaalvik & Skaalvik, 2007; Tschannen-Moran & Hoy, 2001; Woolfolk, Rosoff, & Hoy, 1990). Third, teachers' self-efficacy may positively affect student learning in the end (Dellinger et al., 2008; Skaalvik & Skaalvik, 2007; Tschannen-Moran, Hoy, & Hoy, 1998) as teachers with a high sense of instructional efficacy spend more time and effort to students with learning difficulties in order to help them succeed (Bandura, 1997; Gibson & Dembo, 1984). In the current study, the implementation of SRL is considered a pedagogical innovation which can only be realized when teachers change their way of teaching accordingly (Bakkenes, Vermunt, & Wubbels, 2010). Consequently, a way to help teachers change their classroom practice is by providing them opportunities to incorporate self-efficacy beliefs (Ertmer, 2005). A way to achieve this is by providing a strong supervisory support in schools by, for instance, a strong instructional leader or collegial support (Skaalvik & Skaalvik, 2010). Teachers with higher perceived self-efficacy beliefs are more likely

to select complex and challenging tasks and to experiment and be creative in classroom practice (Tschannen-Moran & Hoy, 2007).

In conclusion, high self-efficacy beliefs of teachers may influence student performance through teachers' emotions and behaviour. Since self-efficacy is closely related to all of these constructs, it has increasingly been used in theoretical models as an explanatory variable in research on teachers' implementation of SRL (Dignath-van Ewijk & van der Werf, 2012; Kramarski & Revach, 2009; Peeters et al., 2014; Perry & VandeKamp, 2000). In the present study, we join in this line of reasoning and consider teachers' self-efficacy as an important variable in the implementation of SRL. We wanted to make this statement even more clear by developing a teacher self-efficacy scale explicitly focusing on the implementation of SRL strategies.

Teacher self-efficacy scales

Teacher self-efficacy has been measured using various different instruments and scales (Skaalvik & Skaalvik, 2007; Tschannen-Moran et al., 1998). There is, however, no common agreement on how teacher self-efficacy scales should be constructed (Skaalvik & Skaalvik, 2010). Some researchers tried to construct more general teacher self-efficacy scales in order to have measures that are not tied to specific situations or behaviour (e.g., Gibson & Dembo, 1984; Sherer et al., 1982). More recently, however, this approach has been criticized by Bandura (2006), arguing that these self-efficacy scales are too general. According to Bandura (1997, 2006), teacher self-efficacy scales must be tailored to the distinct domain of instructional functioning as it is a domain-specific construct (Usher & Pajares, 2008). This makes it possible for researchers to select the scales that are most relevant for the research they want to conduct. In this respect, Bandura (1997, 2006) describes two benefits related to more specific teacher self-efficacy scales. On the one hand, it identifies the difficulties teachers face in certain domains. On the other hand, it creates more predictive power in measuring to what degree teacher self-efficacy contributes to other constructs (e.g., teacher behaviour, students' academic attainments). Therefore, we believe it is important to develop a separate measure for the construct of SRL, that takes the specific characteristics of SRL into account and that adds an extra meaning to general self-efficacy measures. Moreover, we think it is also relevant to explore its predictive power.

Teacher self-efficacy for implementing self-regulated learning

As mentioned above, there is no common agreement about how specific a teacher self-efficacy scale should be (Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2001). Tschannen-Moran and Hoy (2001) give the example of self-efficacy for teaching mathematics. In this respect, a researcher can construct an even more specific scale assessing teacher self-efficacy for teaching algebra or even teacher self-efficacy for teaching quadratic equations. The question raises, however, whether these last options are one step too far in gaining specificity.

As to teachers' implementation of SRL in daily class practice, we argue that this is in fact a useful domain that is neither too broad nor too narrow, to construct a separate teacher self-efficacy measure for. First, the most useful level of specificity depends on the purpose of the research (Bandura, 1977; Tschannen-Moran et al., 1998). The influence of teacher self-efficacy has been investigated in research on teacher differences in promoting students' SRL (e.g., Chatzistamatiou, Dermitzaki, & Bagiatis, 2014; Dignath-van Ewijk, 2016). Nevertheless, with the exception of the recent contribution of Dignath-van Ewijck (2016), who tailored an existing scale (the Teacher-Self-Efficacy scale by Schmitz and Schwarzer, 2000) to the context of SRL, no theory-driven instrument particularly constructed in view of measuring teachers' feelings of competence regarding SRL implementation

exists yet. We, however, believe that the recently adapted instrument of Schmitz and Schwarzer (2000) to the SRL setting by Dignath-van Ewijck (2016), strengthens the fact that researchers are indeed looking for and in need of a specific teacher self-efficacy SRL scale.

Second, it is widely accepted that SRL is an important student quality to pursue in education, as it is highly associated with students' academic success (e.g., Kramarski et al., 2013). As a result, SRL is often structurally included in school curricula and therefore a distinct domain to instruct in class. For example, in Flemish (Belgium) primary education, SRL is incorporated in educational practice through the cross-curricular attainment targets 'learning to learn' (Flemish Department of Education, 2014). In the Netherlands, SRL is considered a characteristic as well as a goal under the umbrella concept 'the new learning' (Oostdam, Peetsma, Derriks, & Van Gelderen, 2006).

