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Using Social Cognitive Theory to Predict Students'
Use of Self-Regulated Learning Strategies in Online Courses

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Abstract

Effective use of self-regulated learning (SRL) strategies may be particularly important for students participating in online education (Schunk & Zimmerman, 1998). The objective of this study was to investigate how different motivational components of social cognitive theory (Bandura, 1986) relate to students' use of cognitive and metacognitive learning strategies in online courses. University students ($n = 96$) completed a survey that assessed their task value and self-efficacy, as well as outcome variables that included their use of three SRL strategies. Pearson correlations indicate that task value and self-efficacy were significantly related to students' use of elaboration, critical thinking, and metacognitive learning strategies. Additionally, results from regression analyses reveal that task value and self-efficacy were significant positive predictors of students' use of various learning strategies. These findings support and extend prior research in traditional classrooms indicating that students' motivational beliefs about a learning task are related to their use of SRL strategies. Educational implications and suggestions for future research are discussed.

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Interest in academic self-regulation has increased considerably in recent years as investigators and practitioners attempt to understand how students become masters of their own learning processes (Schunk & Zimmerman, 1998). Self-regulated learning (SRL) has been defined as, “an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features of the environment” (Pintrich, 2000, p. 453). Self-regulated learners are generally characterized as active participants who efficiently control their own learning experiences in many different ways, including organizing and rehearsing information to be learned, and holding positive beliefs about their capabilities, the value of learning, and the factors that influence learning (Schunk & Zimmerman, 1994, 1998).

Recently, several scholars have suggested that SRL skills may be particularly important for students participating in online education (Bandura, 1997; Dillon & Greene, 2003; Hartley & Bendixen, 2001; Hill & Hannafin, 1997). For example, in their edited volume regarding the instructional implications of academic self-regulation, Schunk and Zimmerman (1998) concluded that effective SRL strategies may be critical in distance learning situations due to the high degree of student autonomy resulting from the instructor’s physical absence. The authors recommended that future research on self-regulation investigate the specific strategies that allow for effective and efficient distance learning.

The present study is the first in a line of research designed to address the recommendations made by Schunk and Zimmerman (1998). Specifically, this study explores the linkages between students’ motivation and self-regulation in online learning courses, seeking to

determine if the pattern of relationships are consistent with those that have been found in traditional academic settings. In short, the present investigation marks a critical first step in extending the robust literature on SRL in classroom settings to online learning environments.

Review of the Literature

Self-regulated learning refers to “learning that occurs largely from the influence of student’s self-generated thoughts, feelings, strategies, and behaviors, which are oriented toward the attainment of goals” (Schunk & Zimmerman, 1998, p. viii). Academic self-regulation has been studied in traditional classrooms as a means of understanding how successful students adapt their cognition, motivation, and behavior to improve learning. In general, investigators have consistently found moderate to strong positive relations between students use of SRL strategies and academic achievement (Pintrich, 1999; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991). For example, in a study of 173 seventh graders, Pintrich and De Groot (1990) found that higher levels of self-regulation were correlated with higher levels of achievement, as measured by final course grades, essays and reports, and in-class seatwork.

Although there are various conceptualizations of academic self-regulation (for a review, see Boekaerts, Pintrich, & Zeidner, 2000), several researchers have found social cognitive models of SRL to be particularly useful in analyzing student success in online education (Lynch, 2003; Miltiadou & Savenye, 2003; Niemi, Nevgi, & Virtanen, 2003; Whipp & Chiarelli, 2004). This may be so because social cognitive models highlight important motivational factors and learning strategies that appear to benefit students in these highly autonomous learning situations. Furthermore, a number of investigators have recently emphasized the importance of social and environmental factors on student success in online education (Gunawardena & Zittle, 1997; Richardson & Swan, 2003). Thus, a social cognitive perspective on self-regulation, which

addresses the interrelationship between the learner, the learners' behavior, and the social environment (Bandura, 1997), lends itself well to an understanding of how successful learners function in online situations.

