

# Student Learning: Self Managing Learning for Success

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**Abstract:-** The study investigates the implementation of a student self-managed learning log and its effects on students' academic performance as measured by performance in their final grades. Students volunteered to be in the participant group, or the control group, with equal numbers chosen for each group. Quantitative data shows a notable enhancement of the student's performance in the group that used the learning log as noted in their final grade for biology, compared to those who did not use the self-managed learning log. An Analysis of the teacher's implemented formative assessment shows a practice of integrating several aspects of formative assessment; and provides supporting evidence of what formative assessment may impact, with a focus on the significant impact on students' final grades.

**Keywords:-** Quantitative Research, Quantitative, Qualitative. Formative Assessment, Self-Managed Learning Log, Self-Regulated Learning.

## I. INTRODUCTION

Students managing their own learning, even with a cursory overview of John Hattie's list of 150 influences on achievement, we find student self-assessment, quickly, it's right at the top, number one. In a system where the average effect size (ES) for one academic year is 0.40, Hattie reports that the ES for what he calls, "self-reported grades" is 1.44. He notes it's not the accurate reflection of their performance that matters for student achievement, but that students have the opportunity to "predict their performance." We do this by "making success criteria transparent, having high, but appropriate, expectations, and providing feedback at the appropriate levels" (Hattie 2012, p. 60). A discussion of the research to date on Self-managed learning practices, teacher's support for student-managed learning, existing self-managed learning tools, and research demonstrating the link or lack of a link between student self-managed learning and course grades, will lead to the explanation of the study, and ultimately the proposed tool that supports students' self-assessment to enhance learning.

## II. SELF-MANAGED LEARNING PRACTICES

Self-regulated learning (SRL) is associated with academic achievement (e.g., Brown & Hirschfield, 2007; Panadero, 2017; Richardson, Abraham, & Bond, 2012; Timperley & Parr, 2009) and is considered a cornerstone of life-long learning (Gielen, Dochy, Onghena, Struyven, & Smeets, 2011; Lüftenegger et al., 2012). When students self-regulate, an internal locus of control provides direction and guidance for the student to meet their learning goals. There

have been a number of studies that conclude that there is a correlation between locus of control and academic achievement. These studies concluded that students with an internal locus of control had higher academic achievement than students with an external locus of control (Uget, 2007). A formative assessment tool, with structure, procedures, processes, and outcomes, when routinized, is demonstrated to facilitate a guided and self-reinforcing method of managing to learn towards a goal, of academic success, indicated by high percentage grades.

Self-regulated learning involves metacognitive, motivational, and behavioral processes and beliefs in a proactive regulation of the learning process (Zimmerman, 2008). In the model by Zimmerman, SRL processes and accompanying beliefs fall into three cyclical phases: forethought, performance or volitional control, and self-reflection (Zimmerman, 2000). The forethought phase refers to processes and beliefs before efforts to learn, the performance phase includes processes during the implementation of the effort and the self-reflection phase involves processes after each learning effort.

An analysis of the task to be completed and the intrinsic motivation to do the work necessary, are two components of the forethought phase processes. Task analysis may include short and/or long-term goals, such as class by class, unit by unit, course by course, setting of goals, and creation of a strategic plan on how to move through the learning objectives. Self-motivation may be a construct individually created founded on the value of the outcome weighed against the inputs necessary for success. If the learning values the outcome enough, or perceives the inputs necessary for outcome achievement are warranted, and within their perceived range of capabilities, motivation proves to be a strong enough force to move the individual to act. For example, self-efficacy beliefs refer to a student's confidence in succeeding with learning or solving a task, and perceived autonomy involves perceiving the freedom to carry out the self-evaluation process. The performance phase processes embody self-control and self-observation. One's ability to achieve focus and maintain strategies towards the goal, with metacognitive reflection, supports the actualization of self-control and self-observation on the specific tasks or processes, monitoring the learning processes through self-observation processes, and motivation increases learning (Zimmerman, 2000). Thus, in the performance phase, individuals observe, evaluate and postulate the benefits of self-assessment to their learning efforts when necessary. The self-reflection phase processes are the individual's evaluation of the performance in the self-assessment and external assessments in which the self-assessment is to impact, and its inherent or desired value

(Zimmerman, 2000). These three phases, when routinized become a cyclical process that supports, and reinforces itself, enhancing the likelihood of continuation.

