The Role of Task Value and Online Learning Strategies in an Introductory Computer Programming Course

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Abstract

The autonomy and flexibility that online learning contents provide students in a traditional face-to-face course require them to pick up newer strategies for regulating their learning process. This study focuses on identifying how students' self-reported traits of self-regulated learning may relate to the task value of the learning contents of an introductory programming course. This study explores the distribution of self-regulated learning and task value components reported by students. A moderately positive correlation is seen between the task value and perceived self-regulated learning traits of students. The findings of this study demonstrate how some of the online learning components and facilitation methods that students value the most could be incorporated into a traditional face-to-face course to promote self-regulated learning skills.
Keywords: Task-Value, Self-Regulated Learning, Computer-Programming, Self-Evaluation, Interest, Help-Seeking

1. INTRODUCTION

Although students today display increasing familiarity with online tools and communication technologies, many are unfamiliar with online learning methods (Gillett-Swan, 2017). The flexibility and autonomy that online learning afford to learners in an online/blended-online environment also necessitate a commitment to effectively completing course-related tasks. To maintain a high responsibility for the learning tasks, students need to perceive a high task value, which is how the course meets the learner's interests and future goals. Task value, which is a motivational construct, increases engagement and promotes course completion and academic success (Jung & Lee, 2018; Vanslambrouck, 2018; Zhang & Liu, 2019). Studies report that students with a high task value employ more profound cognitive and metacognitive strategies (McWhaw & Abrami, 2001). The flexibility and autonomy of online learning also require students to develop critical self-regulated learning (SRL) skills and strategies (Azevedo, 2007; Barnard et al., 2009; Lee & Choi, 2011; Rasheed et al., 2020). This paper explores the distribution of task value and the self-regulated learning skills reported by students who complete an undergraduate computer programming course with significant online learning content.

The concept of task value, which derives from expectancy-value theory, is operationalized by measuring the learners' perspective of the task's interest, usefulness, and importance (Eccles & Wigfield, 2002). In their model, Eccles and Wigfield define task values with respect to the qualities of different tasks and how those qualities influence the individual's desire to do the task. Interest in a task refers to the intrinsic value of enjoyment or inherent motivation for the task. The term usefulness stands for the student's perception that the task will be helpful to meet some future goals. The term importance stands for the attainment value or the value of doing well on the task.

Self-regulated learning indicates the ability of learners to regulate their motivation, metacognition, cognition, and behavior to meet their learning goals. Self-regulated learning takes place through an active, constructive process. Learners plan and set goals before learning, monitor their progress, and then self-evaluate their performance after learning (Pintrich, 1999; Zimmerman, 2008). Studies have also shown that SRL skills regulate students' cognition and motivational factors such as task-value (Butler & Cartier, 2005; Pintrich, 2004). Prior studies have investigated the role of SRL in computer programming courses for a campus-based delivery format (Ramirez et al., 2018; Kumar et al., 2005; Castellanos et al., 2017).

This study intends to explore the distribution of students' perception of the online learning contents' task value and investigate how task value is associated with perceptions of self-regulated learning. This study takes place in a blended online class of an undergraduate level introductory computer programming course at a public university.

The motivation for this study is to explore student perceptions after having redesigned an introductory programming course to meet the learning needs of students during the COVID-19 pandemic. The redesign is characterized by blending online learning with instructor support, either via in-person or zoom sessions during regular class hours due to the COVID-19 pandemic. During the two semesters under this study, the pandemic situation inhibited students from attending in-person sessions. Redesigning the course became crucial to motivating students and supporting their self-regulated learning skills throughout the uncertain conditions caused by the pandemic. This study will help instructors identify how students value the course and its learning tasks and what kind of support they might require in improving their self-regulated learning skills.

2. THE STUDY

This study investigates the distribution of task value perceived by students who attended an undergraduate-level introductory programming course with online learning contents. While online learning activities afford autonomy and flexibility, they also require students to employ self-regulated learning skills. Hence, this study investigates if there exists an association between students' perceptions of their self-regulated learning skills and the task value of the course. This study attempts to answer the following questions:

- How do students perceive the task value of the introductory programming course and its online learning contents?
- How do students who attend an introductory programming course perceive their self-regulated learning?
- What kind of association exists between the task value and the perceived self-regulated learning traits reported by students in an introductory programming course that contains online learning components?

