

# Assessment of Self-Regulation in Ontario Secondary Schools

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*Self-regulation is positively associated with better academic, and life, outcomes. Consequently, many school systems aim to develop self-regulation, or related constructs. Thus, many teachers are asked to assess and report upon students' self-regulation (or related constructs). How secondary teachers in Ontario, Canada accomplish this task was investigated using mixed methods research. Phase 1 involved semi-structured interviews with 26 secondary teachers. The second phase of the study involved the analysis of report card data to examine large scale trends in self-regulation grades. The third phase employed an online survey whose development was informed by the interviews of the first phase. The overall findings are that Ontario secondary teachers vary in their definitions of self-regulation, but the strongest influences on teachers' self-regulation assessments are negative student behaviours. Report card data suggest that teachers struggle to assess self-regulation independently from other constructs such as initiative or collaboration. Implications for practice are discussed.*

*L'autorégulation est positivement associée à de meilleurs résultats scolaires et personnels. Par conséquent, de nombreux systèmes scolaires visent à développer l'autorégulation, ou des concepts connexes. Ainsi, on demande à de nombreux enseignants d'évaluer et de rendre compte de l'autorégulation des élèves (ou des concepts connexes). La manière dont les enseignants du secondaire de l'Ontario (Canada) accomplissent cette tâche a été étudiée à l'aide de méthodes de recherche mixtes. La première phase a consisté en des entretiens semi-structurés avec 26 enseignants du secondaire. La deuxième phase de l'étude a consisté à analyser les données des bulletins scolaires afin d'examiner les tendances à grande échelle des notes d'autorégulation. La troisième phase a fait appel à une enquête en ligne dont l'élaboration a été guidée par les entretiens de la première phase. Les conclusions générales sont que les enseignants du secondaire de l'Ontario n'ont pas tous la même définition de l'autorégulation, mais que les comportements négatifs des élèves sont ceux qui influencent le plus l'évaluation de l'autorégulation par les enseignants. Les données des bulletins scolaires suggèrent que les enseignants ont du mal à évaluer l'autorégulation indépendamment d'autres concepts tels que l'initiative ou la collaboration. Les implications pour la pratique sont discutées.*

Like teachers everywhere, Canadian teachers assess students, assign grades, and report on student achievement. Classroom assessment and grading are well studied in educational research, but those studies overwhelmingly focus on subject area achievement. This is despite the fact that Canadian teachers regularly assess self-regulation and associated constructs. Merchant et al. (2018) found that all Canadian school systems ask teachers to assess areas of student performance beyond academic achievement; these areas include self-regulation, goal setting, perseverance,

and the ability to work independently. The large and ongoing research base demonstrating that self-regulation is positively associated with academic achievement (Dent & Koenka, 2016; Nuckles et al., 2012; Pintrich & De Groot, 1990; Zimmerman & Kitsantas, 2014) provides a strong rationale for school systems to develop and assess self-regulation. This rationale is further strengthened by evidence that teachers can effectively teach self-regulation (Perry et al., 2007). Given this, it is not surprising that many school systems are making self-regulation a focus.

Ontario teachers are required to assess and grade a set of six learning skills and work habits (LSWH). The six LSWH are self-regulation, responsibility, organization independent work, initiative, and collaboration. Thus, as teachers assess self-regulation, they must also assess five other non-achievement constructs. The six LSWH are included on report cards and graded using a 4-point scale with scale points of *excellent*, *good*, *satisfactory*, and *needs improvement*.

This study explores how Ontario secondary teachers operationalize self-regulation. Although we consider the underlying nature of self-regulation, as examined in educational psychology, we approach the problem from the perspective of classroom assessment. The specific research questions guiding this study were:

1. How do Ontario secondary teachers define self-regulation?
2. How do Ontario secondary teachers assess self-regulation? What observable behaviours and student characteristics influence self-regulation grades?

We first consider teachers' grading processes and then review what is meant by self-regulation. Finally, we examine approaches to assessing self-regulation and consider how feasible each is for teachers to employ.

## **Teachers' Grading Practices and Self-Regulation**

There have been many studies on classroom teachers' assessment and grading practices (see Brookhart et al., 2016 for an overview), but these studies have focused on academic achievement. However, school systems across the world require teachers to assess elements of student performance beyond subject area achievement (e.g., Boise School District, 2017; International Baccalaureate Organization, 2009; Singapore Ministry of Education, 2021). Many of these constructs are related to self-regulation. For example, Singapore includes "self-management" and "personal application" as part of its citizenship and character education framework (Singapore Ministry of Education, 2021), whereas Ireland includes "works well independently" and "keeps trying even when tasks are difficult" on its report cards (National Council for Curriculum and Assessment, 2021). Despite such assessments being a common part of teachers' practices, there has been minimal research on how teachers assess and report upon these aspects of student learning.

There is a need to understand how teachers assess self-regulation, and what meaning can be derived from self-regulation grades on report cards, if we are to use this information for formative or summative purposes. Specifically, we need to know if these assessments and grades have sufficient rigour, validity, and reliability to be used for important decisions such as admission into special programs or post-secondary institutions. Further, it is critical to understand how teachers define and operationalize self-regulation. This understanding is required to interpret teachers' comments and ratings of self-regulation, to inform professional development efforts aimed at helping teachers improve their students' self-regulation, and to help parents and students better understand report card information.

## Self-Regulation

Self-regulation refers to mental processes by which individuals control their attention, thoughts, emotions, and actions to improve their performance or achieve a goal (Inzlicht et al., 2021; McClelland & Cameron, 2012). In the context of schooling and learning, the term *self-regulated learning* is used to describe the processes a learner undertakes to meet learning goals. Self-regulated learning could be considered a specific manifestation of self-regulation. We use the term self-regulation in this paper to be consistent with the language used in Ontario schools but note that how self-regulation is described by the Ontario Ministry of Education overlaps with descriptions of self-regulated learning (Ontario Ministry of Education, 2010).