What teachers believe makes a difference to the pedagogical strategies they might use in their classrooms (Fives & Buehl, 2012; Thompson, 1992). Similarly (Cizek, Fitzgerald, & Rachor, 1995; Kahn, 2000) found this to be true for aspects of pedagogy including assessments, as, for, and of learning. Teachers assess the learning intentions, marry them with success criteria and search for or build pedagogical strategies that enable each child in the class to learn. This aspect takes considerable time, and for highly effective strategies to be utilized, teachers need the training to recognize what works very well for what learner. A significantly challenging aspect of assessment for teachers is the employment of student self-assessment (SSA); there are as many varying opinions about the use of student self-assessment as there are types of assessment templates to be used (Tan, 2012). The purpose of this paper is to demonstrate how effective a self-managed, self-reflection and assessment tool can be, when success is, in theory, is aligned with success on end-of-course final grades.

#### ➤ *Self-managed learning tools*

Why would one use self-assessments, it is about judging, evaluating, and considering the qualities of one's own academic work or abilities with the aspiring outcome of improving the knowledge of one's own level of performance and how to improve said performance. Some have proposed that self-assessment practices can be grouped into three major types: self-ratings, self-estimates of performance on formal assessments, and criteria or rubric-based assessments (Brown & Harris, 2013). When learners have significantly developed metacognitive skills, the act of reflection becomes intuitive to the process and means the learner does not need external reaffirmation as to whether or not concepts/content, or processes have been mastered. Self-rating requires students to judge the quality or quantity aspects of their work using a rating system (e.g., a checklist or traffic lights) (Black & Harrison, 2001; Clarke, 2005). By having the learner internalize and see value in a rating system, rubric-based, to assess their learning, they own the assessment and become more meaningful than external validation. Sometimes the learning goal initially is to have learners construct Self-estimates of performance including marking or grading one's own work using either a marking guide for objectively answered questions or a model answer (Todd, 2002). Rubrics arrange quality indicators in incremental progressions that students use to best fit the various aspects of their work and are especially common in writing or portfolio assessment (Andrade & Valcheva, 2009). There are a varied plethora of rubric formats, however choosing one that students are comfortable with, and can implement the use of, without significant energy in learning, will not only expedite the process but increase the reliability of the rubric and its validity in the learning environment.

In a review of student self-assessment in K-12, Brown, and Harris (2013) reported that self-assessment generally had a positive impact on academic performance (median effect

size lay between  $d=.40-.45$ ). However, Hattie (2009) places self-reported grades as the highest effect size of 1.44. Teachers have utilized this strategy for decades when they ask students, once they know the curriculum outline and depth of the course of study, to predict their grades, students are more accurate than the teachers at predicting their final grades. Greater effects were seen in self-assessments that involved deep engagement with the processes affiliated with self-regulation (i.e., goal-setting, self-monitoring, and evaluation against valid, objective standards). Training in diverse self-assessment strategies has been shown to lead to learning gains (Brown & Harris, 2013; McDonald & Boud, 2003; Panadero et al., 2012; Ramdass & Zimmerman, 2008; Ross, Hogaboam-Gray, & Rolheiser, 2002). When students receive instruction in a number of self-assessment strategies and apply them, increases in learning as demonstrated by classroom-based assessments have been forthcoming. Using models, answers, or teacher feedback to guide self-assessment judgments also generally improved performance (Hewitt, 2001; Olin & Sullivan, 2002). Children who contribute to the development of evaluative criteria and who subsequently use the criteria to self-assess also achieve better (Andrade, Du, & Mycek, 2010; Ross, 2006; Sadler & Good, 2006). Consequently, it appears that self-assessment of a task or quality of one's own work will generally improve academic performance across a range of grade levels and subject areas, although the extent of these gains varies across studies. To pinpoint the extent of gains, a more detailed study of subject material (content) context (learning environment) and processes (demonstration of learning) would need to be studied together.

