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Growth and Goals Module: A Course-Integrated Open Education Resource to Help Students Increase their Learning Skills

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Abstract

We developed and launched an online, course-integrated module called Growth & Goals aimed to help students better develop evidence-based learning skills. The module focuses on five main concepts: self-regulated learning, goal-setting, metacognition, mindfulness, and mindsets (growth and fixed continuum). Growth & Goals is an open education resource available for download at no cost to any educator through FlynnResearchGroup.com/GrowthGoals. The module is available in both French and English and can be customized to any university course. The module addresses the aforementioned concepts through a combination of text and videos, with interspersed interactive activities that students use to develop their learning skills. Growth & Goals is intended to help students effectively manage the challenges they may encounter as they progress through their postsecondary academic career and beyond and become more proficient learners. Since 2017, the module has been implemented in more than 15 university courses and has been used by over 8000 students. The preliminary evaluation of Growth & Goals has been largely positive, indicating that the module has been well received by both students and educators and that it successfully guides students in learning the module's concepts.

Nous avons mis au point et lancé un module en ligne intégré au cours intitulé Growth & Goals (Croissance et objectifs) qui vise à aider les étudiants et les étudiantes à mieux développer leurs compétences d'apprentissage basées sur l'évidence. Le module se concentre sur cinq concepts de base: l'apprentissage auto-régulé, la fixation d'objectifs, la métacognition, la pleine conscience et les états d'esprit (continuum de croissance et fixe). Le module Growth & Goals est une ressource pédagogique libre qui peut être téléchargée gratuitement par n'importe quel éducateur par le biais de FlynnResearchGroup.com/GrowthGoals. Le module est disponible en anglais et en français et peut être personnalisé pour correspondre à n'importe quel cours universitaire. Le module traite des concepts mentionnés plus haut par le biais d'une combinaison de textes et de vidéos avec des activités interactives intercalées que les étudiants et les étudiantes peuvent utiliser pour développer leurs compétences d'apprentissage. Le module Growth & Goals vise à aider de manière efficace les étudiants et les étudiantes à gérer les défis auxquels ils peuvent être confrontés alors qu'ils progressent dans leur carrière universitaire et au-delà et deviennent de meilleurs apprenants et de meilleures apprenantes. Depuis 2017, ce module a été mis en application dans plus de quinze cours universitaires et utilisé par plus de 8000 étudiants et étudiantes. L'évaluation préliminaire de Growth & Goals a été généralement positive, ce qui indique que le module a été bien reçu à la fois par les étudiants et les étudiantes et par les éducateurs et les éducatrices, et qu'il guide avec succès les étudiants et les étudiantes dans l'apprentissage des concepts du module.

Keywords

self-regulated learning, metacognition, growth mindset, open education resource, goal-setting, postsecondary; apprentissage auto-régulé, métacognition, états d'esprit de croissance, ressources d'éducation libre, fixation d'objectifs, post-secondaire

Cover Page Footnote

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Addressing Three Problems that University Students Face

Attending university can introduce several new challenges into students' lives. Students must navigate learning in various and often new formats (e.g., lecture, online, blended, flipped, labs) while simultaneously managing many expectations both in school and more generally in life (e.g., part-time jobs, clubs, sports, volunteer work, family). Additionally, the postsecondary experience is often the first time that students have lived away from their family and have had to manage all their responsibilities on their own (Conley et al., 2014; Schulenberg et al., 2004). Through this project, we aimed to address three specific problems that university students may be facing for the first time:

- Problem 1: Learning to manage course and life goals,
- Problem 2: Identifying what they need to learn and how best to learn it, and
- Problem 3: Dealing with failure.

Equipping students to better manage these three problems can impart greater control over their academic success which in turn can help alleviate some of the stress of this transitional time (Abouserie, 1994; Bandura, 1978; Zimmerman, 2000).

These three problems are also at the core of two of the six Undergraduate Degree Level Expectations (UDLEs) outlined by the Ontario Council of Academic Vice-Presidents (OCAV) in the Quality Assurance Framework (Woolcott, 2008): Awareness of limits of knowledge (UDLE 5) and Autonomy and professional capacity (UDLE 6). The UDLEs are learning outcomes that students at any publicly assisted university in Ontario are expected to achieve regardless of their chosen course of study. The UDLEs are intended to provide society at large with the assurance that individuals who are educated at an Ontario university will have the skills necessary to become productive members of society and compete with university graduates from anywhere in the world (Woolcott, 2008). The first four UDLEs concern mastering and conveying the program-specific material and are explicitly taught in courses and programs. The fifth and sixth UDLEs are addressed in few programs and course descriptions (e.g., <https://catalogue.uottawa.ca/en/programs/>). We believe there is value in highlighting the importance of these skills for students and demonstrating that they deserve conscious reflection.

The aim of this work was to create an open education resource (OER) to be used in and customized to a variety of courses to help educators explicitly teach learning skills and help students address the three problems identified above. The OER needed to be relevant to any context into which it would be adopted, scalable, easy to share, adapt, and use, available in French and English, and engaging and relevant to the students who would be using it. Our goal for this manuscript is to introduce the reader to the resulting OER we developed called Growth & Goals. Herein, we describe how Growth & Goals addresses many challenges that students face. We describe the module in detail and explain various ways that educators can implement it in their courses. Finally, we provide a brief overview of the preliminary evaluation of the impact Growth & Goals has had on students and educators who have used it.

Our Approach

To address the three problems and highlight UDLEs 5 and 6, we developed a module that addresses five interrelated frameworks: self-regulated learning (SRL), goal-setting, metacognition, mindfulness, and mindsets. The module addresses these concepts through a combination of text and video with interspersed interactive activities that students can use to practice their developing learning skills (see Figure 1).

Figure 1

The Module Involves Text, Videos, Images, and Activities to Help Students Develop Learning Skills



Self-Regulated Learning: Providing Students with a Framework to Approach Challenges

SRL is a process by which learners take control of their actions and motivations, seize opportunities, and overcome challenges in an effort to achieve desired goals (Järvelä & Hadwin, 2013; Zimmerman, 2008). We focussed on Zimmerman's model of SRL (1989, 2008) to address problem 1 (learning to manage course and life goals). Zimmerman's model is an iterative, cyclical approach consisting of three phases: forethought, performance, and self-reflection (Zimmerman, 1990, 1998, 2000, 2002; Zimmerman et al., 1996). The cycle provides an organized, methodical framework for approaching goals and overcoming the challenges learners will face both in school and in their lives beyond academia. The learner is encouraged to plan an approach to reach their goals (forethought), act out that plan (performance), and then review their progress and adjust either their plan or their goals (self-reflection). The cycle then begins another iteration with the learner modifying their plan in accordance with their self-reflection and then enacting their new plan and so on, with each iteration getting the learner closer to their goal.