Panadero et al. (2016) described different models of self-regulated learning, but what these models have in common is that self-regulation takes place over time and includes phases of planning (forethought), task engagement, and self-observation or self-assessment. In classroom learning, students self-regulate by monitoring cognitive strategies and actions, evaluating the effectiveness of their learning actions, and making adjustments to those actions as needed, and need to be motivated to do so. As motivation is an inherent component of self-regulation, students take steps to regulate and adjust levels of motivation and emotional responses (Boekaerts & Pekrun, 2015; Winne 2011). Effective self-regulation depends upon a host of other processes, including control of impulsivity, working memory, and metacognition (see Kirby & Merchant, 2020, for a review). The results of successful self-regulation include planning, organization, goal setting, self-assessment, and constructive response to feedback (Schunk, 2005; van Loon et al., 2017). Note that these outcomes can be behavioural (e.g., maintaining a homework diary) or latent (e.g., self-assessing in one's own mind).

The nature of self-regulation may change across development (Zimmerman, 1989). In early childhood, self-regulation may be manifested primarily as self-control and is sometimes associated with compliance (e.g., Kochanska et al., 2001, Kopp, 1982). In adolescence, self-regulation is linked to complex study strategies (Zimmerman, 2008), but still requires adequate self-control to attend to instruction and refrain from disruptive behaviours (Gestsdottir & Lerner, 2008).

Zimmerman's (1989) triadic model defined self-regulation (self-regulated learning) as a reciprocal relationship between the person (self), their behaviour, and their environment. In this model, learners attempt to meet learning goals by regulating their environment (e.g., by moving to a quiet area to study), their behaviour (e.g., by following through on plans to study instead of playing video games), or covertly through internal thought processes such as using mnemonic devices to memorize important facts.

Self-regulation is of interest to educators because of its association with academic achievement. Empirically, higher levels of self-regulation are associated with higher report card grades across all grade levels (e.g., Dent & Koenka, 2016). There is evidence that behavioural regulation is more strongly associated with grades than emotional regulation (Edossa et al., 2018) and this may be because teachers observe behaviours and not internal emotional states. There is also evidence that girls demonstrate higher levels of self-regulation than boys (Duckworth & Seligman, 2006; Pajares, 2002). This effect appears to be true for younger learners (Matthews et al. 2009) all the way through to post-secondary learners (Virtanen & Nevgi, 2010).

## **Assessing Self-Regulation**

Assessing self-regulation is challenging because much of it is a covert, intentional mental process—a construct rather than a set of behaviours (Credé & Kuncel, 2008; Dinsmore et al., 2008; Stroud, 2013). To assess self-regulation, researchers have employed a variety of strategies, including self-report inventories, observation, structured interviews, think-alouds, error detection tasks, online exercises, and teacher judgments (Galla et al., 2014; Stroud, 2013). Of these methods, self-report measures have been used most frequently (Winne & Perry, 2000). The weaknesses of self-report measures are well documented (e.g., Hirschfeld et al., 2007), but they enjoy the advantages of accessing students’ internal thought processes and being economical and easy to implement (Winne & Perry, 2000). These positive qualities make them suitable for classroom use. Our conversations with teachers have shown that many Ontario teachers have students complete self-assessments of their LSWH, but those self-assessments are created by the teacher and not based on established measures or founded on known theories of self-regulation (Merchant, 2016). Typically, these self-assessments ask students to self-grade their LSWH and then justify the grade they gave themselves.

Interviews are another self-report method of assessing self-regulation. They suffer from the same flaws as self-report questionnaires but allow researchers (or teachers) to explore a student’s thought processes in greater depth than questionnaire items. The most common interview protocol appears to be the Self-Regulated Learning Interview Schedule (SRLIS). Zimmerman and Pons (1986) developed the SRLIS as a means of assessing self-regulation in high-school students. The SRLIS is essentially a count of self-regulation strategies used by students in the classroom. In theory, teachers could incorporate structured interviews into their assessment practice, although this would require training and dedicated time for these interviews to take place. We could find no research indicating to what extent teachers use interviews to assess self-regulation (or any other construct), but it seems likely that, at an informal level, some teachers use their conversations with students as a means of assessing self-regulation.

Another assessment method reported in the literature is teacher- or parent-report. Given that teachers have extended ongoing contact with students, it may seem they are ideally positioned to assess students’ self-regulation. As an example, there is evidence that teacher reports of self-regulation display good predictive validity. Callan and Cleary’s (2018) study of 100 grade 8 mathematics students found that “teacher ratings [of self-regulation] most strongly predicted more global outcomes” (p. 109) and were stronger predictors of mathematics test scores than self-report measures, trace data, or task-based measures. These results mirrored those of an earlier study conducted on grade 9 students (Cleary & Callan, 2014). However, there are concerns about teachers’ abilities to rate students’ self-regulation (Winne & Perry, 2000). There is a question as to how well teachers can separate self-regulation from other constructs such as achievement and motivation. As part of their validation of the SRLIS, Zimmerman and Martinez-Pons (1988) used teacher reports as a comparison tool and found that teachers assessed different facets of self-regulation as a unitary construct. According to the authors, this provides “compelling evidence that teachers view students’ self-regulated learning as a single, theoretical entity” (p. 288).

Instead of using self or others to report on students’ self-regulation, it is possible to design specific tasks requiring self-regulation and observe students’ performance on the task. The academic diligence task (ADT) developed by Galla et al. (2014) and the Head-toes-knees-shoulder (HTKS) task by Cameron Ponitz et al., (2008) are examples of this type of measure. Task-based measures allow observation of self-regulation in situ, but there is a problem of generalizability.

For example, is the observed performance likely to be typical, maximal, or neither? If the student had no part in setting the task, what impact does this have on their motivation for completing it? Is a teacher- or researcher-designed task measuring self-regulation or compliance? Conversely, it could be argued that any classroom assessment of self-regulation is going to be task-based. Students must work on something to demonstrate self-regulation.