Third, SRL can be considered a distinct domain of instructional practice, in which teachers can have different feelings of competence than for, for instance, mathematics or reading instruction. According to James and McCormick (2009), the present challenge for teachers is to focus on two things: teaching subject matter and teaching how to learn the ideas and practices of this subject matter. The latter requires teachers to acquire new knowledge about how to do this, which makes teaching SRL a distinct way of thinking and teaching, next to teaching subject matter. In this respect, teachers can develop a certain degree of self-efficacy in teaching mathematics, but do not achieve this degree of self-efficacy in teaching students how to effectively learn the subject matter itself. While both are equally important in teaching and instruction (James et al., 2008), teachers can feel differently about teaching subject matter and teaching how to learn this, consequently each should have its own self-efficacy scale to capture teachers' feeling of competence.

The present study

In the present study, we focus on the implementation of SRL in primary schools and more specifically on teachers' perceived ability to successfully integrate activities promoting SRL in their daily classroom practices. Recent studies agree on the fact that SRL should be implemented from primary school on, as children in this age group already show capabilities to self-regulate their learning activities (Martinez-Pons, 2002; Perry, 1998; Perry et al., 2004; Perry & VandeKamp, 2000).

The first goal of this study is to develop an instrument measuring teachers' self-efficacy beliefs about implementing SRL in everyday practice and exploring its underlying structure, since to our knowledge such a specific and theory-driven scale is currently lacking. It is relevant to construct a scale measuring teachers' self-efficacy beliefs about implementing SRL since (1) the implementation of SRL in classrooms is considered an important and distinct domain of functioning, which requires teachers to change their way of teaching accordingly (James & McCormick, 2009) and (2) it is important that self-efficacy scales are adjusted to the activity domains these want to assess (Bandura, 2006). This type of refinement to domains of instructional practice has two benefits. On the one hand it can increase predictability and on the other hand it may reveal patterns of strengths and limitations in the measured domain (i.e., SRL) (Bandura, 2006).

The second goal of this study is to verify whether a teacher self-efficacy scale on promoting SRL strategies is conceptually different from an existing scale measuring teacher self-efficacy in more general and customary classroom activities. In this respect, the following research objectives are tackled in this study:

> RO1: We aim to develop a reliable self-report questionnaire to comprehensively assess teachers' self-efficacy regarding the implementation of direct (i.e., both explicit and implicit) and indirect instruction (i.e., creating a powerful learning environment) in SRL.

RO2: We aim to distinguish SRL as a distinct instructional domain in classroom practice, wherein teachers can have different feelings of self-efficacy than in other more general instructional domains. We particularly want to investigate whether descriptives of the newly constructed teacher self-efficacy scale on SRL compared to a more general teacher self-efficacy scale (i.e., correlations between and mean scores of both measures), show a clear distinction between the construct of SRL and general instructional strategies.

RO3: Lastly, we aim to examine the predictive validity of the newly constructed scale by exploring its relation to teachers' self-reported SRL implementation. Moreover, we want to explore the possible difference in predictability with a more general teacher self-efficacy scale, not tailored to a specific teaching domain.

Method

Data collection

A random selection of primary schools in the region of Flanders (Belgium) was invited to participate in a large-scale study about the implementation and promotion of SRL in primary schools. After the school leader gave permission to participate at this study, teachers received an e-mail with the question to complete an online questionnaire about their implementation of SRL and about their self-efficacy.

The online platform LimeSurvey was used. Informed consent was obtained from all participants. In the online questionnaire, all three instruments on SRL implementation were given in one sitting and in the following order: SRL implementation, teacher self-efficacy, teacher self-efficacy for SRL. Data were collected in a total of 44 Flemish primary schools. A total of 331 teachers completed the questionnaire. The sample included 81.3% female and 18.7% male teachers. The average age was 38.65 years (*SD* = 10.04), ranging from 21 to 61 years. Teachers' average experience in education was 16.4 years (*SD* = 10.37), ranging from 0 to 40 years. Seven questionnaires showed missing values (i.e., 1.9% of the gross total). Because of this small amount of missing data, imputation was unnecessary.

Instruments

Teacher self-efficacy. First, we used the Ohio State Teacher Efficacy Scale (OSTES) by Tschannen-Moran and Hoy (2001). The OSTES is a teacher self-efficacy scale assessing a broad range of capabilities, which are considered important by and for teachers. In this study, we used the short version of the scale. It consists of three subscales: Efficacy for Instructional Strategies (SE_IS, 4 items; exemplary item: "How well can you use a variety of assessment strategies?"), Efficacy for Classroom Management (SE_CM, 4 items; exemplary item: "How well can you control disruptive behaviour in the classroom?") and Efficacy for Student Engagement (SE_SER, 4 items; exemplary item: "How well can you get students to believe they can do well in schoolwork?"). According to the authors, the OSTES is useable across different contexts, educational levels, and subjects (Tschannen-Moran & Hoy, 2001), which makes it a general scale to measure teacher self-efficacy. We adapted the original 9-point scale of the OSTES to a five-point Likert scale ranging from 1 (cannot do at all) and 5 (highly certain can do), to ensure uniformity with the new instrument we developed for the purpose of this study.

To examine the factorial structure of the OSTES, we conducted confirmatory factor analysis (CFA) using Mplus 7.4 (Muthén & Muthén, 2015). We used five fit indicators: the $\chi 2$ test, the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA) and the standardized root mean residual (SRMR). The ratio $\chi 2/df$ should be as small as possible for a good fit. We evaluated this according to the following fit indices: ≤ 2 indicates a good fit; ≤ 3 an acceptable fit (Schermelleh-Engel & Moosbrugger, 2003). For the CFI and the TLI, we put a critical value of .90 forward as a reasonable fit, a fit larger than .95 is good (Hu & Bentler, 1999). For the RMSEA a fit between .06 and .08 is reasonable, a fit below .06 is good (Hu & Bentler, 1999). Lastly, an

SRMR value below .08 indicates an acceptable fit (Hu & Bentler, 1999). The results of the CFA suggest an acceptable to good fit of the model ($\chi 2/df = 2.27$, CFI = .95, TLI = .94, RMSEA = .06, SRMR = .05).