The use of self-regulatory strategies has been significantly positively correlated with course performance (Isaacson & Fujita, 2006; Pintrich et al., 1993; Zimmerman, 2008; Zimmerman & Pons, 1986). Academically accomplished students tend to be more naturally self-regulated than their lower performing peers (Richardson et al., 2012; Zimmerman & Martinez-Pons, 1990). Although self-regulation does not come naturally to all students, the skills required for self-regulation can be learned (Dörrenbächer & Perels, 2016; Hofer & Yu, 2003; Schmitz & Wiese,

2006; Zimmerman, 2002). Academic self-regulation is “the self-directive process by which learners transform their mental abilities into academic skills” (Zimmerman, 2002, p. 65). Because SRL has been broken down into well-defined steps, students can learn to use these steps to work towards achieving goals.

Goal-setting: Clarifying Priorities and Setting SMART Goals

One of the main focuses of SRL is goal setting (Zimmerman, 1989, 1990); thus, students need to learn how to set values-derived, well-defined, appropriate goals. Prior to setting goals, it is critical to connect with the underlying values that give goals energy and allow actions to be evaluated as values-congruent (Smith et al., 2019). Students start by identifying priorities in their life and then connecting those priorities to their involvement in the course. Students are also asked to reflect on their recent experiences and the points of pride and regret and, in doing so, connect previous experience with values-based action. Values clarification helps set the foundation for goals to be effective.

For students to work towards goals in an efficient manner, goals need to be fine-grained enough for students to remain motivated (Bandura & Schunk, 1981). When a goal is too big, it can be difficult to gauge progress. Conversely, when a goal is broken down into sub-goals, students can complete tasks and thus closely monitor their progress toward their larger goal. In addition, an actionable plan can more easily be constructed around smaller goals. Goal setting theory and research on goal setting has shown that productivity and motivation increase when a specific goal has been set (Bandura & Schunk, 1981; Latham, 2004).

To help students formalize their goals, we presented them with a framework for setting course-related goals within the module. We wanted a framework that would be memorable and applicable to most goals so students could also use it in aspects of their lives beyond the course. To this end, we chose the SMART goal framework (see Figure 2). SMART is an acronym that, in our case, stands for Specific, Measurable, Accountable, Reachable, and Time-specific.

Figure 2

The SMART Goals Framework



Metacognition: Self-Monitoring is Crucial for Effective Learning

Simply put, metacognition is thinking about thinking and consists of two main parts: metacognitive knowledge and metacognitive control and regulation (Flavell, 1979; Pintrich et al., 2000) (see Figure 3). Metacognitive skill is required at each of the three phases of the SRL cycle (Butler & Winne, 1995; Garcia & Pintrich, 1994; Perry et al., 2018). During the forethought phase,

metacognitive knowledge is used by the learner to help plan an approach to a goal; the learner must come to know which approaches work best for them. During the performance phase metacognitive regulation is used to guide or control learning behaviours. Finally, during the self-reflection phase, the learner uses metacognition to understand where they stand relative to their learning goal (Hacker et al., 2000; Isaacson & Fujita, 2006; Tobias & Everson, 2002). Those with greater metacognitive skill tend to be higher achievers (Hartwig et al., 2012) and better self-regulated learners (Isaacson & Fujita, 2006; Pintrich et al., 2000). Metacognitively skilled students also tend to have the motivation and ability to control their behaviour in pursuit of goals, which is essential for SRL (Järvelä & Hadwin, 2013).

Figure 3

Metacognition Has Two Main Parts: Metacognitive Knowledge and Metacognitive Control and Regulation



Like SRL, there is evidence that metacognitive practices can be learned through introducing students to metacognitive strategies (Perry et al., 2018; Schraw, 1998); thus there is a need for effective classroom interventions that will educate students on the concept of and the approaches to metacognition (Nietfeld et al., 2005). For our purposes, we approached problem 2 by creating an OER that helps students improve their metacognitive abilities.

Mindfulness: Present-Time Awareness and Acceptance of Thoughts and Feelings

Mindfulness is a practice that allows a person to develop present-time awareness of thoughts and feelings, and accept those thoughts and feelings as natural products of the mind that one can observe and can allow to pass without becoming entangled, distracted, and off track (Hayes et al., 2006). Mindfulness can help us develop awareness of patterns of behavioural responding that may be sub-optimal (Brown & Ryan, 2003).

In the module, mindfulness connects with the phases of SRL, with metacognition (awareness of abilities and strategies), and present-time awareness of mindset and associated emotions. The module educates students on the nature of mindful awareness (present-time awareness, non-judgement, perspective taking) and offers students activities to become more aware of their own tendencies. Online resources are provided to help students develop mindfulness through short meditations and incorporate mindful practices in their everyday life (e.g., brushing teeth, eating) to make mindfulness more accessible.

Growth Mindset: Students' Beliefs About Intelligence Can Impact Academic Achievement

Finally, we included the concept of growth and fixed mindsets (see Figure 4). A person who holds a growth mindset is one who believes that intelligence is malleable and can be increased through appropriate effort and resilience in the face of failure; conversely, a person with a fixed mindset believes that intelligence is hardwired and cannot be increased – its presence (or lack thereof) can only be measured (Dweck 2006; Dweck & Leggett 1988; Robins & Pals 2002). Importantly, growth and fixed mindsets exist on a continuum and can vary from one aspect of a person's life to another (Corradi et al., 2018; Dweck & Leggett, 1988). Additionally, those on the growth end of the mindset continuum tend to have better academic results and respond better to setbacks (Corradi et al., 2018). Beyond the student's own mindset, even the mindset of their educator can have an effect on the student's performance (Canning et al., 2019).