Related to task-based measures are trace data (Perry & Winne, 2006). Trace data are typically collected from online learning environments that record what strategies learners used when interacting with the material. Examples of trace data include which hyperlinks were clicked, how much time was spent on a page, and what text was highlighted. Hadwin et al.'s (2007) *gStudy* software tool is an example of a trace data collection tool. Trace data can provide rich information about students' study habits and help answer important questions about students' study strategies. However, there are important questions about the utility of such data for teachers. Firstly, teachers are not positioned to engage in the types of data analysis computer-based trace data require, although it would be possible to have automated software tools analyze the data for teachers and provide summaries and possible interpretations. A more serious limitation to the computer-based approaches is that most secondary teaching does not occur online, but in face-to-face environments. In principle, trace data could be collected in face-to-face learning environments. For instance, teachers collect trace data when they ask for outlines and rough drafts of written work, ask students to highlight key passages in text, or lay out the variables and unknowns in word problems. However, we did not find any discussion in the literature about whether teachers see these data as evidence of self-regulation, nor how these types of data could be collected and analyzed by teachers for assessment and grading of self-regulation or related constructs.

Given the difficulty of assessing self-regulation, there is a question as to whether it is reasonable to expect teachers to create and administer quality assessments. Teachers lack psychological and assessment expertise, but their sustained interaction with students potentially gives teachers a context-rich perspective that is missing from assessments of a single event such as think aloud processes or task-based measures. Thus, it is possible that teachers are in a privileged position to assess self-regulation (Zimmerman & Pons, 1988). Teachers are also exposed to a range of self-regulatory capabilities among their students, giving them a sense of how a student's self-regulation compares with norms of the current classroom and the teacher's prior classrooms. Further, teachers can assess self-regulation using a variety of tools. Nothing prevents teachers from using questionnaires or interview protocols with their students. This type of data could be supplemented with day-to-day observational data and student self-assessments, such as reflections or journals.

However, the potential advantages that teachers have as assessors of self-regulation are negated if they do not understand the construct or do not use valid assessment tasks and processes. Teachers may judge compliance with teachers' wishes (e.g., avoiding disruptive or inattentive behaviour) as self-regulation, or want students to act as the teachers would in a learning situation, failing to recognize alternative methods of self-regulation. Further, some teachers may not design classroom activities in which self-regulation is prominent or easy to judge (Boekaerts & Cascallar, 2006; van Grinsven & Tillema, 2006). Butler et al., (2017) described how classroom assessment can be thoughtfully designed to develop students' self-regulation skills, but this is different than assessing (and grading) self-regulation itself. Adding to the complexity, self-regulation manifests itself differently in different students, as a function of skill levels, interest in the content, and personal and cultural characteristics.

Ontario teachers are given some guidance on how they might assess self-regulation in the classroom. The Ontario Ministry of Education (2010) assessment policy (provided to all Ontario teachers) lists sample behaviours that could be used as indicators of student self-regulation. The behaviours are:

- sets own individual goals and monitors progress towards achieving them;
- seeks clarification or assistance when needed;
- assesses and reflects critically on own strengths, needs, and interests;
- identifies learning opportunities, choices, and strategies to meet personal needs and achieve goals;
- perseveres and makes an effort when responding to challenges. (p. 11)

These sample behaviours are consistent with current, research-based, definitions of self-regulation. The focus on behaviours rather than intentions or emotional regulation is understandable given that teachers cannot directly observe intentions, motivation, or emotional regulation, but it means that significant components of student self-regulation are not included in the guidance given to teachers.

Example behaviours are provided for the other LSWH, but many of these behaviours are also consistent with research-based conceptions of self-regulation (we have selected those examples most related to self-regulation):

- Responsibility: takes responsibility for and manages own behaviour.
- Organization: devises and follows a plan and process for completing work and tasks; establishes priorities and manages time to complete tasks and achieve goals; identifies, gathers, evaluates, and uses information, technology, and resources to complete tasks.
- Independent work: independently monitors, assesses, and revises plans to complete tasks and meet goals.
- Initiative: approaches new tasks with a positive attitude.
- Collaboration: works with others to resolve conflicts and build consensus to achieve group goals; shares information, resources, and expertise and promotes critical thinking to solve problems and make decisions.

This approach appears to assume that teachers understand what self-regulation is, that they create classroom opportunities to observe it in their students, and that they can distinguish it from the other LSWH. However, there is little evidence that any of these assumptions are valid. Adding further complexity to the matter, these behaviours do not form a definitive list. Ontario teachers are specifically told “the sample behaviours are intended to assist *but not restrict* teachers” (p. 10) in their assessment and evaluation of the LSWH. Thus, Ontario teachers have considerable leeway in how they define and operationalize self-regulation.

As noted earlier, some of these behaviours may be difficult to observe in the classroom. For example, unless a teacher specifically undertakes goal-setting activities in class, and monitors those activities, it may be impossible for the teacher to know if students are setting goals and monitoring progress towards them. Of the listed behaviours for self-regulation, only “seeks clarification or assistance when needed” is a directly observable behaviour, but even in this case, it is possible that students are seeking help outside the classroom and so a teacher would not observe the behaviour. On the other hand, behaviours thought to be inconsistent with self-

regulation, such as not seeming to pay attention in class, may be salient for teachers and affect their judgements unduly. We suggest there is need to explore teachers' conceptions of self-regulation and how they assess it and the other LSWH.

## Method

The goal of this study is to better understand how Ontario secondary teachers operationalize self-regulation. To this end, we investigated teachers' definitions of self-regulation, what student behaviours they considered as evidence of self-regulation, and how they assessed self-regulation. As is appropriate for exploratory, phenomenological studies, a mixed methods approach was adopted (Creswell, 2014). There were three phases of data collection. Because little is known about this topic, we began with interviews, to help us develop an initial understanding of teachers' assessment practices in relation to self-regulation. The second phase used report card data to look at the independence of LSWH ratings and to examine associations between self-regulation grades and achievement grades. The third phase used a survey informed by the interview data. The aim was to capture some of the same information as the interviews, but with a larger sample. Research ethics approval was obtained for all phases of data collection. This approval came from the university's research ethics board as well as the research ethics boards of each school district where data were collected.