Context

This study takes place during two semesters of an undergraduate introductory Java-programming course. The course contains a significant online component that includes a series of short video lectures, detailed code demonstrations of programming solutions, self-assessment quizzes, graded quizzes, graded online assignments, structured feedback, and a discussion forum. In addition, students access all the learning materials for the course from the Learning Management System (LMS).

Students regularly complete auto-graded practice quizzes that follow every lecture video. The lecture videos that introduce key concepts are short and do not exceed fifteen minutes. The practice exercise also includes a series of coding assignments that require students to design and implement programs in Java using Eclipse- an integrated development environment (IDE) used throughout the course. The coding assignments are more significant projects for which students obtain feedback from the instructor to improve their solutions. Students communicate to the instructor via the online discussion board, emails, and office hours set up through Zoom. The assignment submission drop box in the LMS affords ways to provide written and video feedback for the submissions.

Apart from the asynchronous online components, the course supported a bi-weekly instructional session during regular class hours during both semesters. During the first semester under the study, due to the COVID-19 pandemic situation, the instructional sessions were conducted using Zoom. It became possible to achieve in-person sessions during the following semester through in-person classes. However, the pandemic situation still made it impossible for a few students to attend all the in-person sessions due to their need to quarantine. In addition, since all the learning materials and recordings were available online, students could flexibly learn from home and get caught up on the course materials if they could not attend any of the face-to-face sessions.

Each face-to-face session covered a quick recap of the concepts covered in the video lectures, followed by problem-solving sessions that discussed several types of problems typical to the programming topic. In addition, the instructor used the face-to-face sessions to address common errors encountered by students. The assignments for a topic contained multiple questions, and they could be completed by students flexibly and submitted before a hard deadline. Students were allowed to submit their assignments for the instructor's feedback. They were allowed to use the feedback to correct or improve their solution and resubmit the problem before the hard deadline. The video lectures and the associated online quizzes made it possible for students to complete a self-assessment of their knowledge and re-watch the videos if needed to clarify any misconceptions. Students must do prior planning, independently write the programs, obtain feedback, or help if needed, and reiterate the solutions to meet the programming assignments' problem-solving requirements fully. The videos, quizzes, and assignments contained mechanisms that support students' skills to apply self-regulated learning cycles.

The students in this class, who are also the study participants, are regular campus students. The introductory Java Programming course is a required pre-requisite for several higher-level Computer Information Systems courses. However, this is also a general education course that enrolls students who are non-majors.

The LMS has features that allow the instructor to set up deadlines and control access to submission drop boxes, quizzes, and assignments. The calendar system in LMS also provides submission reminders on the course page. In addition, students visit the course pages several times a week to keep track of the tasks and due dates. Finally, the online discussion boards allow students to interact with the rest of the class.

Survey Instruments

Seventeen students from the first semester and fourteen students from the following semester participated in an anonymous, end-of-the-course survey. In the instructor's absence, the survey was administered to all students concurrently during class time using an online survey tool. Table 1 summarizes the three main parts of the study implemented. The end of the course survey includes an SRL section, a task value section, and a ranking of course-related tasks section.

Survey type	Scale	Instru-ment	Measurement
SRL	1 – 5 Likert Scale	OSLQ with six sub-scales	Goal Setting, Environment Restructuring, Task Strategies, Time Management, Help Seeking, Self-Evaluation capabilities of students
Task Value	1 - 7 Likert Scale	MSLQ - task value sub-scale (only)	Interest, Usefulness, Importance of the course.
Ranking Questions	1 - 5 Rank Order	Developed by the author A of set of three ranking questions, each with 5 choices.	Ranking of reasons that makes the course important, interesting, and useful to students