Teacher self-efficacy for SRL. Second, we explicitly aimed at designing a new instrument measuring self-efficacy in SRL implementation. In order to map teachers' self-efficacy beliefs, we developed the Teacher Self-Efficacy Scale to implement Self-Regulated Learning (TSES-SRL). According to Bandura (2006), a sound efficacy scale relies on a good conceptual analysis of the domain of functioning. Therefore we formulated 24 items based on the abovementioned theoretical studies on implementing self-regulated learning in educational practice (Kistner et al., 2010; Perry, 1998; Perry et al., 2002, 2004; Perry & VandeKamp, 2000). The items cover both main components of implementing SRL as described by Kistner et al. (2010): direct (implicit and explicit) instruction and indirect instruction. The first 8 items refer to direct instruction, while the following 16 items reflect four important principles of indirect instruction and features of a high-SRL learning environment as described by Perry and colleagues (Perry, 1998; Perry et al., 2002, 2004; Perry & VandeKamp, 2000). More concretely, the items on indirect instruction question teachers on their competence regarding how well they feel they can (1) provide student choice in the classroom, (2) provide students control over challenge, (3) design complex and meaningful tasks and (4) incorporate student self-evaluation. Following Perry (2013), we stress that both the items on direct as indirect instruction are equally important regarding the implementation of SRL in the classroom. An expert panel on the topic of SRL revised the items and verified whether word formulations and statements were clear for teachers. Respondents were asked to rate the 24 items on a five-point Likert-scale (1 = cannot do at all, 2 = can do limitedly, 3 = can do moderately, 4 = can do certainly, 5 = highly certain can do).

Since self-efficacy is concerned with perceived ability, the items predominantly contain the verb 'can' in order to make clear that the scale is about feelings of personal competence (Bandura, 2006; Skaalvik & Skaalvik, 2010). The term 'self-regulated learning strategies' was explained and clarified at the onset of the questionnaire to ensure that teachers would understand the SRL concept as meant by the researchers. Above this, we used a nondescriptive title ("Teaching practice"), rather than the concept self-efficacy itself, to minimize response bias (Bandura, 2006). The complete instrument is presented in Appendix A.

SRL implementation. Third, to explore the predictive validity of the scale, we also surveyed the teachers on their self-reported implementation of SRL in the classroom. We used the Self-Regulated Learning Inventory for Teachers (SRLIT) (Lombaerts et al., 2007). This scale consists of three subscales, namely SRL implementation in the foretought phase, the performance control phase and the self-reflection phase of the learning process (exemplary item: "Students determine the order in which they complete their tasks"). Items were rated on a six-point Likert scale ranging from never (0) to always (5). We conducted CFA on the original 24 items of the scale and eliminated three items due to bad model fit and allowed three pairs of items to correlate based on conceptual relatedness and similar wording (Harrington, 2009; Vanblaere & Devos, 2015). CFA results on the final 21 items show an acceptable to good fit ($\chi 2/df = 2.2$, CFI = .94, TLI = .93, RMSEA = .06, SRMR = .05). Reliability (Bentlers' ρ) of the subscales is respectively .85, .83 and .87.

Data analysis

In view of research objective 1, exploratory factor analysis (EFA), CFA and reliability analysis were used to study the structure of the developed questionnaire. In order to conduct these analysis, the total sample was randomly divided in two subsamples. The first subsample comprised of 166 teachers, including 81.9% female and 18.1% male teachers. Their average age was 38.12 years (*SD* = 10.12), ranging from 21 to 61 years. The average educational experience was 15.9 years (*SD* = 10.32),

ranging from 0 to 40 years. The second subsample consisted of 165 teachers, with 80.6% female and 19.4% male teachers. The average age here was 39.19 years (*SD* = 9.95), ranging from 21 to 58 years and the average experience in education was 16.9 years (*SD* = 10.44), ranging from 0 to 38 years. Both samples were statistically compared to ensure their comparability as to teachers' background characteristics. In this respect t-tests were used to compare age and years of experience in education. No significant differences were found for age ($t_{(322)}$ = 0.957, p = .751) nor for years of educational experience ($t_{(323)}$ = 0.861, p = .329) between both subsamples. Further, a chi-square test was calculated to observe the distribution of gender between both subsamples. Also no significant differences were found in this respect ($\chi 2_{(1)}$ = .095, p = .758). We can conclude that both subsamples are not significantly different from each other regarding teachers' age, years of experience in education, and gender.
In view of scale construction and validation, we used subsequent steps. First, we performed EFA on the first subsample and CFA on the second subsample to reveal the underlying structure of the questionnaire. Second, reliability analysis was performed to determine the internal consistency of the scale.

In view of research objective 2, correlational analysis was performed to examine the relationship between the SRL-specific TSES-SRL and the OSTES, a more general teacher self-efficacy scale by Tschannen-Moran and Hoy (2001). Moreover, we compared the descriptive statistics of both scales in search for potential differences between participants' answers to justify that SRL can be considered a distinct domain of instruction. Before interpreting the descriptive data, we conducted paired samples t-tests on all the subscales of the OSTES and the TSES-SRL to verify whether the means of both scales can be considered significantly different. Results show that all means of all subscales are significantly different from each other.