### Phase 1: Interview

The first phase used interviews with 26 high-school teachers from three school districts. These teachers had a broad range of teaching experience and came from a variety of subject areas. The interview protocol focused on teachers' assessment practices surrounding the six LSWH—including self-regulation. Interview questions probed assessment practices, construct definitions, and grading decisions. The interview questions were:

1. *Select student #8 from your gradebook and describe the process you went through to assign the LSWH grades to that student.*
2. *Compare/contrast the process of deciding upon an academic grade vs. a LSWH grade.*
3. *Thinking about this same student, when you awarded this grade what were your thoughts about how the grade would be received and/or interpreted by the student.*
4. *Please select your top student in terms of the learning skills and work habits and describe what characteristics make them the top student.*
5. *Please select another very good student in terms of the learning skills and work habits and describe what characteristics make them very good, but not the top student.*
6. *Tell me about a student who achieved very highly in their academic work but demonstrates low LSWH. What are they like? What allows them to be successful academically? Which LSWH are they weakest in? Strongest?*
7. *I noticed student #8 got a "XXXX" in independent work. How is independent work different from initiative? How is organization different from responsibility? Where does self-regulation fit in?*

8. *Is there anything else you would like to tell me about assessing learning skills and work habits?*

Each main question (except the last) had additional prompts to guide conversation towards a rich response. For example, additional prompts for Question #1 asked participants what information was recorded in their gradebook, what events or memories stood out as informing the LSWH grades, and whether specific activities were used to assess different LSWH.

Interviews were recorded and transcribed verbatim. Interview responses were coded using five codes: definition of self-regulation, behaviours used to assess self-regulation, overlap with other LSWH, distinguishing among achievement levels, and miscellaneous. One author conducted the coding with the results being checked by another researcher who is expert in qualitative research. There were three instances of coding disagreements, which were resolved through discussion.

### **Phase 2: Report Card Data**

The second phase of data collection consisted of Grade 9 and 12 report card grades from the school district where most of the interviews took place. Each set of grades included the course code, achievement grade, six LSWH grades, number of absences, and number of lates. Also included were examination results from a standardized Grade 9 mathematics examination that all students in Ontario must write. The raw data included  $N = 26,076$  sets of grades. Data cleaning reduced the sample to 22,962 sets of grades. Grade sets were eliminated when there was no grade for self-regulation within the set. This tended to occur if either no grade information was entered for the student or the academic grade was present but the LSWH grades were not. The deleted data did not match the retained data in a few aspects. Firstly, 83.6% of the stricken data was from Grade 12, compared to 51.5% of the data that was retained. This was because Grade 12 students are more likely to drop courses or leave school than Grade 9 students. Secondly, the mean achievement grade of the stricken data ( $M = 76.1, SD = 15.72$ ) was significantly lower ( $t = -3.32, p = .001$ ) than the mean achievement grade of the retained data ( $M = 77.9, SD = 14.55$ ). Although this difference was statistically significant, the absolute difference was small.

### **Phase 3: Survey**

The final phase of data collection used a 38-item online survey that examined how teachers valued and operationalized learning skills and work habits. The survey underwent two phases of development. Using data from the interviews, a bank of 112 survey items was developed. An initial draft of the survey was created by selecting items that minimized duplication and encompassed the aspects of assessment (i.e., definition and operationalization of the construct) that we wanted to include in the study. This first draft contained 61 items. Twenty teachers trialed this draft of the survey. Based upon the resulting data and written feedback from those teachers, the survey was shortened to 38 items. The shorter survey was needed because 61 items meant that survey completion times were unreasonably long. Much of the shortening was accomplished through branching logic where participants were asked to respond to items about one or two LSWH of interest to them and not about all six LSWH.

Survey participants were recruited through social media. This method of recruitment allowed for a broad sample in terms of geographical location, but also meant that many surveys were not usable. Of the 300 surveys received, only 108 were usable. The demographic questions did not



ask the respondents' gender, but years of experience varied from 1 to 36 with a median of 14. All major subject areas were included such as science, mathematics, English, French, humanities, fine arts, business, and physical education. A further 112 surveys were completed by elementary teachers, and the remaining 80 surveys were not complete enough to incorporate into the statistical analyses.

Most survey items were 7-point Likert items in which respondents were asked to rate their level of agreement with provided statements. Examples of statements include, "*I have specific activities I use to assess specific learning skills and work habits*", "*I have students self-assess their learning skills and work habits*", and "*I use school, district, or ministry policy documents to guide my assessment of the learning skills and work habits*". Another item showed student behaviours that interview participants had mentioned as informing their LSWH grading decisions (e.g., talking out of turn, helping a fellow student, seeking help after class, texting in class) and asked respondents to link each behaviour to individual LSWH. Open-ended items included "List three things you look for when assessing self-regulation" and "What makes self-regulation so difficult to assess?" (this item appeared only for respondents who indicated self-regulation was difficult to assess).

Survey results were analyzed using descriptive statistics for the quantitative items while the open-ended items were coded using the same themes that emerged from the interview data. The same researcher who checked the coding of the interview data checked the coding of the survey data. There were no disagreements in the coding.

## Results

Results are presented in two sections: teachers' definitions of self-regulation, and how teachers assess self-regulation; each section integrates information from every phase of data collection. These sections are not independent, as teachers' definitions impacted their methods of assessment.