Table 1. Summary of survey instruments

The survey instrument includes an Online Strategies for Learning Questionnaire (OSLQ), a pre-validated 24-item questionnaire that evaluates students' SRL skills in an online learning environment (Barnard et al., 2009). The OSLQ consists of goal setting, environment restructuring, task strategies, time management, help-seeking, and self-evaluation subscales. The subscales of OSLQ map into Zimmerman's SRL model (Zimmerman, 1998), consisting of forethought, performance, and self-reflection phases. The goal setting and environment restructuring phase correspond to the forethought phase of Zimmerman's SRL model. The subscales of task strategies, time management, and help-seeking correspond to the performance phase of the SRL model. As the name suggests, the self-evaluation subscale measures the self-evaluation phase of Zimmerman's SRL model. The OSLQ asks students to rate their responses on a scale of 1 ('not-at-all-like-me") to 5 ("very-much-like-me"). Appendix A shows the subscales and items in the OSLQ used in this study. The internal reliability of

OSLQ, as indicated by Cronbach's alpha value, is between 0.85 and 0.92 for the subscales (Barnard, Paton & Lan, 2008).

In addition to the items from the OSLQ questionnaire, the survey instrument contains six questions that measure the perceived task value of course contents. These questions are part of a Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1993). Appendix B shows the task value subscale of the MSLQ. In addition to the task value scale, the survey also includes a series of ranking questions created by the author to discover how various critical features of the course content shape students' perceived importance, usefulness, and interest. Students rank the answer choices on a scale of 1 (most important/useful/interesting) to 7 (least important/useful/interesting). This survey component helped the instructor pinpoint the course design's important aspects of the perceived task value.

The task value components of the MSLQ survey can only be used to collect a general perception of students about the importance, interest, and usefulness of a course. To learn how students value various course features, the author of this paper created a set of ranking questions to know what some of the course-related features were useful, important, and interesting to students. Appendix C shows three ranking questions, each with five choices. Students respond to these questions by ordering the choices on a scale of 1(high value) to 5 (low value). The electronic survey tool ensured that no choice in a set had the same rank.

3. RESULTS

Before analyzing the survey results, the author of this paper inspected the data to find and remove any incomplete attempts. The online survey tool had features that could control the ranking questions' irregularities, such as using the same rank value for two different answer choices. Altogether, 31 students had fully completed the survey.

Measuring SRL

Cronbach's alpha value provides the reliability of the 24-item survey instrument on online learning strategies. In the current study involving OSLQ and consisting of 31 (complete) responses, the Cronbach's coefficient value of the subscales is sufficient with an alpha value between 0.88- 0.66 for the sub-scales, as shown in Table 2. A high alpha value indicates a high internal consistency of the items in each subscale and the overall SRL scale. Shapiro-Wilk test performed on data from each subscale revealed that only three out of the six subscales indicated a normal distribution. Therefore, median values are used as the descriptor for each subscale.

SRL Sub-Scale	Cron bach-Alpha	Median Score
Goal Setting (GS)	0.72	3.9
Environment Restructuring (ER)	0.88	3.4
Task Strategy (TS)	0.78	3.6
Time Management (TM)	0.86	3.1
Help Seeking (HS)	0.66	3.4
Self Evaluation (SE)	0.68	3.5
SRL total	0.85	3.5

Table 2. Aggregate scores of the online SRL subscales

Appendix A shows the items for every subscale of the OSLQ questionnaire. As described in the previous section, students' responses to the SRL questionnaire are scored on a scale of 1 ("not-at-all-like-me") to 5 ("very-much-like-me"). Table 2 indicates the median value of the weighted average scores of each of the subscales of the SRL questionnaire. All the components appear symmetrically distributed from the histogram shown in Figure 1, except for environment restructuring skewed to the left. The scores used to construct the bar chart uses the median value of the survey responses for each of the components of the SRL survey.

Task Values

The survey measures the task value of the course on a scale of 1 (that stands for most important/useful/interesting) to 7 (least important/useful/interesting), using the task value subscale of the MSLQ questionnaire. Appendix B shows the items and the task value subscale. Shapiro-Wilk test was used to check the normal distribution of the responses for the task value subscales that were found to be non-parametric.