Figure 4

Fixed and Growth Mindsets Exist on Two Extremes of a Mindset Continuum

As you approach a challenge:



Mindset will often become apparent upon encountering a challenge. Students entering university are often faced with more difficult academic challenges than that to which they are accustomed (Aronson et al., 2002; Dweck, 1986, 2000; Robins & Pals, 2002). Often, the strategy chosen to approach the challenge is based on how they view intelligence. Those with a fixed mindset tend to approach challenges and the potential for failure as a threat to their intelligence and see the need to exert effort as something that might expose their inadequacies; in contrast, those with a growth mindset see effort (as well as failure) as necessary to achieving success and welcome a challenging task as a chance to learn something new (Blackwell et al., 2007; Dweck & Leggett, 1988; Fink et al., 2018). Because cultivating a growth mindset can teach students to believe they can increase their intelligence and to accept rather than fear failure, we include this concept in our OER to address problem 3.

Changing one's mindset is not easy work. Receiving criticism (e.g., poor results on an evaluation) can be emotionally taxing but should ideally be viewed as a chance to improve rather than as a personal attack (Dweck, 2006). Furthermore, a person cannot simply declare they have a growth mindset and instantly become an "A" student. A learner must actively recognize when their fixed mindset is predominating and then work towards transforming their reaction to one that will cultivate a growth mindset (Dweck, 2006). Oversimplifying the process (either by the educator or the learner) can actually be detrimental; learners may become discouraged when they do not experience an immediate change in academic achievement or motivation. It is, therefore, crucial

to instil in learners that having a growth mindset is not about words and intentions but about actions, practice, and time.

While there has been much positive attention on growth mindset as a tool to improve learning, a recent double meta-study of growth mindset has indicated that the effectiveness of interventions aimed at increasing growth mindset may have been overstated (Sisk et al., 2018). The meta-study did however indicate that for academically at-risk students and students from low socioeconomic status (SES) homes, there was a significant effect of intervention. This finding may not be surprising since members of these populations often hold a more fixed mindset in the first place thus have more room to move towards a growth mindset; Claro et al. (2016) found that over 60% of students in the lowest family income decile held a fixed mindset and less than 15% held a growth mindset whereas about 30% of students in the highest decile held a fixed mindset and a roughly equal number held a growth mindset. The prevalence of fixed mindset in students from low SES households relative to their higher SES peers is due to a situational difference rather than an inherent difference between these groups (see Claro et al., 2016 for a valuable discussion of the impact of SES on mindset and academic achievement).

Despite this tempered view of growth mindset interventions, we were mindful that interventions (let alone low-cost interventions) that show any impact on academic achievement are difficult to find, thus we believe that these effects do warrant the inclusion of the concept of growth mindset in Growth & Goals. Furthermore, incorporating mindfulness in the cultivation of a growth mindset is helpful in discouraging students from taking self-deprecating thoughts as literally true and encouraging them to continue to engage with valued activities despite the presence of negative internal experiences. Mindfulness also connects with growth mindset in that developing such a mental stance requires the student to be an observer of the self (referred to as self-as context; Hayes et al., 2006) and take perspective without over-identifying with self-definitions (e.g., I'm just not a math person).

The literature outlining the importance of SRL (Pintrich, 1995; Zimmerman, 2008), metacognition (Hartwig et al., 2012; Isaacson & Fujita, 2006; Nietfeld et al., 2005), growth mindset (Aronson et al., 2002; Paunesku et al., 2015; Sriram, 2014; Yeager & Dweck, 2012), and mindfulness (Bellinger et al., 2015; Keye & Pidgeon, 2013; O'Driscoll et al., 2017) for university students is abundant and presents important opportunities to better equip students for academic, personal, and professional success. However, existing interventions and available resources to teach students about these concepts and their interrelated nature proved difficult to find, as described in the next section.

Existing Interventions

The research on SRL, metacognition, and growth mindset skills suggests that students who already possess these skills are more likely to achieve academic success and show resilience in the face of failure than those who do not (Dörrenbächer & Perels, 2016; Nietfeld et al., 2005; Yeager & Dweck, 2012; Zimmerman & Pons, 1986). Furthermore, studies have reported that these skills are teachable (Aronson et al., 2002; de Bruin et al., 2017; Fink et al., 2018; Louis, 2011; Miller & Geraci, 2011; Perry et al., 2018; Pintrich, 1995; Zimmerman et al., 2011). Through consultation with expert collaborators and stakeholder focus groups (including both students and educators), we identified a set of critical features including and in addition to the aforementioned skills (Table 1) that would be valuable to include in an OER. Once the desired content was identified, we developed a meaningful delivery approach through further discourse with experts and

stakeholders. We looked at examples of existing resources that were also aimed at helping students manage academic life and found that, while existing resources certainly have great value, none encompassed all the desired content and features determined through our consultations, thus we created Growth & Goals to meet these needs in a single resource. For further information on existing interventions, please refer to the Appendix.

Table 1

List of Growth & Goals Features Determined in Consultations with Experts and Stakeholders Compared with Existing Resources.

Features	Growth & Goals	The Learning Portal (Ontario College Libraries) ^a	CompleteStudent.ca ^b	Brainology ^c	Developing self-regulated Learners ^d
1 Open Education Resource (OER)	✓	✓	✓		
2 English	✓	✓	✓	✓	✓
3 French	✓				
4 Interactive	✓			✓	
5 Customizable	✓				
6 Self-Regulated Learning	✓				✓
7 Metacognition	✓				
8 Growth mindset	✓			✓	
9 Goal setting	✓				
10 Mindfulness	✓				
11 Study strategies	✓	✓	✓		
12 Scheduling	✓	✓	✓		
13 Postsecondary level	✓	✓	✓		✓

a. tlp-lpa.ca/home

b. completestudent.ca/

c. mindsetworks.com/programs/brainology-for-schools

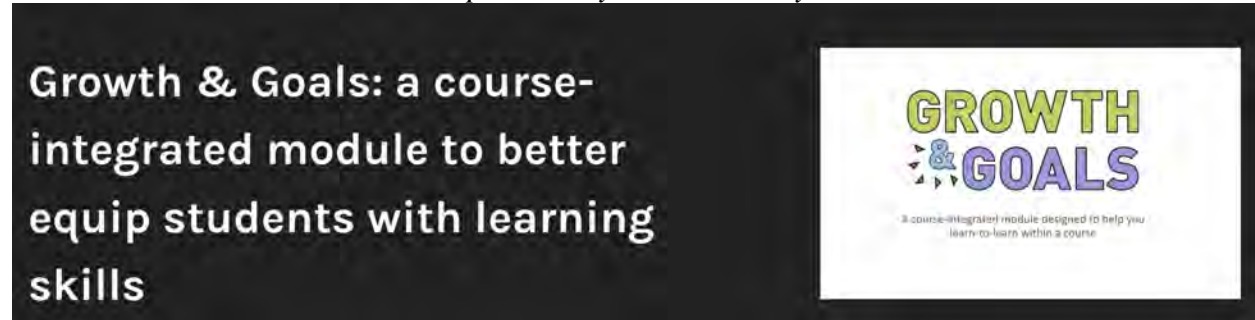
d. catalogue.pearsoned.ca/educator/product/Developing-Selfregulating-Learners/9780133906905.page