### Definition and Dimensionality of Self-Regulation

Two broad themes emerged from the interview data. First, teachers struggled to articulate a definition of self-regulation, and second, they viewed self-regulation as a construct that overlapped the other five LSWHs they assessed. This was most directly exemplified by a beginning history teacher who stated, "I don't understand self-regulation," and went on to explain that assessing self-regulation is difficult because "I don't know what I am looking for." A mid-career English teacher also reported not being able to define self-regulation, but this was not an issue for him as he placed very little value in these assessments.

The second broad theme was that self-regulation was the foundational construct upon which the other five LSWH rested. As one special-education teacher noted, self-regulation "overlaps with almost all of them [the LSWH] because if a student can't self-regulate most of the other [LSWH] suffer." A mathematics teacher characterized self-regulation as "almost the cumulation of them [the LSWH]. It's the summative of the other five." A geography teacher viewed self-regulation as "compliance-based" and expressed the view that students who scored high on self-regulation were complying with teachers' wishes and expectations, and therefore likely to score high on all the LSWH.

Most of the interviewed teachers reported that self-regulation overlapped with the other five

LSWH, but the exact nature of that overlap depended on the teacher. Across the 26 participants there was no consensus on where the overlap lay. For example, three teachers saw self-regulation and responsibility as overlapping constructs. A technical education teacher stated that, “Self-regulation definitely ties into responsibility. They work hand in hand. If you are self-regulating, you have, usually, huge responsibility, you know, you’re a person of responsible practices.” A Chemistry teacher also saw self-regulation as overlapping with responsibility. When describing why students submit work late he said, “maybe it is a responsibility thing, maybe it is a self-regulation thing.”

Fuzzy boundaries between self-regulation and the other five LSWH existed for many teachers. A civics teacher saw self-regulation as overlapping with initiative, and an English teacher described the boundary between the two constructs as “blurry”. A late career business studies teacher linked self-regulation with independent work. An English teacher described self-regulation using the same student behaviours he used to describe initiative and organization and another English teacher reported making no attempt to distinguish self-regulation from the other five LSWH. When completing report cards, he assigned the same grade across all six LSWH.

Seven of the teachers interviewed used the sample behaviours given by the Ministry of Education to help them define self-regulation. Only two of these teachers reported deliberately using the Ministry of Education assessment policy documents to help them define self-regulation, the remaining five teachers independently linked self-regulation to these behaviours. Although there were instances in which teachers’ concept of self-regulation aligned with controlling cognitive and emotional processes to achieve a desired goal, this was not the dominant view.

Seventeen teachers in the interview sample described self-regulation in terms of students complying with behavioural expectations set by the teacher. Examples included not distracting others and submitting work in a timely manner. A civics teacher linked self-regulation with coming to class regularly, on time, and ready to learn. He asked himself “Are they [students] regulating their behaviour, or are they coming to class stoned?” An English teacher thought that “part of self-regulation is that they are respecting the rights of others in the classroom,” and that it needed to be assessed “through their behaviours, and what they say and do.” All of these relate to behavioural control and adherence to classroom rules and social norms.

Further on the theme of prosocial behaviours, an English teacher who noted that girls tend to achieve higher self-regulation grades stated that some girls have a mindset of “I am a follower, I am a pleaser, I need to do everything the way it is expected.” The report card data demonstrated that girls receive higher self-regulation grades than boys. In Grade 9, the mean self-regulation grade for girls ( $M = 3.42$ ,  $SD = 0.84$ ) was higher than for boys ( $M = 3.10$ ,  $SD = 0.94$ ). This difference was statistically significant ( $t(11,130) = 19.08$ ,  $p < .001$ ). The Grade 12 data results were similar, with girls’ self-regulation grades ( $M = 3.40$ ,  $SD = 0.86$ ) being higher than boys’ ( $M = 3.09$ ,  $SD = 0.98$ ). Again, t-tests revealed the difference to be statistically significant ( $t(11,816) = 18.62$ ,  $p < .001$ ). The effect sizes for gender differences in Grade 9 ( $D = .36$ ), and in Grade 12 ( $D = .34$ ) were both small (Cohen, 1992). The report card data also demonstrated that girls receive higher achievement grades than boys both in Grade 9 ( $t(10,980) = 16.4$ ,  $p < .001$ ) and Grade 12 ( $t(11,812) = 16.6$ ,  $p < .001$ ). To test whether gender differences in self-regulation grades remained after controlling for academic achievement, multiple linear regression was used. Students’ self-regulation grade was the dependent variable and the achievement grade and gender were used as predictor variables. When the achievement grade was entered into the model first, it was found that gender nearly disappeared as a predictor variable. The standardized coefficient for the achievement grade ( $\beta = 0.650$ ,  $p < .001$ ) was much higher than for gender ( $\beta = 0.079$ ,  $p < .001$ ),

and the inclusion of gender improved the variance accounted for by only 0.6%. Collinearity diagnostics (tolerance = 0.98, VFI = 1.02) were well below problematic levels (Field, 2013).

Survey data showed that teachers associate productive classroom behaviours with high self-regulation. One survey item used branching logic within the survey so that when respondents selected self-regulation as the most valuable LSWH, the next question asked them why. Twenty-two respondents selected self-regulation as the LSWH most important for success in their subject area. The dominant theme from these responses was that self-regulated behaviour allowed students to learn better in the classroom. One teacher wrote that students “cannot address academic deficits until [they] can control behaviour enough to engage in class activities,” and another wrote that self-regulation was central to students’ abilities “to focus and work well with others.” The notion of focus or staying on task was put forward by half the respondents to this item. Only four of the survey responses related to the sample behaviours of self-regulation put forward by the Ministry of Education. All four of those responses addressed metacognition and reflection.

Some survey respondents commented on the difficulty of defining self-regulation. One teacher wrote, “It [self-regulation] is hard to define and generally overlaps with most other learning skills. Many teachers don’t seem to quite understand what it is to begin with, how can they assess it?” Another commented that “definitions of it vary.” Relevant to these two comments was a survey item that asked if respondents thought their colleagues shared the same definition of self-regulation. Thirty-nine of 75 agreed that they shared the same definition of self-regulation as their colleagues, and 19 disagreed (the remaining 14 answered “neither agree nor disagree”).