To examine research objective 3, we tested the predictive validity of the TSES-SRL by exploring the relationship between the TSES-SRL, OSTES and teachers' self-reported SRL implementation by conducting (multiple) regression analysis.

Results

Exploratory factor analysis

EFA was conducted in SPSS 22.0 on the data of the first subsample (n = 165) to investigate the structure of the 24 items. We used maximum-likelihood extraction with promax rotation. In order to determine the number of factors to retain, parallel analysis was used. Items were removed when their factor loadings were lower than 0.30, as these are considered poor loadings (Tabachnick & Fidell, 2007), and when loading higher than 0.30 on two or more factors.
A first analysis showed a four-factor solution. In this solution, direct instruction is seen as a factor on its own, without distinguishing explicit and implicit instruction. Indirect instruction is divided into three different factors. Three items were deleted due to high loadings across factors or low communality loadings (item 8, item 20, item 24). Item 8 ("How well can you give feedback to your students at the times they use self-regulated learning strategies (i.e., at the moment of use itself, not afterwards)") and item 20 ("How well can you present larger tasks that take several lessons to work on?") had low loadings on all factors. Item 24 ("How well can you involve your students in the preparation of the evaluation criteria for tasks or tests?") also loaded on factor 2, which is justifiable as factor two contains all items on providing student choices and item 24 deals with providing choices in setting individual evaluation criteria.

A second analysis with the remaining 21 items again resulted in a four-factor solution. Table 1 shows the rotated loadings of this exploratory factor analysis. The first factor describes direct instruction and assesses teachers' feelings of competence to apply both implicit and explicit direct instruction in class (i.e., "Teacher self-efficacy for direct instruction"). The remaining three factors describe indirect instruction and reflect "Teacher self-efficacy for providing choices" (factor 2),

"Teacher self-efficacy for providing challenges and complex tasks" (factor 3), and "Teacher self-efficacy for building in evaluation" (factor 4). We can theoretically support the retention of these four factors as these align with the above described theory of direct and indirect instruction (Kistner et al., 2010; Perry, 1998; Perry et al., 2002, 2004; Perry & VandeKamp, 2000). However, providing challenge and engaging in complex, meaningful activities is grasped in only one factor in the TSES-SRL. This is not supported by theory of Perry and colleagues. Nevertheless, we support the combination of these two characteristics because this can be explained by the fact that providing challenge by deciding how much, where, and with what level of support, can be done by using more or less complex and challenging tasks.

Table 1

Rotated results of the exploratory factor analysis (EFA) of the first subsample (*n* = 166)

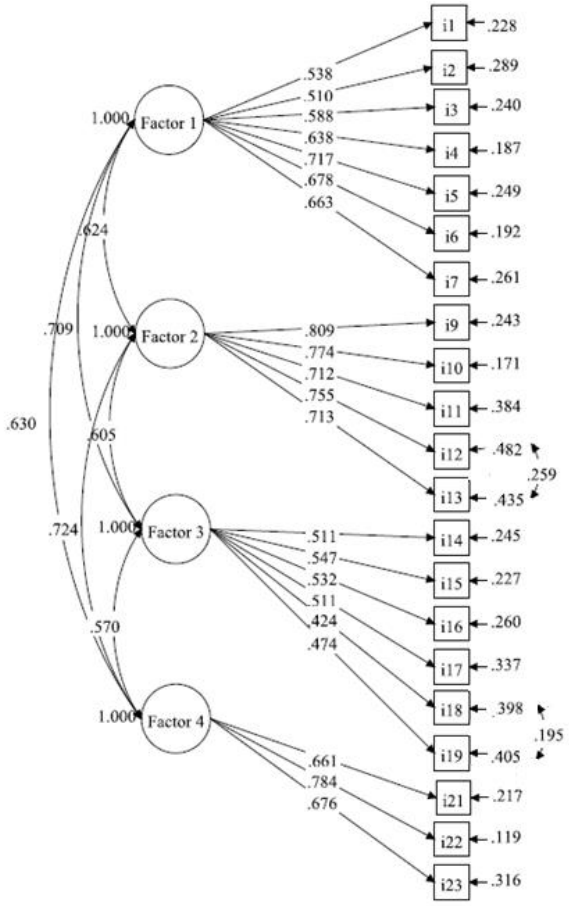
Item number	Item description	Factor 1	Factor 2	Factor 3	Factor 4
Item 1	How well can you demonstrate self-regulated learning strategies (i.e., without for example explicitly explaining the how and the why of the strategy)?	.56			
Item 2	How well can you express your thought process aloud when demonstrating self-regulated learning strategies?	.54			
Item 3	How well can you encourage your students to use self-regulated learning strategies (for instance by asking open-ended questions)?	.59			
Item 4	How well can you teach your students which self-regulated learning strategies exist?	.73			
Item 5	How well can you inform your students about the importance and usefulness of self-regulated learning strategies?	.86			
Item 6	How well can you teach your students how to use and apply different self-regulated learning strategies?	.86			
Item 7	How well can you teach your students when and in what situations they can use and apply self-regulated learning strategies?	.80			
Item 9	How well can you make decisions with your students about what they learn?		.63		
Item 10	How well can you allow your students to make their own choices about the goals and expectations they set for themselves?		.60		
Item 11	How well can you make decisions with your students about with whom they learn?		.71		
Item 12	How well can you make decisions with your students about where they learn?		1.06		
Item 13	How well can you make decisions with your students about when they learn?		.81		