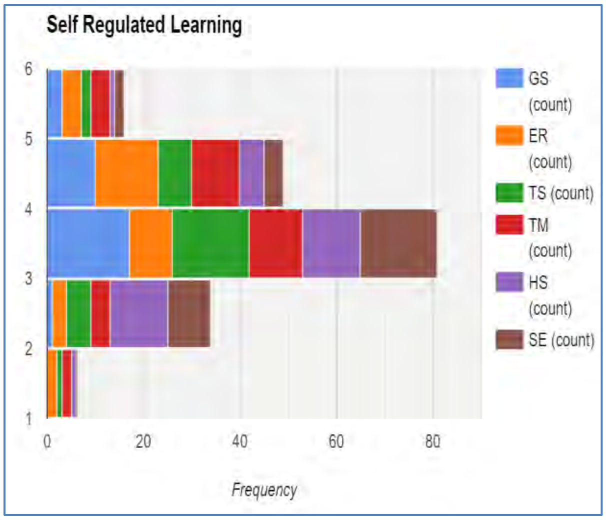

Figure 1. SRL Components Histogram

Table 3 shows the median scores for importance, utility, and interest. The median overall task value score is 6.5, which indicates a high value. Through the task value survey responses, students express how much they felt the course to be important, useful, and interesting by answering a series of ranking questions on a scale of 1(most important/useful/interesting) – 7 (least important/useful/interesting).

Task Value Sub-Scale	Cronbach-Alpha	Median Score
Importance	0.91	7
Utility	0.76	6.7
Interest	0.85	6.5
Task Value Total	0.91	6.5

Table 3. Aggregate Task Value Scores

The components of the task value scores are depicted in a bar chart in Figure 2. The bar chart has seven bins corresponding to the task value scale of 1 to 7. The scores are used to construct the histogram using the median value of the task value survey responses from each student for each task value component. As a result, the bar chart displays a skewed distribution of the three task value components.

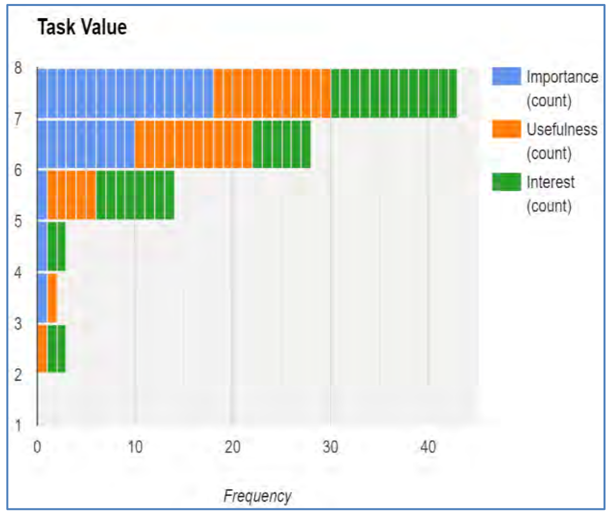

Figure 2. Task Value Components Histogram

Correlation between Task Value and SRL

Data collected from the survey reveals a moderately positive correlation between some SRL and the task value components. Table 4 shows the correlation matrix with the values of Spearman's rank correlation coefficients, r, and the significance value p. For correlating the aggregate SRL and task value scores, values of 'SRL Total Score' and 'Task Value Total Score' are calculated for every student by using the weighted average of all SRL and Task Value responses, respectively.

The correlation matrix in Table 4 indicates a medium positive correlation between task value components and the SRL components of task strategy, help-seeking, and self-evaluation.