Report card data cannot directly address the question of how teachers define self-regulation, but exploratory factor analysis was used to examine the extent to which the six LSWH were assessed as separate constructs. Because a Kolmogorov-Smirnov test demonstrated the distribution of self-regulation grades was not normal ( $D(22,904) = 0.30, p < .001$ ), principal axis factoring was determined to be the best algorithm to extract the factors (Fabrigar & Wegener, 2011). The factor analysis revealed that the six LSWH grades could be represented by a single factor accounting for 85.25% of the variance. Self-regulation and initiative had the highest factor loadings, with values of 0.92 for both, but the other four LSWH also had high loadings that ranged between 0.87 and 0.91. Exact factor loadings changed slightly, but the overall factor structure remained constant across grades.

### **Assessing Self-Regulation**

All the interview participants reported following district and Ministry of Education policies when assessing academic achievement. However, this adherence to policy was not found in teachers’ assessments and grading of self-regulation. Part of the reason for this may have been the difficulty in defining the construct. The interview and survey data both suggest Ontario secondary teachers find self-regulation difficult to assess. During her interview, an early career business studies teacher described assessing self-regulation as “really tough.” A beginning history teacher echoed this sentiment saying, “in terms of assessing, I find that one [self-regulation] a bit trickier.” When a geography teacher was asked how she assessed self-regulation, she said she “would have to read the little bullets underneath” to remind herself of what behaviours should be considered when assessing self-regulation. An English teacher who found self-regulation difficult to assess decided to link the self-regulation grade to unauthorized use of mobile phones in the classroom. By using this narrow definition of self-regulation, the teacher was able to create a construct that was easy

for him, and his students, to understand.

To test whether Ontario secondary teachers found self-regulation more difficult to assess than other LSWH, a survey item asked teachers to rank the LSWH in order of easiest to assess. Self-regulation was rated as more difficult to assess than independent work,  $t(75) = 3.25, p < .01$ , but was not significantly different from the other four LSWH. Respondents who selected self-regulation as the most difficult LSWH to assess were given a follow-up question asking why it was so difficult to assess. Five responses focused on the difficulty of observing self-regulation as not only is it a latent construct, but it can manifest itself in different ways in different contexts. One teacher noted that “it is really hard to see that it [self-regulation] is actually happening” and another commented that “it is hard to know if a student is lazy or exhausted from working five nights a week.” A further five responses centered on the difficulty of finding time to assess self-regulation. One teacher wrote, “It is difficult to make time to hear from students about their thinking around their learning, particularly in groups that aren't able to write much/well.” In addition, two teachers responded that they struggled to assess self-regulation because they did not have a good, actionable definition of self-regulation.

Half of the interviewed teachers said they used student self-assessment as part of their LSWH assessment practice. These teachers described using student self-assessment as a way of assessing the student's metacognitive abilities, and of seeing how well the student's self-assessment aligned with the teacher's assessment. Although interview participants said the self-assessments were useful for engaging in dialogue with students about LSWH, no interview participant reported using self-assessments to determine the LSWH grade. Mismatches between the teacher's assessment and the student's self-assessment were seen as evidence of a student's distorted self-image, and not as a potential misjudgement by the teacher. Sixty-two of 76 survey respondents (82%) indicated they had students self-assess their LSWH, a proportion that was significantly higher than that of interview respondents, 52 % ( $\chi^2(1) = 9.93, p = .002$ ).

To better understand what behaviours teachers consider when assessing self-regulation, the survey presented a list of typical classroom behaviours. This list was created based upon behaviours mentioned by teachers during the interview phase. We selected these behaviours because we believed these would be most familiar and relevant to the experiences of survey respondents. Survey respondents were asked to indicate what LSWH they associated with different classroom behaviours and could choose any number of the LSWH to be associated with each behaviour. Thus, a respondent could indicate that a behaviour impacted zero, one, two, or even all six LSWH. Results from this item are shown in Table 1. As can be seen from the table, the top four behaviours teachers associated with self-regulation were disruptive behaviours, suggesting teachers were using negative behaviours to identify poor self-regulation. It can also be seen that behaviours such as seeking help and asking questions were selected by few teachers, even though these behaviours align with the Ontario Ministry of Education's (2010) suggested behaviour of “seeking assistance or clarification when needed” (p. 11).

Interview participants fell into three groups when describing what behaviours would impact students' self-regulation grades. Eleven teachers were placed into the first group. These teachers struggled to define what behaviours impacted self-regulation grades. This difficulty stemmed from not being able to clearly define or distinguish self-regulation from the other five LSWH. The second group of nine teachers used policy documents to determine which behaviours they would consider when assessing self-regulation. These teachers used behaviours such as time management, goal-setting, and planning as part of their assessment process. The third group of six teachers linked self-regulation with good behaviour in the classroom. A technical education

Table 1

*Proportion of Respondents Who Associated Each Behaviour With the Individual LSWH*

Behaviour	Self-Regulation	Organization	Responsibility	Initiative	Independent Work	Collaboration
Texting in class	0.83	0.10	0.49	0.13	0.27	0.14
Talking out of turn	0.83	0.04	0.23	0.00	0.07	0.39
Distracting another student	0.77	0.04	0.40	0.07	0.27	0.34
Arriving late to class	0.56	0.46	0.80	0.19	0.13	0.11
Being polite towards the teacher	0.54	0.01	0.37	0.04	0.04	0.26
Not completing an in-class assignment	0.47	0.43	0.73	0.31	0.71	0.13
Complaining about working in a group	0.46	0.04	0.30	0.08	0.08	0.85
Constantly asking for help	0.41	0.17	0.34	0.43	0.63	0.06
Submitting homework on time	0.41	0.61	0.93	0.38	0.44	0.04
Refusing to work with another student in a pair group	0.37	0.04	0.32	0.11	0.03	0.94
Seeking help after class	0.31	0.17	0.67	0.92	0.20	0.06
Not bringing required supplies to class	0.28	0.66	0.76	0.18	0.20	0.08
Asking a relevant question	0.18	0.00	0.32	0.92	0.10	0.24
Helping a fellow student	0.10	0.03	0.34	0.62	0.00	0.96

teacher in this group linked self-regulation negatively with “horseplay” in the shop, and a mathematics teacher saw it as “behaviour management.” Other behaviours teachers in this group considered included not distracting peers, and “respecting the rights of others.”