While most SRL theorists acknowledge the influence of motivation on self-regulation, Pintrich's (2000, 2003) model of SRL stresses the importance of motivation in *all* phases of self-regulation. Pintrich and his colleagues have demonstrated that effective and less effective self-regulated learners differ in several motivational processes. For example, their research suggests that learners' task value (i.e., the extent to which they find a task interesting, important, and/or valuable) relates positively to their use of SRL strategies. Similarly, Schunk (2005) concluded, "Students with greater personal interest in a topic and those who view the activity as important or useful are more likely to use adaptive self-regulatory strategies" (p. 87).

Existing research (Pintrich & De Groot, 1990; Schunk, 2005) has also suggested positive relations between students' academic self-efficacy and their use of SRL strategies. In an early study of middle school students, Pintrich and De Groot (1990) found that students' self-efficacy beliefs were positively related to their cognitive engagement and academic performance. In part, their results indicated that students who believed they were capable of learning were more likely to report use of SRL strategies and to persist longer at difficult academic tasks. More recently, in a review of past research, Schunk (2005) indicated that highly self-regulated learners tend to report higher levels of academic self-efficacy than do students with poorer self-regulatory skills.

Taken together, much of the research on SRL supports the hypothesized linkages between motivation, self-regulation, and academic success. The objective of the present study was to determine if the relations between motivation and self-regulation that have consistently been found in traditional academic settings extend to online learning environments. Specifically,

the following research question was addressed: Are students' perceived task value and self-efficacy associated with their self-reported use of cognitive and metacognitive learning strategies in online courses? Consistent with findings in traditional classrooms, it was hypothesized that both students' perceived task value and self-efficacy would be positively related with their self-reported use of critical thinking, elaboration, and metacognitive self-regulation in online courses.

Methods

Participants

Participants for the study included a convenience sample of 32 graduate (33.3%) and 64 undergraduate (66.7 %) students from a large public university in the northeastern United States. Participants were enrolled in several different courses delivered completely online through WebCT. The sample included 45 women (46.9%) and 51 men (53.1%), with a mean age of 30.7 years ($SD = 9.28$; range 19-56). Participants reported a wide range of educational experience, including: High School/GED ($n = 3$, 3.1%), Some College ($n = 29$, 30.2%), 2-Year College Degree ($n = 22$, 22.9%), 4-Year College Degree ($n = 13$, 13.5%), Master's Degree ($n = 28$, 29.2%), and Professional Degree ($n = 1$, 1.0%). The majority of participants ($n = 75$, 78.1%) reported that they had completed one or more online courses in the past, while a few ($n = 21$, 21.9%) reported that this was their first online course.

Measures and Procedures

During the last four weeks of the semester, participants completed an anonymous, online survey. The survey was composed of 66 items with a Likert-type response scale ranging from 1 (*not at all true of me*) to 7 (*very true of me*). Items were adapted from the *Motivated Strategies for Learning Questionnaire* (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1993). The items used in the present study were similar in all ways to the original MSLQ, except that some items

were re-worded to reflect the online nature of the course. For example, the original MSLQ has the question, “I try to apply ideas from course readings in other class activities such as lecture and discussion.” In the revised version, this question was listed as, “I try to apply ideas from course readings in other class activities such as online discussions.” All of the variables derived from this survey were created by computing means of the items associated with a particular scale.

The five subscales used in this study included (1) a 6-item *task value* scale designed to measure judgments of how interesting, useful, and important the course content is to the student (alpha = .94); (2) a 7-item *self-efficacy for learning and performance* scale intended to assess perceptions of expectancy for success and confidence in one’s ability to perform the learning task (alpha = .93); (3) a 5-item *elaboration* scale designed to assess students’ use of elaboration strategies (e.g., paraphrasing, summarizing; alpha = .87); (4) a 5-item *critical thinking* scale intended to assess students’ use of critical thinking strategies (e.g., applying previous knowledge to new situations or making critical evaluations of ideas; alpha = .88); and (5) a 10-item *metacognitive self-regulation* scale intended to assess students’ use of metacognitive control strategies (e.g., planning, setting goals, monitoring one’s comprehension, and regulating performance; alpha = .89).