Growth & Goals

In response to the three problems we sought to address, we developed an open-source, online, scalable, adaptable, interactive module to help students learn skills related to SRL, goal-setting, mindfulness, mindsets, and metacognition, called Growth & Goals (see Figure 5). We developed two versions, each available in English and French: course-integrated ([French](#), [English](#)) and course-independent ([French](#), [English](#)) (Flynn, 2022).

Figure 5

Growth & Goals is an Interactive Module with English and French Versions. As an Open Education Resource, It Can Be Adapted to Any Postsecondary Context



Features

Growth & Goals is available in Pressbooks format; becomes part of the course; is adaptable to each course's context (discipline, pedagogical approach, level); is customized by the educator to include information about the course and the course's prerequisite and intended learning outcomes; conforms to the Accessibility for Ontarians with Disabilities Act (AODA); and can be delivered through a learning management system (LMS), a website, or as hard copies. The module is available to everyone as an online OER under Creative Commons licensing (CC-BY-NC-SA: Creative Commons – Attribution – Non-Commercial – Share Alike). To assist with the customization process, we created detailed written and video customization instructions (O'Connor, Roy, Flynn, 2018a).


Growth & Goals in Courses

Growth & Goals uses the course's prerequisite and intended learning outcomes as a basis for exploring the module's own concepts, thus taking minimal class or study time away from course content; in fact, it can enhance students' understanding of the overall goals of the course. Educators decide exactly how the module will fit into the structure of their course, including when activities will be due; whether the module will be worth course marks, bonus marks, or purely voluntary; and which activities will be included. We recommend assigning marks for completing the module to ensure high participation rates and to indicate that the educator places value in completing Growth & Goals; refer to the preliminary evaluation section for further details.

Growth & Goals has two main components: an informational component and an interactive component. The informational component is presented as a combination of text and video. The interactive component consists of online activities that include Likert scale, true/false, multi-select, and long-answer, free-writing style questions (see Figure 6). The module is presented to students as a series of chapters in Pressbooks, which contain the written information, embedded videos, and links to activities. Using an online, auto-populating spreadsheet, educators can track students' progress through the activities.

Figure 6

Example of An Activity from Growth & Goals. Educators Make Modifications to Suit Their Course

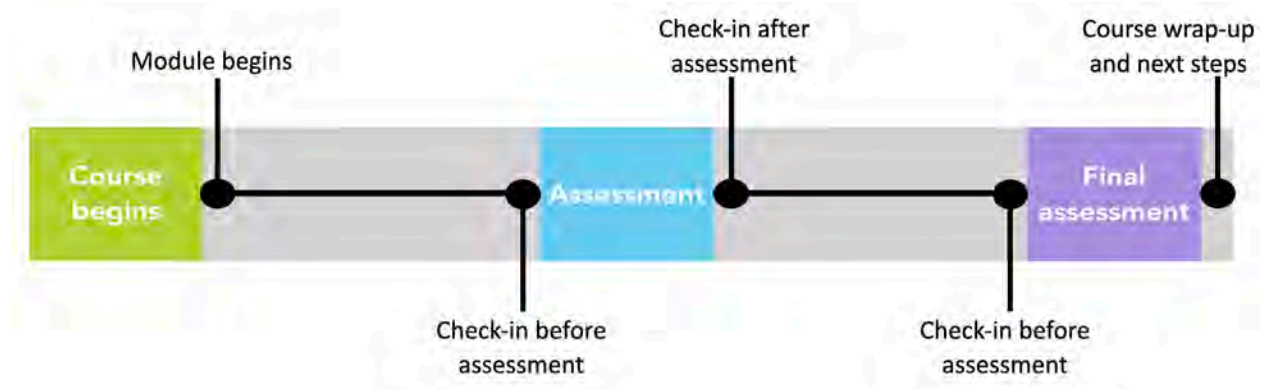


Rate your knowledge or skill at the following, with 1 being lowest ability (not able) and 10 being highest (mastery). [MODIFY LEARNING OUTCOMES TO SUIT YOUR COURSE. INCLUDE MORE OR LESS AS NECESSARY.] *

	1	2	3	4	5	6	7	8	9	10
Learning outcome #1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning outcome #2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning outcome #3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning outcome #4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning										

Although totally customizable, the module typically has a minimum of five sections: (a) an introduction to the concepts, (b) and (c) check-ins before and after major midterm assessments (such as midterm exams or assignments), (d) a check-in before the final assessment, and (e) a course wrap-up questionnaire (see Figure 7). The two midterm check-in sections are repeated based on the number and nature of major midterm assessments.

Figure 7
Module Distribution Timeline Within a Course



Module Sections

1. Introduction. Students complete the introduction at the beginning of the semester, which takes 2–5 hours. We modified Zimmerman’s SRL cycle in two ways. First, we renamed the phases to make them verbs and also make them more accessible and meaningful to students to name the new phases: Reflect, Plan, and Act. Second, we directed students to enter the cycle at the Reflect Phase rather than the Plan Phase as in Zimmerman’s SRL cycle. During the Reflect Phase, we ask students about their study strategies and their feelings about the subject. The concepts of mindfulness and present-time awareness are explained and situated in the academic context, including a discussion of the effects of distractions. Associated activities help students identify their present-time awareness, practice mindfulness, and learn ways to skillfully respond to situations rather than react automatically. We bring in the concept of mindsets by explaining how to recognize the mindset they hold towards the course, and how to change mindsets if desired. Next, we instruct students to move onto the Plan Phase where we introduce and prompt them to set SMART goals, so they have a plan in place to achieve their goals. We introduce the concept of metacognition and then ask students to rate their abilities with respect to the course’s prerequisite and intended learning outcomes to encourage metacognitive thinking patterns (Figure 8). We direct them (with a video example) to schedule their time and determine what resources they need in order to achieve their goals. Finally, they move onto the Act Phase where the students are encouraged to put their plan in motion to carry them to the first major midterm assessment in the course.