During interview, nine teachers reported using academic achievement to inform their LSWH grades, and another three stated they directly linked the LSWH grades to academic achievement. On the survey, 66 of the 75 survey respondents (88%) agreed that poor academic performance (below 50% achievement) makes it likely that a student would receive a grade of “needs improvement” for at least one of the LSWH. At the other end of the achievement scale, 28 of 74 teachers (38%) agreed that achievement above 80% made them reluctant to award “needs improvement” or “satisfactory” on any LSWH. These data suggest that many teachers conflate academic achievement and self-regulation in their grading decisions, especially for low achieving students. To test this hypothesis, the strength of association between self-regulation grades and the teacher awarded achievement grade was calculated. The Pearson correlation coefficient was moderately high and statistically significant ( $r= 0.65, p < .001$ ). This was across all subjects in grades 9 and 12.

This correlation could be further evidence of conflation; however, it could also represent an important relationship between self-regulation and learning. To further test if teachers conflate academic achievement and self-regulation, the associations amongst self-regulation grades, teacher awarded achievement grades, and standardized examination scores were investigated. If the correlation between teacher awarded achievement and self-regulation grades was solely due to better learning, the correlation should be equally strong between self-regulation grades and the

standardized examination score (assuming that both classroom assessments and the standardized test are assessing the same constructs). The only suitable standardized examination that Ontario secondary students write is in Grade 9 mathematics, so the analysis was restricted to this course. The sample for this analysis was  $N = 736$ . The correlation between the self-regulation grade and teacher awarded achievement in Grade 9 mathematics ( $r = 0.69, p < .001$ ) was similar to the overall result reported above, but the correlation with the standardized mathematics examination was lower ( $r = 0.48, p < .001$ ). The difference between the two coefficients was statistically significant using Fisher's  $r$  to  $z$  transformation ( $z = 6.11, p < .001$ ). This is consistent with the hypothesis that mathematics teachers are conflating achievement and self-regulation when awarding grades, but it is also possible that classroom assessment tasks require different levels of self-regulation than standardized tests.

## **Discussion**

The three phases of data collection provide a consistent, if somewhat blurry, picture of how Ontario secondary teachers define, assess, and grade self-regulation. Many Ontario secondary teachers struggle to define and operationalize self-regulation, while others imagine a self-regulated student to be one who demonstrates prosocial classroom behaviours. A minority of teachers operationalized self-regulation in a manner consistent with accepted theories of self-regulation such as those of Zimmerman (1989), Winne and Hadwin (1998), or Boekaerts (2011). This may be because teachers associate self-regulation with behaviours that align with the teacher's classroom goals and not the student's. Teachers seem to prefer orderly, disciplined classrooms, in which students submit assignments on time, and the students work productively together during class. Our survey results showed that teachers see these prosocial behaviours as an important support for learning. Achieving such a classroom is a reasonable goal for teachers but may not be a goal that originates from a student perspective. Current conceptions of self-regulation have the individual student's goals as their foundation (e.g., Usher & Schunk, 2018).

Assessing self-regulation means students need opportunities to demonstrate self-regulation. Teachers must create opportunities for students to set goals, to explain what actions and steps they are taking to achieve their goals, and to self-assess to what extent they are meeting their learning goals. Our own (admittedly anecdotal) observations of high school classes suggest that only a small minority of teachers provide structured opportunities for students to engage in self-regulatory practices.

The small number of teachers using the sample behaviours provided by the Ontario Ministry of Education (2010) to anchor their definitions of self-regulation is of importance for two reasons. The first is that the sample behaviours provide a framework for teachers to use in assessing self-regulation. Consistent use of this framework could potentially lead to more consistent operationalization of the construct across teachers and better clarity for students, parents, and other stakeholders on how to interpret the self-regulation grades. The second reason is that it indicates teachers are either unfamiliar with LSWH assessment policies, or do not follow these policies closely. This is very different from how interview participants described their assessment of academic achievement. Interviewed teachers described their assessment of achievement as being strongly aligned with district and provincial policy. All interview participants reported adhering to assessment policies such as explicitly stating which assignments were summative assessments at the beginning of the year, not deducting marks for late work, and giving students rubrics with the assessments.

Ontario secondary school teachers' inconsistent definition and operationalization of self-regulation points to another potential issue—that self-regulation is not being effectively taught. Even if we assume teachers are trying to teach self-regulatory strategies to their students, the varying definitions of the construct and different ways of assessing it would lead students to a confusing picture of what self-regulation is and how best to demonstrate it in a classroom. It is possible that the inconsistent definition and assessment of self-regulation are related to the low value placed on LSWH assessments by school and district administrators. Only one interviewed teacher recalled being questioned about her LSWH grades by an administrator (the teacher happened to teach the child of that administrator, and the questioning took place during a parent-teacher interview). Further, only two teachers reported being given formal training on assessing LSWH, although a further five had (with administrator support) started their own professional learning community surrounding the assessment of LSWH. Another possible reason teachers are not following assessment policies related to LSWH is these grades are not used for high stakes decisions. This was mentioned by 17 of the 26 interview participants. Many universities consider skills like self-regulation when making admissions decisions, but they do not use the LSWH grades on report cards as a source of information. Instead, they ask teachers to report upon these skills through reference letters. In short, the LSWH grades do not appear to be used for any purpose. The lack of accountability for this portion of their assessment practice, may account for teachers' willingness to depart from policy guidelines. It would be interesting and valuable to conduct future work investigating the relationship between teachers' valuation of self-regulation, how effectively they teach it, and how they assess it. We believe the assessment component adds an important dimension to research that investigates how teachers can effectively develop self-regulation through their teaching (e.g., Butler et al., 2017).