	Task Value Total Score	Task Value-Interest	Task Value-Useful	Task Value-Importance
SRL Total Score	r=0.41 p=0.02	*r=0.39 p =0.02*	r=0.51 p =0.03	r=0.39 p = 0.02
Goal Setting	r=0.33 p=0.06	*r =0.28 p =0.1*	r= 0.44 p =0.01	r=0.37 p=0.03
Env. Restruct	*r=0.13 p= 0.4*	*r=0.1 p =0.5*	*r=0.16 p=0.3*	r=0.17 p=0.35
Task Strategy	r=0.46 p =0.008	r= 0.38 p =0.03	r= 0.46 p= 0.009	r=0.52 p=0.002
Time Management	*r=0.29 p=0.1*	*r=0.16 p=0.3*	r=0.38 p=0.03	r=0.48, p=0.005
Help Seeking	r=0.49 p=0.004	r=0.4, p=0.02	r=0.45 p=0.009	r=0.48, p=0.05
Self Evaluation	r=0.52 p=0.002	r= 0.49 p=0.005	r=0.5 p <0.001	r=0.58 p < 0.001

Table 4. SRL – Task Value Correlations

All the grey-colored cells in the correlation matrix in Table 4 show the significant correlations whose p-values are less than 0.05. There was no significant correlation between task value and the SRL components of environment restructuring and time management. Perception of goal setting and time management is moderately correlated with the usefulness and interest in the course. A medium positive correlation between the SRL and task value indicates that students who perceive high task value may not always report high SRL. Conversely, students who have low scores of SRL may still perceive a high task value. students

Cluster analysis is used to visualize how students could be separated into distinct clusters based on the association between their task value and SRL scores. A K-Means cluster analysis using the standardized aggregate scores of SRL and task values shows the presence of three discernable clusters, as shown in Figure 3. The three-cluster model, created using the K-Means cluster analysis method, is shown in Figure 3. This three-cluster model explains 66.08% of the variance, a within-group error-sum-of-squares (SSE) of 20.35, and a between-group SSE of 39.7. Among the three clusters, Cluster 0 is the largest one that has 13 students who report moderately high task value and medium to low SRL skills. Cluster 1 is the next large cluster with 9 students, indicating high perceptions of task value and higher SRL score. Finally, Cluster 2 has 9 students who report low perceptions of task value and lower scores of SRL. A sizeable number of students under Cluster 0 supports the lack of a strong correlation between task value and SRL scores, as indicated in Table 6.

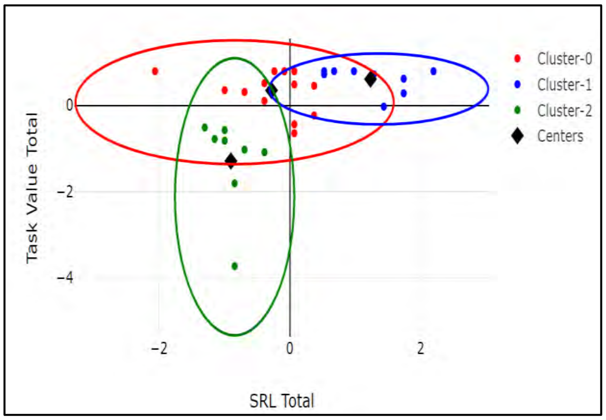

Figure 3. Cluster Analysis SRL and Task Value

Ranking the Factors that Make the Course Valuable

Tables 5, 6, and 7 show the ranking of various features of the course to learn the order in which these features contribute to the perceptions of task value. The ranking questions require the survey respondents to order the choices such that a response of 1 stands for the most ranked-choice and a response of 5 stands for the least ranked one. However, the responses to the ranking questions, as shown in Tables 5, 6, and 7, elicit the course design features that students find most, or least important, interesting, and useful. For each ranking question, students were asked to order the choices on a scale of 1 to 5. The median score values in Tables 5, 6, and 7 show the ranking scores' median values based on student responses. The column called 'Final Rank' is by ordering the calculated median scores of each choice.

Please rank each of the choices on a scale of 1 - 5 on why this course is important to you. On the 1-5 scale, 1 stand for (most important) and 5 stands for (least important).		
	Median Score of Ranks	Final Rank
It is a required course	4	3
It allows me to learn how to write computer programs	2	1
It improves the chances of getting a job	2	1
It allows me to understand how a programming solution is constructed using logical elements	3	2
It makes me successful in future classes	4	3

Table 5: Ranking question on why the course is important.