An important consequence of self-assessment is that it contributes to increased self-regulation of learning (Klenowski, 1995; Ramdass & Zimmerman, 2008). Self-regulation of learning requires the exercise of metacognitive functioning in which the student monitors and evaluates his or her own performance and generates feedback as to what should be done next (Butler & Winne, 1995; Zimmerman, 2008). For learners at any age to self-ass with any degree of accuracy, requires the learner to have developed skills to manage their behaviors, otherwise known as self-regulation abilities. It should be no surprise then, that self-assessment, especially when using rubrics and scripts, has been found to improve student self-regulation (Brown & Harris, 2013), including higher education students (Panadero & Alonso-Tapia, 2013a; Panadero, Alonso-Tapia, & Reche, 2013; Panadero & Romero, 2014). Goals are more effective when students share a commitment to attaining them because they are more likely to seek and receive feedback (Locke & Latham, 1990). The feedback the learner receives has a focus shift in that, the feedback is self-generated, and may be combined with external teacher feedback if the student feels it is meaningful and constructive. Nonetheless, teachers need to implement self-assessment in an appropriate manner, including giving training and practice in the process (Brown & Harris, 2013; Goodrich Andrade, 1996, Andrade & Valcheva, 2009; Ross, 2006). Teachers need to provide space in the curriculum for SSA to happen and support students in engaging in the self-regulatory and metacognitive processes required in SSA. Because students tend to adapt to their teacher's assessment practices (Andrade & Du, 2005; Cowie,

2005), it seems important to investigate the reasons underlying teachers' uses (or not) of student self-assessment. Teachers are awakening to better utilization of classroom minutes, and not teaching until the end of the allotted time. Instead, teachers have built into their routine, student self-assessment on the lesson, and often use formative assessment tools such as exit slips, rewind sheets, and other strategies to review the required learning and their success with it, within the lesson's time frame.

The major components of feedback answer the three most important questions in education that need to be in place for learning to advance. John Hattie and others have noted that students' improvements in performance generally arise out of three conditions in the learning environment. Where am I going? (What are the goals?), How am I going? (What progress is being made toward the goal?), and Where to next? (What activities need to be undertaken to make better progress?) These questions correspond to notions of feed-up, feedback, and feedforward (Hattie and Timperley, 2007). This paraphrased means, what are the learning intentions, do I know what success looks like, and what do I need to do to go from where I am (present) to where I need to be (future). When students reflect during or at the end of class, on these questions, they generate their own feedback and can provide that to the teacher, which helps the teacher review, teach differently, or find new approaches that enable deeper and mastery learning of the day's lesson.

An important concern about SSA is whether it is accurate or not (Brown & Harris, 2013). Studies reviewed by Ross (2006) indicated that the student can be highly consistent in self-evaluations but much less reliable when compared to other measures (e.g., test scores, teacher ratings, or peer ratings). In general, in K-12 studies (Brown & Harris, 2013), the correlations between (a) student self-ratings and teacher ratings, (b) student self-estimates of performance and actual test scores, and (c) student and teacher rubric-based judgments were positive, but few studies had correlations greater than .60. It is important to note that these values were not consistent across student experience and academic proficiency. According to Brown and Harris (2013), younger children tended to be more optimistic, lenient, or generous than older students in their self-estimation of performance; while, older students' self-ratings were lower than younger students. Nevertheless, older students' self-assessments tended to correlate more strongly with teacher ratings or test scores. Additionally, higher-performing students evaluated their own work more accurately and seemed to be more severe in assessing their work than their teachers; while lower-ability students tended to be more lenient and less accurate. More recently Boud, Lawson, and Thompson (2013, 2014) reported, similarly, that high achievers underestimated their performance and low achievers overestimated, while average performing students were more accurate. Interestingly, the average students they studied had the most noticeable improvement in their performance, while more modest gains were found among the high and low achievers.