The finding that teachers award girls higher self-regulation grades than boys is consistent with other studies (e.g., Chapple et al., 2010; Else-Quest et al., 2006), although the effect sizes reported here are lower than what other researchers have found. As an example, Duckworth et al. (2015) reported an effect size ( $D= 1.62$ ) almost five times higher than the effect size found in our data. The data from this study do not explain what the underlying causes of this gender difference may be. There is evidence that during the teen years, girls' and boys' brains develop differently, and that marked areas of difference include the prefrontal cortex and inferior frontal gyrus—both areas are involved with executive function and social cognition (Blakemore & Choudhury, 2006; De Bellis et al., 2001), and therefore likely to influence self-regulation.

Another possibility comes from interview data, which demonstrated that some teachers allow a student's academic achievement grades to influence the LSWH grades. In this sample, girls have higher academic achievement grades than boys, and it is possible they are receiving higher self-regulation grades as a result. This interpretation is supported by the regression results demonstrating the gender difference in self-regulation grades almost disappears when academic achievement is controlled. This effect may also be due to teachers including non-achievement factors in their grading (e.g., Bowers, 2011). These two explanations are not mutually exclusive.

Another possibility is that some teachers see boys demonstrating more negative behaviour in the classroom. There is some evidence for this (e.g., Carlo & Randall, 2002; De Wied et al., 2007; Eisenberg et al., 2014), and as the survey results showed that some teachers use negative classroom behaviours to inform self-regulation grades, it follows that girls would receive higher self-regulation grades than boys. A better understanding of the underlying causes in gender differences in self-regulation grades could be useful for better understanding what future actions and interventions may help close the achievement gap between boys and girls in high school.

Assessment experts have repeatedly called for classroom assessment policies that allow grades to be “pure” measures of achievement (e.g., Brookhart, 1994; Guskey, 2006; Marzano & Heflebower, 2011). This call has led to report cards having a distinct section for teacher to report achievement grades and another distinct section where teachers report upon non-achievement factors, such as self-regulation, collaboration, or responsibility. Although the rationale behind separating achievement and non-achievement factors is clear, teachers have thus far been given little direction or advice on how to effectively assess and grade non-achievement constructs such as self-regulation. The results presented here indicate that the existence of a few pages in a large policy document is not sufficient to counteract the lack of training teachers have received on how to assess complex constructs such as self-regulation. Improving classroom assessments of self-regulation will require teachers to be given support and training that goes beyond a single policy document. This support and training should focus on defining self-regulation, and what classroom behaviours will be used to assess it. One possibility is to focus more on those behaviours than on the abstract construct of self-regulation; another is to suggest how teachers could construct tasks in which intermediate performance (such as the trace data of Perry and Winne, 2006) would provide evidence of self-regulation. Butler et al. (2017) offered good advice for teachers on how to design classroom assessment with self-regulation in mind. Finally, there should be a consensus on what separates the different levels of achievement. This is critical not only so students, parents, and other stakeholders can interpret self-regulation grades, but also to help teachers provide feedback to students on how to improve their self-regulation.

Developing teachers’ ability to define and assess self-regulation would likely have the additional benefit of improving teachers’ ability to develop self-regulatory skills in their students. Initial teacher education programs seldom mandate instruction about self-regulation and how to develop it. Thus, any instruction teacher candidates receive about self-regulation is dependent upon whether the instructors they have in the programme have knowledge of, and an interest in teaching about, self-regulation. Although we cannot comment on how prevalent instruction about self-regulation is in all universities, the Ontario College of Teachers requirements for accrediting teacher education programs make no mention of including self-regulation, self-regulated learning, or any of the LSWH as part of the instruction given to teacher candidates (Ontario College of Teachers, 2017).

### **Limitations**

Our decision to use interview results to inform survey development rather than using a known theoretical framework (e.g., Zimmerman, 1989) was made with a view towards making the questionnaire accessible and familiar to respondents but may have promulgated incorrect notions of self-regulation that arose within the interview responses. It would be interesting to conduct a similar study but relying more on a known theoretical framework instead of grounded theory. The report card data, although giving a large sample size, do not allow an examination of the thinking of teachers as they make grading decisions about students’ self-regulation. The limited number of standardized tests written by Ontario students also meant that examining relationships between teacher ratings of students’ self-regulation and academic achievement was limited to a single subject area and grade. The survey data had fewer responses than we would have liked, and this was especially true for items that were subject to branching logic and so not all participants responded to these items.



## Summary

Just as researchers in psychology and education have struggled to assess self-regulation, so too have teachers. Although some teachers are direct in stating they do not understand what self-regulation is, it appears that Ontario secondary teachers often associate self-regulation with appropriate classroom behaviour, although a minority of teachers consider goal setting, metacognition, and planning when assessing self-regulation. Teachers use a variety of classroom behaviours to assess self-regulation, but these behaviours are not consistent across teachers. Interview and survey data also revealed that many teachers ask students to self-assess their self-regulation, but do not incorporate this self-assessment information into their grading decisions.

Given the different definitions of self-regulation, the high correlation of self-regulation grades with other LSWH grades, and the variety of behaviours and assessment practices used to inform self-regulation grades, it is difficult to ascertain what these grades represent. This makes using self-regulation grades problematic for formative, summative, or decision-making purposes. Improving teachers' assessment practice will require strong direction both from policy makers and from educational researchers. Research into how teachers can better operationalize these constructs is necessary for developing policies and practices that will allow classroom assessment and reporting practices to provide meaningful, actionable information.

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