Figure 8
Mindfulness Section and Activity in the Growth & Goals Introduction
How present are you?

Distraction is an inherent part of student life. Apart from thoughts and worries about the next test or assignment due date, paying the rent etc., being constantly plugged in, social media, multi-tasking interfere with our ability to alert ourselves to important information and direct and maintain our attention on that information.



Activity 3 asks you to reflect on your **present-time awareness** and how present you are in your day-to-day experiences. Research shows that persons who engage in practices that build mindful qualities have greater levels of present-time awareness. Zen meditation practitioners, for example, score higher on average than individuals who do not practice mindful awareness. Mindful awareness among Zen practitioners correlated with the number of years they had been practicing. In the same study, mindful awareness was also associated with greater well-being.¹

Activity 3: Reflecting on my own mindful qualities

Below is a collection of statements about your everyday experience. Using the scale below, please indicate how infrequently or frequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

	Almost never	Very infrequently	Somewhat infrequently	Somewhat frequently	Very frequently	Almost always
I could be experiencing some emotion and not be conscious of it until some time later.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I break or spill things because of carelessness, not paying attention or thinking of something else.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find it difficult to stay focused on what's happening in the present.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Check-in Before Assessment 1. The second section is released to students just before a major course assessment (e.g., midterm, project). The educator edits this section to include all the learning outcomes that will be addressed in the assessment. In this section, students enter their second iteration of the SRL cycle. In the Reflect Phase, they are asked to practice their metacognitive skills by rating their abilities on module learning outcomes (i.e., how well they have learned the concepts of SRL, metacognition, goal-setting, mindfulness, and growth mindset) (Figure 9) and the course learning outcomes addressed in the upcoming assessment. They are asked to explain their ratings (i.e., did they base their ratings on feelings, self-tests, etc.). The aim of these self-rating activities is to help students identify and monitor gaps between their perceived and actual mastery of the course concepts. Then, they move on to a Plan Phase where they look again at the study strategies they intend to implement in preparation of the upcoming assessment. Finally, they move on to an Act Phase in which they do the work to prepare for the assessment.

Figure 9

A Metacognitive Activity in Which Students Rate their Abilities with Respect to the Growth & Goals Learning Outcomes

This question addresses with learning outcomes from the Growth & Goals Module. Rate your knowledge or skill at the following, with 1 being lowest ability (not able) and 10 being highest (mastery). *


Personal feelings, values, expectations, goals, etc. will not be assessed.

	1	2	3	4	5	6	7	8	9
Give the definition of Self-Regulated Learning and each phase (in your own words)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identify personal expectations for this module	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Address common myths about learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. How Did Assessment 1 Go? This section takes students through the next iteration of the SRL cycle and is released after the assessment is completed. Students are asked to reflect on the goals they set at the beginning of the semester and strategies they chose to use to prepare for the assessment (Figure 10). Some students will need to amend their goals so they are more realistic, some will need to make them more ambitious, and some will find they are on track. Finally, they are asked to think about their current mindset toward the course and whether they need to modify their schedule and plan for the rest of the semester.

Figure 10

In a Post-Assessment Activity, Students Are Asked to Reflect on How the Course is Going for Them and to Decide on Any Changes to Their Goals or Strategies.



In the space below, spend 5 minutes writing down everything you can think of about how the course is going so far.*

You can include how you're feeling about the course and [assessment], your effort level, how you're studying, outside factor affecting the course (positively or negatively), help you've sought (was it helpful?), friends, professor, etc.

Your answer _____

Now review your [assessment] and learning strategies you used leading up to the [assessment].

What changes will you make, if any?

Your answer _____

4. Check-in Before the Final Assessment. This second-to-last section of the module guides students through their final iteration of the SRL cycle for the course. This section repeats the activities that students encountered in the sections released both before and after midterm assessments. Additionally, as with the section released right after the midterm, they are asked to reflect on their progress towards their course goals (Figure 11) and their mindset towards the course. At the end of this section, students are encouraged to prepare for the final assessment.

Figure 11

An Activity that Asks Students to Reflect on the Progress They Have Made Towards their Course Goals



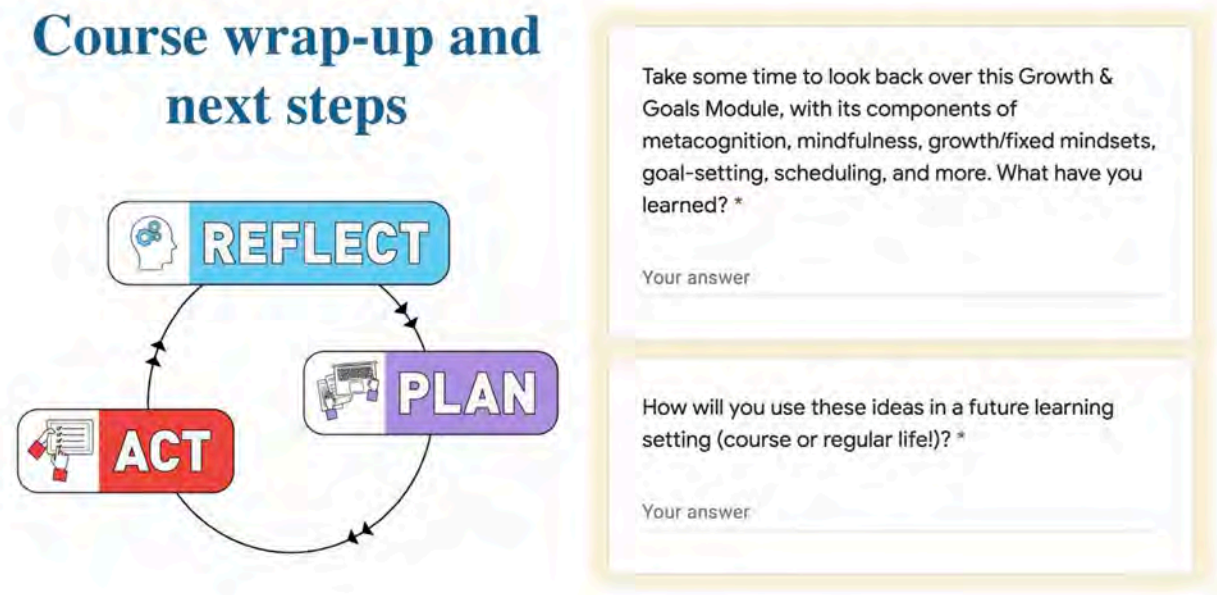
What progress have you made so far in progressing towards your SMART goals?
Is there anything that you now want to change?