Item 14	How well can you provide your students just enough support so they can work independently?	.35	
Item 15	How well can you challenge your students to achieve more than they initially thought (e.g., by determining with what additional help they can solve an exercise)?	.46	
Item 16	How well can you adapt tasks and learning content so that they are sufficiently challenging for individual students?	.70	
Item 17	How well can you present challenging exercises that can be solved in different ways?	.67	
Item 18	How well can you apply new learning content in a meaningful, authentic context?	.91	
Item 19	How well can you present new learning content in different contexts, so students can look at it from different angles?	.71	
Item 21	How well can you let your students evaluate their own tasks?		.78
Item 22	How well can you let your students reflect on their own learning process?		.97
Item 23	How well can you let your students give feedback on the work of others?		.77

Confirmatory factor analysis

A CFA was conducted on the second sample (n = 165), to evaluate the significance of the scale and the stability of the four-factor structure. Statistical analysis was conducted in Mplus 7.4 (Muthén & Muthén, 2015). The results of the CFA suggests a good fit of the model based on the ratio $\chi 2/df$ ($\chi 2$ = 358.5, $\chi 2/df$ = 1.98, $p < 0.001$), and an adequate fit between the hypothesized model and the observed data based on the other fit indices (CFI = .92, TLI = .91, RMSEA = .08, SRMR = .06). As figure 1 illustrates, we allowed the residuals of two pairs of items (item 18 and 19, and item 12 and 13) to correlate based on conceptual relatedness and similar wording (Harrington, 2009; Vanblaere & Devos, 2015). Figure 1 further shows the standardised estimates between the factors and the items.

Figure 1. Results of the confirmatory factor analysis: standardised pattern coefficients for the four factors.



We also tested here whether the four sub scales of the TSES-SRL could be represented as indicators of one overall latent factor regarding self-reported promotion of SRL. We conducted a second-order CFA analysis to test the fit. This resulted in an adequate to good fit based on the model fit indices ($\chi2 = 370.749$, $\chi2/df = 2.03$, $p < 0.001$, CFI = .92, TLI = .90, RMSEA = .08, SRMR = .07). Results supported the representation of the three subscales as one general latent factor while still emphasizing its multidimensionality and allowing for domain-specific variability (Geiser, 2013).

Reliability analysis

Reliability analysis was performed on the complete data set (*n* = 331) to examine the internal consistency of the four factors. As we use different domains of efficacy, item homogeneity within each of the domain-relevant factor is necessary (Bandura, 2006). Model-based internal consistency coefficients were computed for each subscale (Bentler, 2009) and are depicted in table 2. The scales were all found to be highly reliable (all Bentlers's $\rho \geq .80$). The mean scores indicate that teachers feel moderately to certainly competent to apply direct instruction (*M* = 3.29, *SD* = 0.61) and certain elements of indirect instruction, namely providing challenges and complex tasks (*M* = 3.53, *SD* = 0.54) and building in evaluation (*M* = 3.25, *SD* = 0.76). They however feel less than moderately competent to provide students with choices regarding what, where, when, and with whom to learn (*M* = 2.72, *SD* = 0.82).

Table 2

Bentler's ρ and descriptive statistics for the four TSES-SRL scales and the three OSTES scales for the total sample (*n* = 331)

	ρ	*M*	*SD*

Teacher self-efficacy for SRL			
(1) Teacher self- efficacy for direct instruction	.91	3.29	0.61
(2) Teacher self- efficacy for providing choices (indirect instruction)	.87	2.72	0.82
(3) Teacher self-efficacy for providing challenges and complex tasks (indirect instruction)	.80	3.53	0.54
(4) Teacher self-efficacy for building in evaluation (indirect instruction)	.88	3.25	0.76
Teacher self-efficacy			
(1) Teacher self- efficacy for instructional strategies (SE_IS)	.68	3.73	0.49
(2) Teacher self- efficacy for student engagement (SE_SE)	.74	3.64	0.52
(3) Teacher self-efficacy for classroom management (SE_CM)	.86	3.90	0.59

Notes. Means were measured on a five-point Likert scale ranging from 1 to 5.

Relationship with the OSTES

In order to demonstrate the specific and distinctive nature of the TSES-SRL, we compared it to the more general OSTES. On the one hand, we explored the correlation patterns between both instruments (see Table 3) and on the other hand, we examined mean scores and standard deviations. We consider correlations between 0.20 and 0.39 to be weak and correlations between 0.40 and 0.59 moderate (Evans, 1996).

Table 3

Correlation patterns among the OSTES (short version) and the TSES-SRL

	Direct instruction	Choices (indirect instruction)	Challenges and tasks (indirect instruction)	Evaluation (indirect instruction)
SE_IS	.43*	.23*	.42*	.31*
SE_SE	.25*	.20*	.30*	.26*
SE_CM	.24*	.10*	.26*	.17*

Notes. *p ≤ .05, SE_IS = teacher self-efficacy for instructional strategies, SE_SE = teacher self-efficacy for student engagement, SE_CM = teacher self-efficacy for classroom management

The overall weak correlations between both instruments suggest that they capture and describe different concepts. The moderate correlations between Self-efficacy for Instructional Strategies (SE_IS) and Teacher self-efficacy for direct instruction (.43) and Teacher self-efficacy for providing challenges and complex tasks (.42) advert to related concepts, although the overlap is clearly far from perfect. Nevertheless, we can theoretically justify the moderate correlations. The items in the SE_IS contain questions about the use of evaluation strategies (e.g., “To what extent can you use a variety of assessment strategies”), using different teaching methods (e.g., “How well can you implement alternative strategies in your classroom”), asking questions to students (e.g., “To what extend can you craft good questions for your students”), and explaining difficult concepts (e.g., “To what extent can you provide an alternative explanation for example when students are confused”). These items are also relevant when implementing SRL in the classroom as involving assessment and evaluation and adapting classroom activities to students’ needs by using different methods and asking questions can be considered important characteristics of a powerful learning environment (Perry, 1998; Perry et al., 2002, 2004; Perry & VandeKamp, 2000).