Examples of questions from the adapted MSLQ include “It is important for me to learn the course material in this class” (task value); “I’m confident I can do an excellent job on the assignments in this course” (self-efficacy); “When I study for this class, I pull together information from different sources, such as readings, online discussions, and my prior knowledge of the subject” (elaboration); “I treat the course material as a starting point and try to

develop my own ideas about it” (critical thinking); and “When I study for this class, I set goals for myself in order to direct my activities in each study period” (metacognitive self-regulation).

Results

Descriptive Results

Table 1 presents means, standard deviations, and Cronbach’s alphas for the five subscales used in this study. Results indicate a mean slightly above the midpoint of the response scale and a standard deviation between 1.03 and 1.67 for each subscale. Although the frequency distributions are not provided here, the means for these five scales show some evidence of negative skew. Cronbach’s alphas for the five subscales are quite good, ranging from .87 to .94 (Clark & Watson, 1995).

Table 1

Means, Standard Deviations, Cronbach’s Alphas, and Pearson Correlations Among the Motivation and Learning Strategies Variables.

Variable	<i>M</i>	<i>SD</i>	α	1	2	3	4	5
1. Task Value	5.78	1.23	.94	–	.58*	.67*	.48*	.60*
2. Self-Efficacy	5.79	1.03	.93		–	.65*	.65*	.56*
3. Elaboration	5.58	1.23	.87			–	.85*	.75*
4. Critical Thinking	5.00	1.36	.88				–	.68*
5. Metacognitive Self-Regulation	4.76	1.67	.89					–

Note. $N = 96$. * $p < .01$.

Correlational Analyses

Pearson correlations, also presented in Table 1, indicate that task value and self-efficacy were significantly positively related to each other ($r = .58, p < .01$) and to students’ use of cognitive and metacognitive learning strategies. As expected, the extent to which students value

the learning task was positively related to their use of cognitive strategies, such as elaboration ($r = .67, p < .01$) and critical thinking ($r = .48, p < .01$), and metacognitive strategies ($r = .60, p < .01$). Likewise, students' self-efficacy was positively related to their use of elaboration strategies ($r = .65, p < .01$), critical thinking strategies ($r = .65, p < .01$), and metacognitive strategies ($r = .56, p < .01$). Overall, these results indicate that when considered individually, the motivational variables of task value and self-efficacy explained from 23% to 45% of the variance in students' self-reported use of cognitive and metacognitive strategies.

Regression Analyses

A multivariate regression was conducted to determine if the set of independent variables, task value and self-efficacy, could be used to predict the three learning strategies variables (Stevens, 2002). Results indicate a statistically significant relationship between the two predictor variables and the dependent variables of elaboration, critical thinking, and metacognitive self-regulation (Wilks' Lambda = .37, $F = 19.62, p < .001$). Furthermore, univariate F -tests indicate that elaboration, critical thinking, and metacognitive self-regulation were all significantly related to the set of predictors.

Table 2 presents a summary of the regression analyses for each dependent variable. As indicated, task value and self-efficacy were both significant positive predictors ($\beta = .44$ and $.40$, respectively) of students' self-reported level of elaboration, accounting for approximately 55% percent of the variance, $F(2, 93) = 57.04, p < .001$. Results from the second analysis predicting students' use of critical thinking strategies indicate that task value and self-efficacy accounted for approximately 44% of the variance, $F(2, 93) = 35.86, p < .001$. However, self-efficacy was the only statistically significant individual predictor of critical thinking ($\beta = .55, p < .001$); task value only approached significance ($\beta = .16, p = .10$). Finally, results from the third analysis

mirrored those of the first, indicating that task value and self-efficacy were both significant positive predictors ($\beta = .41$ and $.32$, respectively) of students' reported level of metacognitive self-regulation, accounting for approximately 42% of the variance, $F(2, 93) = 34.14, p < .001$.

Table 2

Summary of Regression Analyses Predicting Students' Reported Use of Self-Regulated Learning Strategies

Variable	Elaboration			Critical Thinking			Metacognitive Self-Regulation		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Task Value	.43	.08	.44**	.18	.11	.16	.39	.09	.41**
Self-Efficacy	.48	.10	.40**	.73	.13	.55**	.37	.11	.32*
Model Summary	$R^2 = .55, p < .001$			$R^2 = .44, p < .001$			$R^2 = .42, p < .001$		

Note. $N = 96$. * $p < .01$. ** $p < .001$.