Chappuis, J. (2009) said "Research results repeatedly confirm that when students are required to think about their own learning and articulate what they understand and what they still need to learn, achievement improves). With the optimal goal, being increased learning, and students as self-assessors, as the determining, what is needed is a tool and process that provides that eventuality.

#### ➤ *Formative Assessment*

Compared to traditional assessment, formative assessment is one of the assessments for learning. In this study, the definition of formative assessment (FA) is defined as "Practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about next steps in instruction that are likely to be better, or be better founded, than the decisions they would have taken in the absence of evidence that was elicited" (Black & Wiliam, 2009, p. 9).

Traditional assessment is teacher-centered and focuses on the content, while formative assessment is more student-centered and focuses on the process of learning. The agents (teachers, peers, and the learner) discover what students know while they are still in the process of learning through formative assessments. As de la harper and Radloff (2000) stated that students' cognitive, metacognitive, motivational, and affective characteristics have an impact on the student's academic achievement (p. 169). With formative assessment, these characteristics can be detected. Students and teachers can make informed decisions about the way how they learn and teach by analyzing these characteristics (de la Harpe & Radloff, 2000, p. 173). Therefore, formative assessment is a student-centered assessment that emphasizes the role of the teacher, student, and peers in the assessment process to enhance ongoing learning and learning autonomy (TICAL as cited in Vlachou, 2015, p.101).

Formative assessment feedback does not impact students' SRL and SSA but also has a significant influence on informing teachers' practices. Evaluative judgment is a vital capability for effective SRL and SSA (Panadero, 2018, p. 3). Students' evaluative judgment capability can be increased through active students' involvement (William, 2011). Formative assessment feedback is a method that allows students' active engagement in a bidirectional way, feedback from teachers to students and from students to teachers. On the one hand, feedback generated by teachers through formative assessments reflects students' current learning situation, which facilitates higher accuracy of evaluative judgment. Moreover, according to Yan and Brown (2017), self-directed feedback-seeking is a dispensable component of the self-assessment process model. The model contains determining assessment criteria, self-directed feedback-seeking, and self-reflection. During the phase of self-directed feedback-seeking, students acquire external and internal feedback to reflect on their performances. FA is a platform where feedback can be generated by various agents (teachers, peers, and the learner) and used for students' SRL and SSA. On the other hand, students' feedback to teachers facilitates teachers' understanding of students' mastery situation. Students'

feedback informs future instructions on reducing the discrepancy between current and desired to understand (Hattie & Timperley, 2007, p. 86). The online learning log in this study amongst other insights is an example of how students' feedback impacts teachers' lesson planning. [more information here?]

### III. THE STUDY

The teacher who partook in the use of the learning log self-management tool had worked as a biology teacher for over 25 years, with varied approaches for formative assessment and student self-assessment strategies prior to the study. The author was involved in this study as a biology teacher. The teacher had two biology classes running concurrently, but at different blocks in the day. The learning log was used by 100% of all students in one class, and 50% of students in the 2<sup>nd</sup> class, all voluntary.

The teacher had participated in professional development over his 25 years of teaching biology and expressed that he had attempted to implement many formative assessment practices in the past in Canada and China. The teaching strategies were the same in both classes except for the students in Class B who 100% were using the student learning log and in Class A where 50% were using the student learning log. The teacher implemented the learning log practice in both the intervention class and the control class, and the two parallel biology classes were taught by him. The participating students were between the ages of 17 - 19 years of age and from almost identical social and cultural backgrounds, as they were all attending a Chinese International school. There were two foreigners, in each class, in Class B two participated, and in Class A, two did not participate. The number of students in the intervention class was 20, and 20 in the control group. There were 10 males and 10 females in each class A and B who agreed to participate and provided signed consent forms from themselves and their parents.