When asked why the course is important to students, the median scores of the item with the highest and the lowest ranks varied by 2 points on the Likert scale. The most important feature of the course was that it helps students learn how to write computer programs and helps them get jobs. Even though the introductory programming course is a pre-requisite for many other upper-level courses in the CIS program, it is also a general education course that enrolls non-majors.

Non-majors may not require introductory programming for their future studies. However, many non-majors attend this class to view programming as an essential job skill. Therefore, future course design iteration could leverage this motivational aspect and show how professionals in different careers use computer programming in day-to-day jobs.

Table 6 shows the ranking for items that ask students about the usefulness of the course. Again, the variation between the minimum and maximum scores was 2 points on the Likert scale. Furthermore, it seems as if students focus on the usefulness of the course based on problem-solving and programming skills they have picked up.

Please rank each of the choices on a scale of 1 - 5 on why this course is useful to you. On the 1-5 scale, 1 stands for (most useful), and 5 stands for (least useful).		
	Median Score of Ranks	Final Rank
I learnt how to write and test Java programs using Eclipse (IDE)	3	2
I improved my problem-solving skills by writing programs	2	1
I can apply what was learnt in this class in future courses	3	2
I have developed skills to evaluate the correctness of my programs	4	3
I have gained skills on how to translate the requirements in the problem to develop programming solutions	3	2

Table 6. Ranking questions on why the course is useful.

Student perceptions on the utility of the course could have been influenced by the fact that heavy emphasis was placed on problem-solving methods. For example, the code-demonstrations video breaks down a typical programming process into identifying the givens in the problems, looking for similar problems from the worked-out examples, identifying the required outputs, and configuring the programming constructs. In addition, the class discussions usually centered around problem-solving methods. The assignment feedback also contained pointers on how students could improve their self-evaluation skills and programming skills. Therefore, a sizable portion of the online videos and class discussions afforded instruction on developing problem-solving and programming skills, supporting student SRL.

Students would spend most of their learning time writing and iterating their programming solution using Eclipse IDE equipped with 'intelli-sense' to guide students through their code. However, most novice students struggle with self-evaluating their code's correctness and require help and feedback from the instructor. That could have been why students gave lower rank to the usefulness of the course in helping them learn how to evaluate the correctness of their program by themselves.

Table 7 shows the ranking for items that ask students why the course is interesting. In Table 5, ranks 1 and 2 pertain to the design of the course. The hands-on, active learning and facilitation methods involved learning components that made the class enjoyable.

Please rank each of the choices on a scale of 1 - 5 on why this course is interesting to you. On the 1-5 scale, 1 stands for (most interesting) and 5 stands for (least interesting).		
	Median Score of Ranks	Final Rank
I liked the way the course was facilitated (e.g.: code demos, videos, self-assessment quizzes, and multiple submissions for assignment)	2	1
I found it interesting to learn programming by completing the module assignment questions.	3	3
I enjoyed the hands-on learning process	2.5	2
I enjoy learning how the basic programming constructs such as the decision structures, loops, and objects are used in real-world applications	3	3
I enjoyed working with Eclipse	4	4

Table 7. Ranking questions on why the course is interesting

The lower final ranks pertain to the steps required to complete a coding assignment, including using

Eclipse IDE to complete programs. Future course design could investigate more user-friendly IDEs suitable for beginner learners.

4. DISCUSSION

This study investigates students' perceptions of the task value of an introductory programming course. This study also presents the distribution of various SRL skills reported by the students. While the task value items of the survey pertain to the course-specific features, SRL questions pertain to a student's learning skill that may not pertain specifically to the programming course. Their past and current learning experiences may influence a student's self-reported SRL skills. The distribution of the SRL components shows a mostly symmetrical distribution, but the reported task value components are all are skewed onto the higher task values in the 1 (high task value)-7 (low task value) scale.

The study results cannot ascertain if perceptions of task value would have contributed to the reported SRL scores or vice versa. However, the study discovers a moderately positive correlation between various components of task value and the SRL. In addition, the presence of student clusters has implications on how the course design could have catered to the learning needs of students from each group.