Your answer _____

5. Course Wrap-Up. This final section contains a short questionnaire that asks students for their experience with Growth & Goals (Figure 12). They are asked to identify what the module taught them and how they will use the module's concepts in the future. These last two questions are designed to encourage them to transfer their learning to new courses and other areas of their lives. Questions also ask how they believed the module impacted their learning, whether they would recommend it to a peer, and what they would change.

Figure 12

The Final Activity Invites Students to Reflect on the Course and Decide on How to Use the Growth & Goals Skills in the Future



Does the Module “Work”? Preliminary Evaluation Findings

As of December 2022, the module had been implemented in at least 15 courses and has reached over 8000 students at multiple institutions and we continue to evaluate the module's impacts as we collect data.

Our preliminary evaluation from the first implementation of the module in an introductory organic chemistry course yielded positive and promising results. Before starting the module, students were given a questionnaire to understand their feelings and prior experience with the subject matter; 82% of students reported that they believed the module would improve their learning (N = 180). Upon completing the module, students were given a second questionnaire to gauge their reaction to having used the module; 79% of students reported that they would recommend that their peers should also complete the module (N = 34, note: the number of students who responded to the second questionnaire was considerably less than the first due to a questionnaire distribution error). Students from the chemistry course were taking advantage of the opportunity to reflect on their learning: for the long answer questions in the activities, we saw thoughtful, detailed responses with a mean word count of 55 words/response (N = 159). Based on implementation in three post-secondary courses (two introductory chemistry courses and an introductory calculus course), completion rates were greater than 75% when educators offered an incentive to students for completing the module, even if the incentive was as small as a 1–2%

bonus mark. A second-year psychology course offered a 5% bonus and had an average activity completion rate of 85% (N = 57). When no incentive was offered in a graduate level education course, completion rates fell below 30%. Students who participated in a focus group (N = 27) held after the first pilot semester gave generally positive comments with regards to their experience with the module. Three major themes emerged during the focus group: that the module content was highly transferable to other courses, had high value learning skills, and taught concepts of resilience.

Professors reported that the module took 1-4 hours to integrate in their courses initially, then almost no time in subsequent semesters of the same course. At the end of the course 0.5-2 hours were needed to collect and analyse the marks, which auto-populate in online spreadsheets. Professors also gave helpful feedback regarding the first iteration of the module, which was incorporated to improve the subsequent versions.

As the module has been implemented in more classrooms, a larger, more comprehensive educational evaluation of this module is ongoing, which is intended to answer questions related to the module's use, effectiveness, and adaptability in different contexts. Overall, the findings to date have been very positive (O'Connor et al., 2022).

Conclusions

We created the first open-source, customizable, online learning module to help students learn to learn using self-regulated learning, metacognition, goal setting, mindfulness, and growth mindset skills, called Growth & Goals. The module has two aims: (a) to better equip students with the necessary skills to learn to manage competing course and life goals and demands (Problem 1), identify what they need to learn and how they can best learn it (Problem 2), and deal with failure (Problem 3); and (b) to achieve Undergraduate Degree Level Expectations 5 (Awareness of the limits of knowledge) and 6 (Autonomy and professional capacity skills). Growth & Goals introduces its concepts through a series of text, video, and interactive activities that are integrated with the content of the course. Students receive sections of the module to complete at various significant time points throughout the semester. Preliminary results from the module's evaluation are extremely positive. Educators do not need expertise in learning skills to use the module in their courses. The module is available in English and French and can be adapted to any postsecondary context across disciplines, either integrated in a course ([FR](#), [EN](#)) or as an independent resource ([FR](#), [EN](#)) (Flynn, 2018a).

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Appendix

Module Development and Evaluation

Data Collection

The data collected through the Growth & Goals module itself consists of student responses to the activities. Data collection is important for three reasons: (i) instructors use the data to assign grades for module completion (if grades have been allotted), (ii) instructors can review responses to gauge how students are progressing through the module and with respect to their self-rating on course's LOs, and (iii) if shared, the data collected allows us to study the effectiveness of the module, following appropriate Research Ethics Board guidelines and approvals. Using Google Office Suite for the Growth & Goals module allowed for easy and efficient data collection, as discussed further in the Development section of this paper. The output format is easy to use both for instructors and for module evaluation. Alternatively, the module could be adapted to other formats.