#### ➤ *Study Group*

The teacher, participating in the present study, had been at the school since its inception and had taught for the two preceding years biology classes. From the onset of the semester, he started the intervention where the student learning log practice was utilized during the school year with the purpose of both increasing the students' biological competence and the student's ability to master their own self-regulated learning with a result in a higher final exam score. The development of the learning log was based on experiences gained over 25 years of teaching experience, and highly effective strategies supported by John Hattie's work in Visible Learning. The learning log was designed and used by the biology teacher alone. A side benefit of successful utilization of the learning would have seen the learning log proposed to the School System's leaders as a future Professional Development opportunity in training teachers on its use.

#### ➤ *Teaching process*

The teacher provided instruction in biology five days a week with each class being 70 minutes in duration. These lessons were designed as follows: The teacher used the flipped

classroom format where students were to pre-read sections of the textbook in preparation for the class. Students also had all the PowerPoint presentations, work assignments, previous student examples of presentations, and scenarios to test their content, context, and process knowledge, as well as practice unit and final exams. With the information they were exposed to from the text (and from the web if they chose to investigate deeper), the students and teachers identified the specific learning intentions (aligned to the curriculum), for that lesson. Next, the students and teachers identified the success criteria for the lesson, and how would they know if they "Know, Understand, or can Do" the learning intentions. The instructional activity took place, in many of the strategies identified in Hattie's Highly Effective strategies, including problem-based learning, project-based learning, discussions, building models, running simulations, scenarios, etc. The students had to complete the learning log and submit it via email in order to be excused from the class at the end of the 70 minutes. This was part of the 5 minutes used at the end of the class for students to review their learning intentions and success criteria, review and achieve reinforcement of the learning from the day's lesson.

#### ➤ *Data Collection*

An analysis of the emails from the students for each class was used to assess participation percentages, for both Class A and Class B. The learning logs were analyzed for the percentage of completion of all data requirements in each column in the learning log. Results from the teacher-created assessment were done for each assessment administered for both the experimental students and the control students. Attendance records were analyzed for both Class A and Class B. Data from Unit tests were gathered and analyzed, as well as final course marks. The students in each class chose randomly generated numbers as their study identifier and class student. This ensured the teacher did not demonstrate bias, and the numbers/name combinations were only given to the teacher once the course was completed.

The log has as its foundation, student information (in the form of Text) for Learning intentions. These intentions were specific Standards, Outcomes, or content knowledge. Students input the success criteria, described in terms that meet the aforementioned Learning intention formats. The students completed a quantitative self-evaluation choosing a number between 1-4, following the rubric, from Introductory to Mastery of the Success criteria on their learning in that given class. The final stage is the self-reflection and prescription of actions to be taken by the student to move from their number (1-4) to 4 (master). Once completed the learning log is emailed to the teacher, as it is kept as a running log and a feedback loop to help the teacher identify which sections or processes of the teaching-learning process need to be taught in another deeper way.

Students were taught how to assess their performance in class based on their ability to meet the success criteria for the specific learning intentions for the day. Students were also trained on highly effective strategies supporting their knowledge acquisition, moving them from their existing level to mastery of the learning intention. The visible nature of the



learning intentions, success criteria, and student self-assessment, drives the learning. Epstein et al. (2008) defined “concurrent self-assessment” as “ongoing moment-to-moment self-monitoring” (p. 5). Self-monitoring “refers to the ability to notice our own actions, curiosity to examine the effects of those actions, and willingness to use those observations to improve behavior and thinking in the future” (p. 5). A tool that places students at the helm of the journey, places the control where it needs to be in self-assessment, with the self. The self-managed learning log was both a feedback loop for students to themselves, as well as a feedback loop to the teacher on the student’s achievement of mastery or what areas needed to be taught again.