The ranking questions for the three components of the task value, as depicted in Tables 5, 6, and 7, show that the course design and facilitation of an active learning process play an essential role in generating interest in learning. The course facilitation methods and active learning that students found enjoyable require them to apply higher levels of SRL while working on the various online components. For example, completing the assignment is a multi-week process that requires cycles of planning, learning the materials, writing the programming solutions, obtaining feedback, and fixing the solution. Every assignment package also requires students to plan out their learning process by deciding when and how to complete the self-assessment quizzes, watch or re-watch the videos and get help. The instant feedback from the quizzes allows students to revisit the concepts presented in the videos. The debugging methods demonstrated through the videos show how to check the code before submitting the program. Multiple submissions of an assignment allow students to obtain feedback and guidance from the instructor and a chance to improve the final version. The feedback and the grades from the formative assessments could help students strategize their learning for the coming weeks. Therefore, a significant part of instruction and feedback provided ways to involve students in self-regulated learning.

The clusters in Figure 3 reveal an association between low-task value and lower perceived SRL. Therefore, students in this cluster could be motivated by making the course more exciting and engaging that they feel motivated to develop their SRL skills by engaging in the course. On the other hand, students from the central cluster that reported medium to high task value and low SRL skills could benefit from encouraging feedback that explains how completing the task has improved or could improve their SRL skills. Therefore, another approach will be to adapt the learning contents that will enhance task value and perceptions of SRL among students depending on their current perceptions.

This study took place in two small classes, and only 31 students participated in the survey. A small sample size limits the generalizability of the findings. Despite its limitations, this study has developed a method to study the relationship between online learning strategies and task value using well-known and validated survey instruments that can apply across multiple contexts and online course delivery methods. Future studies could compare the self-reported SRL skills with the observed SRL by collecting course-related data logs. What students reports, however biased they might be, are nevertheless significant as it could determine the perceptions of self-efficacy, which is a crucial motivating factor for students to continue to engage in future programming courses.

Both self-efficacy and SRL are perceptions that could be influenced by factors unrelated to the course alone. However, task value is an important motivating factor that shows the situational interest of the student. Knowing what students value in a course can help instructors figure out ways to improve student SRL. Such a student-centric approach to course design will help students take advantage of the flexibility and autonomy provided by online learning components to achieve academic success.

5. CONCLUSIONS

This study elicits student perceptions of their SRL skills and task value for an undergraduate introductory programming course with significant online learning content. Course-specific factors that influence the perceived task value regarding importance, utility, and interest could guide the future redesign of the online learning experience.

Student responses rank a well-facilitated, hands-on learning experience essential for making the course interesting. Students found the course to be necessary for their long-term career prospects. Additionally, due to the focus on problem-solving methods, students felt the course helped improve their problem-solving skills.

Correlation studies and cluster analysis indicated an association between task value and perceived SRL reported by students. The clusters did suggest that students who express high task value also tend to perceive higher SRL skills. It is also observed that students who perceive a low SRL for themselves tend to report a lower task value. Most of the students do not fall under either extreme, reporting a medium to low SRL with medium to high task values. Students in the low and medium score clusters that form a sizable portion of the class could benefit from instruction, activities, and feedback to improve their actual SRL and how they perceive their SRL skills. Future studies could use student data to infer self-regulated learning behavior and compare the findings with the SRL that students report through surveys.

Online learning continues to challenge ways in which students employ self-regulated learning. Students' lack of face-to-face interaction and increased autonomy and responsibility requires them to develop newer SRL strategies in an online learning environment. Therefore, developing strategies to improve the course content's task value could motivate students to build better online learning strategies.