Table 2 shows Bentler's ρ and descriptive statistics for the three OSTES scales. When comparing this to the Bentler's ρ and descriptive statistics for the TSES-SRL, the following can be concluded. First, except for teacher self-efficacy for classroom management, the Bentler's ρ of all TSES-SRL subscales are higher than those of the OSTES. This implies that the TSES-SRL is in no way inferior to the widely used OSTES regarding internal consistency, on the contrary. Second, the mean scores for the OSTES subscales are overall higher, suggesting that teachers feel more competent implementing general instructional strategies, managing the classroom and engaging students than implementing SRL strategies. Comparisons also show higher standard deviations in the TSES-SRL for teacher self-efficacy for providing choices (0.82) and teacher self-efficacy for building in evaluation (0.76), suggesting that some teachers feel more competent in promoting these SRL characteristics than others. Lastly, except for teacher self-efficacy for providing challenges and complex tasks, the standard deviations of the OSTES subscales are smaller than those of the TSES-SRL, suggesting more agreement in feelings of competence among teachers.

Predictive validity

As the TSES-SRL is based on universally used theory and literature on SRL (Kistner et al., 2010; Perry, 1998; Perry et al., 2002, 2004; Perry & VandeKamp, 2000), we believe the instrument can be useful for other researchers who want to investigate teachers' self-efficacy beliefs on the level of SRL, in order to increase predictability in theoretical models regarding characteristics potentially influencing SRL (Bandura, 2006). Therefore, we explored the predictive validity of the TSES-SRL using (multiple) regression analysis. Additionally, our aim is to compare the difference with a general scale, the OSTES.

We performed a two-step procedure. First, we modelled the relationship between teacher self-efficacy and teachers' self-reported SRL implementation. Second, we added teacher self-efficacy for SRL to the equation to explore a possible shift in effects. Table 4a lists the regression coefficients of the first model, table 4b of the second model.

Table 4a

Regression analysis with self-reported SRL implementation as dependent variable and teacher self-efficacy as independent

Variables	B	SE B	β	t
(Constant)	-.52	.20		-2.65**
Teacher self-efficacy [a]	.87	.06	.63	14.49**
F	33.46**			
R^2	.093			
Adjusted R^2	.090			

Table 4b

Multiple regression analysis with self-reported SRL implementation as dependent variable and teacher self-efficacy and teacher self-efficacy for SRL as independent variables

Variables	B	SE B	β	t
(Constant)	-.37	.30		-1.24
Teacher self-efficacy [a]	-.06	.09	-.03	-.63
Teacher self-efficacy for SRL [b]	.89	.07	.64	12.75**
F	104.99**			
R^2	.394			
Adjusted R^2	.390			

Notes. * p < .05, **p < .01, [a] measured with OSTES, [b] measured with TSES-SRL

The results of the first regression analysis (table 4a) show that teacher self-efficacy is significantly related to self-reported SRL implementation, indicating that teachers with higher teacher self-efficacy are expected to implement SRL more in the classroom ($\beta = .63$, $p < .001$). However, this effect nullifies ($\beta = -.03$, $p = .528$) when teacher self-efficacy for SRL is added to the model (table 4b). Teacher self-efficacy for SRL is strongly and positively associated with SRL implementation ($\beta = .64$, $p < .001$).

Discussion

Teacher self-efficacy is a domain-specific construct and up until now, no research to our knowledge has tried to grasp the concept of teacher self-efficacy in the domain of SRL. Nevertheless, the concept of SRL is considered an important educational goal by researchers, also in primary education, and an essential role to implement and promote this is given to the teacher. Therefore, it is important that teachers feel competent and capable to do so. The purpose of this study was (1) to develop an instrument to measure teachers' self-efficacy beliefs regarding the implementation of self-regulated learning in the classroom (RO1) and (2) to verify whether SRL can be considered as a specific and distinct domain, justifying the need for a distinct teacher self-efficacy measure (RO2). This twofold aim resulted in the development of the Teacher Self-Efficacy Scale to implement Self-Regulated Learning (TSES-SRL). Finally, this paper explored the predictive validity of the TSES-SRL in relation to teachers' reported use of SRL strategies (RO3).

As to the first research objective, this study was able to develop and validate a self-report questionnaire tapping into teachers' self-efficacy regarding the implementation of SRL strategies. The TSES-SRL more particularly contains a four-factor structure with an adequate to good fit and high reliability. Additionally, second-order factor analysis confirms that also the total scores can be used to assess teacher self-efficacy for SRL. However, the fit did not improve. Therefore, in order to maintain the complexity that entails SRL implementation and because we believe it is more interesting to use the scale as a reflection tool (further described in recommendations for future research), it is preferred to use the subscale scores. The TSES-SRL fills in the gap of non-existent teacher self-efficacy scales on the implementation of SRL and can consequently be useful for all research in this educational domain. The current research shows that teachers feel moderately to positively competent to implement direct instruction, to provide challenges and complex tasks to students, and to build in evaluation. However, they feel uncertain as to providing students with choices regarding their learning process. The distinct results in the different scales make clear that the TSES-SRL discloses patterns of strengths and weaknesses in teachers' feeling of self-efficacy regarding the implementation of SRL (Bandura, 2006), which indirectly implies as well that the TSES-SRL might indicate strengths and weaknesses in the actual implementation of SRL.