The students completed a pretest for each unit test, and the unit test. The student’s average for unit tests, their final exam scores, and the percentage use of the learning log were all data input into the xls data analysis sheet. An independent t-test analysis was conducted on the means of the unit test and the final exam. The data is presented in figure 1.0.

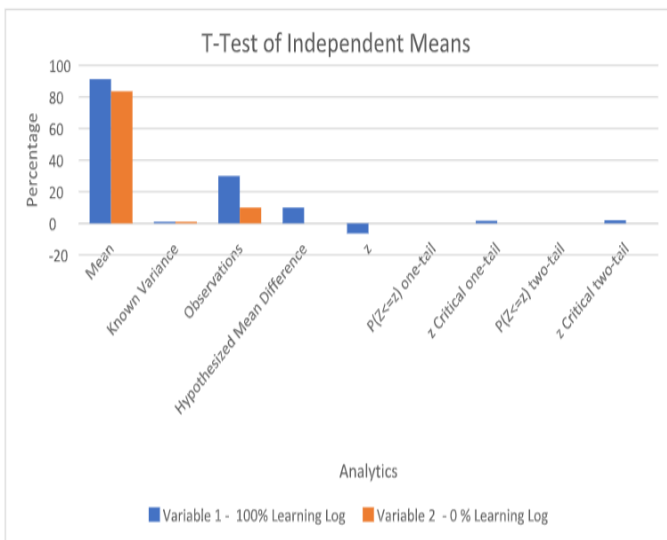


Fig 1

**IV. DISCUSSION OF DATA**

What do the results of the study mean? The results tell us that the use of the Student Learning Log has a positive effect on students’ final exam marks. The T-Test shows a difference of means of 7.67 %, which is a standard GPA or letter grade classification that would mean the difference between a B and an A, or 3.5 to a 4.0 GPA, which is significant for university admissions applications.

**Mean Difference Calculations**

**Treatment 1**

N1: 30  
 $df1 = N - 1 = 30 - 1 = 29$   
 M1: 91.27  
 SS1: 591.87  
 $s21 = SS1/(N - 1) = 591.87/(30-1) = 20.41$

**Treatment 2**

N2: 10  
 $df2 = N - 1 = 10 - 1 = 9$   
 M2: 83.6  
 SS2: 204.4  
 $s22 = SS2/(N - 1) = 204.4/(10-1) = 22.71$

**T-value Calculation**

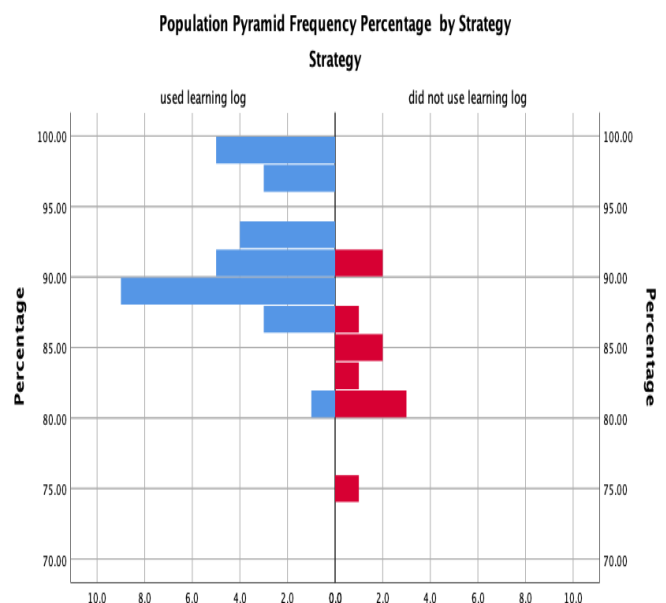
$s2p = ((df1/(df1 + df2)) * s21) + ((df2/(df2 + df2)) * s22) = ((29/38) * 20.41) + ((9/38) * 22.71) = 20.95$   
 $s2M1 = s2p/N1 = 20.95/30 = 0.7$   
 $s2M2 = s2p/N2 = 20.95/10 = 2.1$   
 $t = (M1 - M2)/\sqrt{(s2M1 + s2M2)} = 7.67/\sqrt{2.79} = 4.59$