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Appendix A

This set of questions requires you to self-assess your competency in various aspects of self-regulated learning. Please note that the use of the term "online" in some of the questions are synonymous with "blended-online". Please provide responses to the following questions on a 1 to 5 scale where 1 stands for " Not at all like me" and 5 stands for "Very much like me"					
Goal Setting					
	5- Very much like me	4	3	2	1- Not at all like me
I set standards for my assignments in *online/blended* courses.					
I set short-term (daily or weekly) goals as well as long-term goals (monthly or for the semester).					
I keep a high standard for my learning in my courses					
I set goals to help me manage studying time for my *online/blended-online* courses.					
I don't compromise the quality of my work because it is online					
Environment Restructuring					
I choose the location where I study to avoid too much distraction.					
I find a comfortable place to study.					
I know where I can study most efficiently for *online/blended-online* courses.					
I choose a time with few distractions for studying for my *online/blended online* courses.					
Task Strategies					
I try to take more thorough notes for my *online/blended online* courses because notes are even more important for learning online than in a regular classroom.					
I read aloud instructional materials posted online to fight against distractions.					
I prepare my questions before joining in discussions.					
I work extra problems in my *online/blended-online* courses in addition to the assigned ones to master the course content.					
Time Management					
I allocate extra studying time for my *online/blended-online* courses because I know it is time-demanding					
I try to schedule the same time everyday or every week to study for my *online/blended-online* courses, and I observe the schedule.					
Although we don't have to attend daily (in-person) classes, I still try to distribute my studying time evenly across days.					
Help Seeking					
I find someone who is knowledgeable in course content so that I can consult with him or her when I need help.					
I share my problems with my classmates online so we know what we are struggling with and how to solve our problems.					
If needed, I try to meet my classmates face-to-face.					
I am persistent in getting help from the instructor through e-mail *and regular class-sessions.*					
Self Evalutaion					
I summarize my learning in *online/blended-online* courses to examine my understanding of what I have learned.					
I ask myself a lot of questions about the course material when studying for an *online/blended-online* course.					
I communicate with my classmates to find out how I am doing in my *online/blended-online* classes.					
I communicate with my classmates to find out what I am learning that is different from what they are learning.					

OSLQ questionnaire and responses were used to rate various SRL skills. The term "online" in the original survey was modified to "online/blended-online" to be consistent with the names of the learning modality that is familiar to students. All the changes made to the original survey instruments are shown as italicized words in the items listed above.

APPENDIX B

Please answer this question on a scale of 1-7 where 1 stands for "Strongly disagree" and 7 stands for "Strongly agree".							
	7- Strongly Agree	6	5	4	3	2	1- Strongly Disagree
Importance							
It is important for me to learn the course material in this class.							
Understanding the subject matter of this course is very important to me.							
Utility							
I think I will be able to use what I learn in this course in other courses.							
I think the course material in this class is useful for me to learn.							
Interest							
I am very interested in the content area of this course.							
I like the subject matter of this course.							

Task Value subscale of MSLQ questionnaire and survey results

APPENDIX C

Please rank each of the choices on a scale of 1 - 5 on why this course is important to you. On the 1-5 scale, 1 stand for (most important) and 5 stands for (least important).	
	Rank Order
It is a required course	
It allows me to learn how to write computer programs	
It improves the chances of getting a job	
It allows me to understand how a programming solution is constructed using logical elements	
It makes me successful in future classes	

Please rank each of the choices on a scale of 1 - 5 on why this course is useful to you. On the 1-5 scale, 1 stands for (most useful), and 5 stands for (least useful).	
	Rank Order
I learnt how to write and test Java programs using Eclipse (IDE)	
I improved my problem-solving skills by writing programs	
I can apply what was learnt in this class in future courses	
I have developed skills to evaluate the correctness of my programs	
I have gained skills on how to translate the requirements in the problem to develop programming solutions	

Please rank each of the choices on a scale of 1 - 5 on why this course is interesting to you. On the 1-5 scale, 1 stands for (most interesting) and 5 stands for (least interesting).	
	Rank Order
I liked the way the course was facilitated (e.g.: code demos, videos, self-assessment quizzes, and multiple submissions for assignment)	
I found it interesting to learn programming by completing the module assignment questions.	
I enjoyed the hands-on learning process	
I enjoy learning how the basic programming constructs such as the decision structures, loops, and objects are used in real-world applications	
I enjoyed working with Eclipse	

Ranking Question for why the course (and its tasks) were interesting, important, and useful