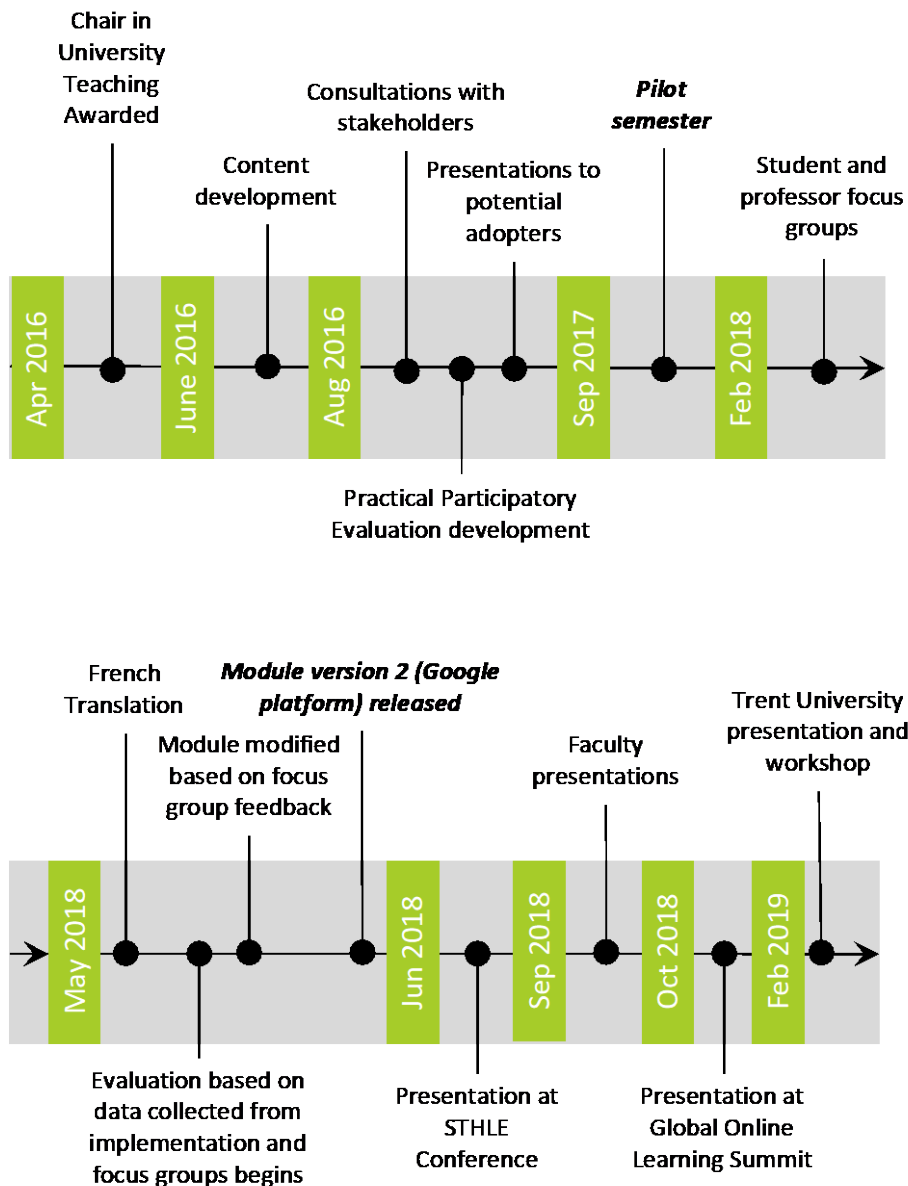
Development

To design the module, we used a variation of an instructional design model known as ADDIE: Analysis, Design, Development, Implementation, and Evaluation (Branch, 2008) and using concepts from cognitive psychology to engage learners and design learning activities (Brien, 1997). Essential to this process was the collaboration between an instructional designer, graphic designer, students, and professors.

An online module integrated into courses

The format of the OER (*i.e.*, a module integrated in courses) was decided through early consultations with students, professors, and e-learning instructional designers using focus groups and meetings (Fig. 13). These consultations revealed that students preferred a resource that was integrated in existing courses rather than other options that would have additional requirements (*e.g.*, workshop, separate course). Two versions of the module were tested. One used the university's learning management system which made it simple to share within the university but difficult to disseminate beyond our institution; it also made data collection difficult. The second version consisted of PDFs that were distributed to students which linked to activities developed in Google's office suite. This second version was easily shareable and student responses were easy to collect and analyse. As of January 2023, we have versions available through a learning management system (Brightspace by D2L) and through Pressbooks, all available through our website: FlynnResearchGroup.com/GrowthGoals.

Figure 13
Module Development from Inception to Time of Publication



Design team

The design team consisted of the Chair in University Teaching (Flynn), students, an instructional designer from the University of Ottawa’s Centre for Innovative Pedagogies and Digital Learning, a web programmer, graphic designer, web designer, and professional translator. Many other people contributed to the project through consultations, including the manager of uOttawa’s Access services (part of Student Academic Support Service), professors, and students (through additional focus groups).

Evaluation framework

We are using a practical-participatory evaluation (P-PE) framework (Cousins & Whitmore, 1998; Cousins, Whitmore, & Shulha, 2012). In this framework, an evaluation team is formed of project stakeholders (e.g., students, instructors, Teaching and Learning Support Service members, Student Academic Support Service Representatives, administrators). Together, the team developed an evaluation framework, which involves developing the major evaluation questions, indicators, data sources, data collection methods, and bases of comparison. A P-PE was appropriate to allow us to bring in and value the voices of various stakeholders, with the intent that the results of the evaluation would be more meaningful, applicable, and result in a better end product. Katherine Moreau, a member of uOttawa's Faculty of Education joined the evaluation team as a facilitator for the process. This initial program evaluation has led to further study, which will be reported in due course.