**Significance Level:**

The t-value is 4.58669. The p-value is .000024. The result is significant at  $p < .05$ .

The results tell us the difference is statistically significant and cannot be rejected. In addition, this tells us that those students who used the learning log had better results on the final exam than those students who did not use the learning log.

The student learning log could be described as a management tool prescribed by the teacher, and student compliance means they knew the option, to use or not to use. Co-regulation occurs through student SRL effects on formative (and summative) assessment with others (such as a teacher), whereby the teacher not only helps students perform the task but also helps them regulate their actions before, during, and after the task (Allal, 2016; McCaslin & Hickey, 2001; Panadero et al., 2019). The teacher prescribed the use of the learning log and that it must be emailed to the teacher at the end of class, this fits in the co-regulation or management structure previously mentioned.



**Fig 2:- Population Pyramid Frequency of Final Course Mark**

The above histogram identifies a number of significant analytics from the study. The difference between the number of scores at each of the percentage bands. The number of participants that use the learning log on the left and the number that did not use the learning log on the right. The percentage scores for each participant in the two groups. The chart appears to be skewed to the left for participation in the use of the learning log, however, when taken in combination with the non-users a normal distribution exists.

Learners need to be sufficiently motivated, able to establish goals, reflect on prior performance, think critically about feedback, monitor their progress, make corrections during their performance, manage their time effectively to achieve their performance goal, and evaluate and reflect on their performance and its outcomes in order to make the best use of formative assessment (Nicol & McFarlane-Dick, 2006; Panadero & Alonso-Tapia, 2013). All the students were pursuing universities listed in the top 100 of the world, so they could be described as very motivated to do the work necessary to achieve that end. Students were, as the aforementioned authors described as, needed conditions, skills on goal establishment, ability to reflect on performance in a critical fashion, understanding of the concept, construct and design of self, peer and teacher feedback, and the learning of the management tool. Learners also need to find ways to move forward when confused or stuck during learning (Lodge et al., 2018). In the self-Assessment Learning Log, there was an Action column for learners to describe what efforts they take to get past their level of success (1-4) and achieve mastery of the day's learning (4).

In traditional Chinese Culture, parents expect the school to manage the student's learning behaviors, which is counterproductive to the students learning self-regulation and self-management, thus posing a challenge for Chinese students to develop these skills. The students and parents had agreed that these skills were necessary for them to have when moving to attend western-style post-secondary learning institutions, therefore building those skills in the school they already trust to support student learning, proved to be advantageous for them.

What do the results not tell us? The results do not speak to any factors that were not accounted for that may have impacted the study, such as the number of students repeating the course, and the type of formative assessment each student used (unless they included it in the self-assessment strategy column).

## V. CONCLUSION

The use of the student learning log provides the self-management tool needed to increase performance on final course grades. In addition, it provides support for self-actualizing learners to support their growth in self-assessment, self-management, and metacognition, to be placed with an advantage for future life-long learning. The students would be able to create their own learning log for future classes, with their teacher or peers, or tutors to increase the likelihood of increased performance. Finally, the authors of this paper agree

with Zimmerman (2000) when he wrote: The development of SRL skills in the three phases and how they may be supported can be described in a series of four developmental levels: observation, emulation, self-control, and self-regulation. The learning log is designed as a specific tool that fills the function of building skills in self-control and self-regulation/self-management with the ultimate benefit of improved performance in course marks.

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