As to research objective two, the present study was also able to construct a teacher self-efficacy scale that is distinctly different from the OSTES, a more general teacher self-efficacy scale (Tschannen-Moran & Hoy, 2001). Comparisons between the TSES-SRL and the OSTES point out that teachers feel less competent to instruct SRL strategies than to instruct the more general instructional strategies, incorporated in the OSTES. This is not so surprising as the OSTES describes the most frequent activities within a teachers' work life (Tschannen-Moran & Hoy, 2001), which are in our opinion representative for a more evident, well-known way of teaching. The OSTES does not take into account the more recent challenges teachers face in teaching students how to learn and in making learning explicit (James & McCormick, 2009). In comparison, the TSES-SRL measures the innovation of teaching students how to learn, in which teachers may feel less confident as it is considered a new way of teaching (Oostdam et al., 2006). Comparisons of the standard deviations of the subscales of both instruments further show that teachers differ more in their self-efficacy regarding the implementation

of SRL strategies, implying that some teachers are very familiar with instructing SRL, while others are absolutely not.

Regarding research objective 3, the present study found that the TSES-SRL is positively and strongly related to teachers' self-reported SRL implementation. Furthermore, the results show that the TSES-SRL is more strongly related to self-reported SRL implementation than the OSTES. Consequently, these results are a strong argument for the predictive validity for the TSES-SRL. From a theoretical and educational point of view, this means that the use of the TSES-SRL is valuable due to multiple reasons. First, it will possibly create more predictive power in theoretical models about constructs related to SRL implementation (Bandura, 2006). Second, as teacher self-efficacy is strongly related to teaching behaviour (Bandura, 1997), specific attention to all the subscales of the TSES-SRL, can prepare teachers better to tackle the complex interplay of all instruction strategies that SRL implementation entails.

Some limitations should be mentioned with regard to the validation of the TSES-SRL. First, the application of the TSES-SRL is limited by its focus on SRL. However, we believe that the TSES-SRL could easily be adapted to be field specific (e.g., teacher self-efficacy for implementing SRL during mathematics) as it is possible that teachers feel differently about teaching important SRL strategies in different subjects. Moreover, this creates the possibility to further investigate differences in the implementation of SRL within different subjects as research on this is currently lacking.

Second, the validation of the scale was conducted on a moderate number of teachers, resulting in rather small subsamples. Factor analysis on larger samples may be beneficial for the model fit, as these samples lead to more generalizable results (Osborne & Costello, 2005). Furthermore and related to this, we acknowledge that the current construction of the instrument is the result of just one data collection in primary schools. Repeated scale-testing with a new data set, potentially in various different educational contexts (e.g., secondary education, higher education), is therefore wanted and important as we believe that the items of the TSES-SRL can probably be used in these contexts without adaptations. The items are not specifically tailored to primary education.

Third, in order to validate the uniqueness of the TSES-SRL, we contrasted it with a more general teacher self-efficacy scale, the OSTES. We used this questionnaire as it is probably the most widely used instrument to measure teacher self-efficacy and definitely the instrument featured in 'the most cited article with a focus on teacher efficacy in teaching and teacher education' (i.e., 451 citations in 2014) (Kleinsasser, 2014, p. 170). Exploring relationships (i.e., correlations, comparisons of descriptives) of the TSES-SRL with other frequently used teacher self-efficacy scales would strengthen the argument that the TSES-SRL is a scale with a unique kind of teacher self-efficacy that currently cannot be measured by existing instruments. Lastly, we acknowledge the need to further investigate the external and construct validity of this instrument with teachers in different educational settings and in different cultures or countries. After testing the instrument in the Flemish context (Belgium), we can confirm that the TSES-SRL is a useful instrument, but recognize that this still needs to be tested and confirmed in other educational contexts.

Fourth, all measures used in this study are self-report questionnaires in a cross-sectional design, which have two important limitations. On the one hand, the answers could be biased by the way teachers felt at the time they filled out the survey. For instance, teachers who were discouraged by their instruction (e.g., because of a certain recent event) at the time of administration, might have answered more negatively than they normally would on the scales. Therefore, more research is necessary to confirm our findings within a longitudinal design in which the variables are measured at different occasions, making the results less independent from specific events. On the other hand, the implementation of SRL and the feelings regarding this implementation are measured as an aptitude because teachers were asked to generalize their actions and feelings across situations (Winne & Perry, 2000). Consequently, all references regarding SRL implementation need to be interpreted as teachers' personal assessments and interpretations and not as actual classroom behaviour. Especially regarding

measuring SRL implementation, future studies with a mixed method approach using observations in comparison with survey results could provide a more qualitative and realistic image of teachers' actual SRL implementation. More specifically, it would be very interesting to further explore the predictive validity of the TSES-SRL by relating the scale to SRL implementations as measured by observations.