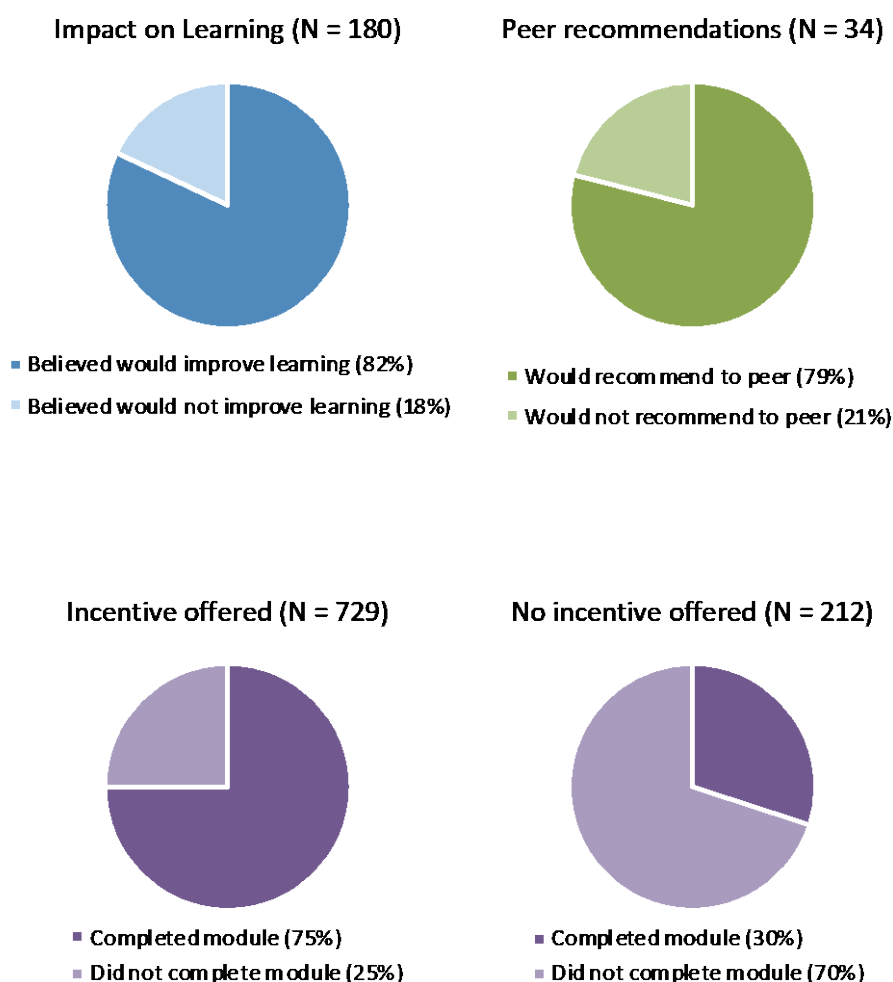
Research involving human participants

As a program evaluation, the University of Ottawa's Office of Research Ethics deemed that this project was exempt from full Research Ethics Board Review, based on Canada's Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2), Article 2.5 (<https://ethics.gc.ca/eng/documents/tcps2-2022-en.pdf>).

Preliminary evaluation findings

The chief issue reported initially was that there was too much work to do in the module right before midterm assessments when the students preferred to be focusing on learning course content. We adjusted the module to address this comment by moving the relatively time-consuming goal-related reflections to the post midterm assessment activities and have received no further complaints regarding the length of the module.

Figure 14
Positive Preliminary Findings.

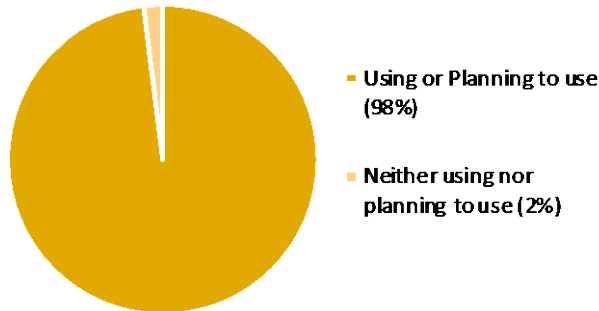


To determine if students were still using and benefiting from what they had learned in Growth & Goals, we surveyed students in a Biochemistry course that had Organic Chemistry II as a prerequisite (N = 111, 41% response rate). The University of Ottawa offers three sections of Organic Chemistry II: one in French and two in English. Growth & Goals had been piloted in one of the two English sections of Organic Chemistry II in the semester prior to the biochemistry course thus we hypothesized that between one third and one half of biochemistry students in the course had been exposed to the module. This classroom provided us with a pseudo-control-experimental design to compare the results of students who completed the module against those who did not; 41 survey respondents reported having used the module while 70 had not. Of the respondents who had been exposed to the module, 98% were either still using or planning to use one or more of the concepts or strategies that they learned from the module (Fig. 15); 28% were using the SRL cycle and 40% were planning to use it; 52% were using metacognition and 25% were planning to use it; and 40% were cultivating a growth mindset and 30% were planning to do so. The high proportion

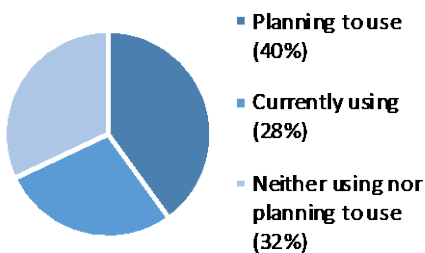
of students still using the module’s concepts is an excellent sign that students value the skills they have learned.

Figure 15
Students are using Concepts from the Module in Subsequent Courses

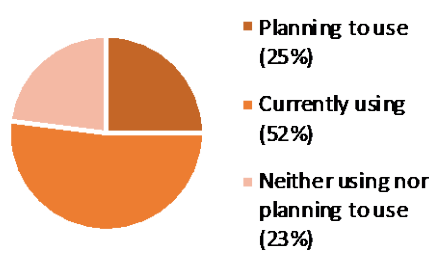
Any module concepts (N = 41)



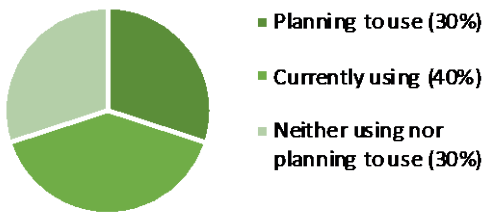
Self-Regulated Learning (N = 41)



Metacognition (N = 41)



Growth Mindset (N = 41)



Knowledge mobilization
Module presentations

As part of the process of sharing our module with potential adopters, we have given multiple presentations in various settings outlining the problems we set out to solve, the approaches we took to addressing these problems, and the early findings of our evaluation (Flynn, 2018; O’Connor, Roy, Flynn, 2018a; O’Connor, Roy, Flynn, 2018b; O’Connor, Roy, Flynn, 2019; Flynn, 2022). Prior to the pilot semester, the module was presented to staff and faculty within uOttawa to stimulate interest in implementing the module in their classrooms. Using the preliminary data collected from the first round of implementations, both through actual module data and through student and faculty focus groups, we presented the module and our findings to

date at the 2018 STLHE Conference, the 2018 Global Online Learning Summit, and at the Teaching and Learning Support Service at Trent University; we continue to present this work at department meetings and meet one-on-one with interested instructors.

Student champions: Peers sharing their experiences

People tend to be more accepting of adopting a given behaviour (in this case, the use of the Growth & Goals module) when someone from their peer group models the behaviour (Dale H. Schunk & Zimmerman, 1997). In line with this phenomenon, students told us they wanted to see previous users of the module introduce new users to the module. We refer to these module ambassadors as student champions. To recruit champions, we included a question in the final module questionnaire that asks students if they would like to volunteer to be a student champion in the following semester. This question allows instructors to easily follow up with interested students. Prospective champions would have already completed the module and, importantly, have felt they gained valuable skills and insight as a result.