In conclusion, we state the following recommendations for further application of the TSES-SRL and further research. First, this study suggests to use the TSES-SRL as a reflection tool (Lombaerts, De Backer, Engels, Van Braak, & Athanasou, 2009). Findings from the TSES-SRL might stimulate discussion about where teachers' insecurities about the implementation of SRL strategies are located. Ultimately, teachers can reflect on ideas about how to overcome them in order to eventually tackle flaws and insecurities in their current practice. For example, our study points out that teachers feel uncertain in providing choices to students. Therefore, we should support teachers and feed their competence in providing students opportunities to choose topics of their interest, choose a place to work where they feel they can concentrate better, choose "study buddies" with whom they can work together or whom they can ask for help, etc. These kinds of choices demand a higher level of students' decision making, in contrast to for example choices about which pen colour they want to use. The latter does not make them metacognitively or strategically competent (Perry, Phillips, & Hutchinson, 2006).

Secondly, we explored the relationship of the TSES-SRL, a domain-specific scale, with teachers' implementation of SRL and compared this with a different, more general scale, the OSTES. Further comparisons with other scales would be useful. Moreover, it would be interesting to see the possible relationship between the TSES-SRL and other SRL related variables, such as students' use of SRL strategies. Nevertheless, considering its predictive value for teachers' self-reported SRL implementation, we believe that the TSES-SRL is an interesting and relevant instrument to use in future SRL research.

Thirdly, since the TSES-SRL is a new instrument and a first in its category, it gives other researchers a good model to start experimenting with. Moreover, it can be refined and adapted through continued use in further research (Dellinger et al., 2008). Furthermore, we conducted our study in primary education, which makes it a useable instrument for research in this field. Future research should investigate the usefulness of the TSES-SRL within other educational levels, such as secondary education or even higher education. We believe this instrument can also be useful for research in higher school levels as the same requirements and ways of instructing SRL still apply in those higher years. However, repeated scale-testing is needed. Additionally, it will be interesting to compare whether teachers feel more or less competent regarding the implementation of SRL in these higher grades.

Finally, a large number of beginning teachers leaves the profession early (Ingersoll, 2003; Skaalvik & Skaalvik, 2016). This may be caused by low feelings of competence when facing the tough challenges in primary education, especially when thinking about the complex challenge of stimulating SRL in primary school children. Future research about the differences among preservice, beginning, and experienced teachers' self-efficacy beliefs regarding SRL will also contribute to the current literature, especially when this research is longitudinal in nature (Skaalvik & Skaalvik, 2007, 2010; Tschannen-Moran & Hoy, 2001).

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Appendix

Appendix A. Items of the TSES-SRL with instructions (translated from Dutch).

Appendix A

Items of the TSES-SRL with instructions (translated from Dutch).

Teaching practice

The following questions aim to evaluate your teaching practice regarding the **implementation of self-regulated learning** in the classroom. Self-regulated learning is a complex concept and encouraging this can occur in very different ways. Through the following questions we want to map your perceptions regarding the implementation of self-regulated learning strategies. It is certainly not our intention to see these questions as a personal evaluation of your teaching practice.

Keep this in mind when answering the following questions:
When talking about "teaching self-regulated learning strategies", we mean:

- **Cognitive learning strategies:** strategies that are used to remember, analyse, and structure information (examples: rehearsing, making a mind-map, underlining, summarizing).
- **Metacognitive learning strategies:** strategies to address tasks in a structured and planned way (examples: planning, goal setting, self-organizing and evaluating at different stages in the learning process).
- **Motivational learning strategies:** strategies that are applied to stay focused and committed to a task (examples: rewarding, doing the most fun task first, avoiding distractions).

1	2	3	4	5
Cannot do at all	Can do limitedly	Can do moderately	Can do certainly	Highly certain can do

How well can you achieve these things in your classroom?	1 2 3 4 5
1. How well can you demonstrate self-regulated learning strategies (i.e., without for example explicitly explaining the how and the why of the strategy)?	
2. How well can you express your thought process aloud when demonstrating self-regulated learning strategies?	
3. How well can you encourage your students to use self-regulated learning strategies (for instance by asking open-ended questions)?	
4. How well can you teach your students <u>which</u> self-regulated learning strategies exist?	
5. How well can you inform your students about the <u>importance</u> and <u>usefulness</u> of self-regulated learning strategies?	
6. How well can you teach your students <u>how to</u> use and apply different self-regulated learning strategies?	
7. How well can you teach your students <u>when</u> and in <u>what situations</u> they can use and apply self-regulated learning strategies?	
8. How well can you give <u>feedback</u> to your students at the times they use self-regulated learning strategies (i.e., at the moment of use itself, not afterwards)?	
9. How well can you make decisions <u>with your students</u> about <u>what</u> they learn?	
10. How well can you allow your students to make their own choices about the goals and expectations they set for themselves?	

11. How well can you make decisions with your students about with whom they learn?
12. How well can you make decisions with your students about where they learn?
13. How well can you make decisions with your students about when they learn?
14. How well can you provide your students just enough support so they can work independently?
15. How well can you challenge your students to achieve more than they initially thought (e.g., by determining with what additional help they can solve an exercise)?
16. How well can you adapt tasks and learning content so that they are sufficiently challenging for individual students?
17. How well can you present challenging exercises that can be solved in different ways?
18. How well can you apply new learning content in a meaningful, authentic context?
19. How well can you present new learning content in different contexts, so students can look at it from different angles?
20. How well can you present larger tasks that take several lessons to work on?
21. How well can you let your students evaluate their own tasks?
22. How well can you let your students reflect on their own learning process?
23. How well can you let your students give feedback on the work of others?
24. How well can you involve your students in the preparation of the evaluation criteria for tasks or tests?

Note. Struck-through items were left out of the final instrument.