Discussion

Findings from the present study support prior research indicating that students' motivation to learn is related to their use of self-regulated learning strategies in academic settings (Pintrich, 1999). Specifically, students' self-reported task value and efficacy beliefs were significant positive predictors of their reported use of elaboration, critical thinking, and metacognitive strategies. These findings not only support the existing literature on motivation and self-regulation in traditional, classroom-based learning environments (Schunk & Zimmerman, 1994, 1998), they also offer an important extension of this line of research by illustrating that these processes and their interrelations are equally robust in online learning situations.

Task Value and Students' Use of Learning Strategies

When considered alone, task value was positively correlated, as expected, with students' reported use of elaboration, critical thinking, and metacognitive strategies. Additionally, after controlling for self-efficacy, task value was a significant individual predictor of elaboration and metacognitive self-regulation. It appears that students who believed the course was interesting and important were more cognitively and metacognitively engaged in trying to learn the material.

These findings parallel the work of Pintrich and De Groot (1990), who found that task value was strongly related to students' use of cognitive strategies and metacognitive self-regulation. These researchers also found that while task value was a strong predictor of cognitive and metacognitive strategies use, it did not have a significant direct relation to student performance when cognitive and metacognitive strategy use were considered. Instead, it was students' use of cognitive and metacognitive strategies that were the best predictors of actual academic performance. These results are similar to work that has been done with expectancy-value theory (see Eccles & Wigfield, 1995), which shows that, in general, value components do not directly influence achievement, but rather are closely tied to students' choice of future enrollment in similar courses. Future research with online learners should include measures of student achievement and choice of future online enrollment as additional outcome variables to investigate whether this fairly robust finding in traditional classroom environments holds up in online education.

Self-Efficacy and Students' Use of Learning Strategies

When considered alone, self-efficacy was positively related, as expected, to students' reported use of elaboration, critical thinking, and metacognitive self-regulation. Additionally, after controlling for task value, self-efficacy was a significant individual predictor of elaboration,

critical thinking, and metacognitive self-regulation. It appears that students who believed they were capable of learning were more likely to report use of cognitive and metacognitive strategies. Again, these results are consistent with the findings of previous investigations of self-efficacy and its influence on SRL strategies use in traditional classrooms (Pintrich & De Groot, 1990; Zimmerman & Bandura, 1994; Zimmerman & Martinez-Pons, 1990).

While the links between self-efficacy and students' use of SRL strategies have been well established in traditional classroom environments, few studies have tested these relationships in online courses. That being said, studies conducted in online settings have found a significant and positive correlation between perceived self-efficacy and academic achievement (see, for example, Lynch, 2003; Wang & Newlin, 2002). It is possible, then, that online students' self-efficacy for learning and performance influences their actual achievement in a similar fashion as task value (i.e., by facilitating students' use of cognitive and metacognitive strategies, which then enhance academic performance). However, more research is needed to elucidate the manner in which online learners' efficacy beliefs influence their use of SRL strategies and, ultimately, their online academic performance.

Educational Implications

Results from the present study suggest some preliminary implications for online educational practice. In particular, online instructors, challenged with having to discern students' engagement with online materials in the absence of traditional classroom cues (e.g., facial gestures, fidgeting, non-attendance), may be able to utilize a survey like the modified MSLQ used in the present study as a diagnostic tool. For instance, an instructor could administer the survey early in an online course to help assess which students are likely to have adaptive motivational attributes, and thus, which students are more likely to use deep cognitive and

metacognitive processing strategies. Using this simple, proactive approach, online instructors could gain important insights and know ahead of time which students are likely to need more help regulating their online learning experience.

Of course, many instructors may not have the time or resources to conduct this kind of formative assessment. Nonetheless, educators can design their courses in a way that enhances both their students' valuing of the required learning tasks and their sense of efficacy to complete those tasks. For example, problem-based learning cycles, rooted in contemporary (if not controversial) issues within the field of study, can not only capture students' immediate interest but can also help them appreciate the larger social, "real-world" relevance and importance of what they are learning (Bransford, Brown, & Cocking, 2000). Furthermore, students' sense of efficacy can be promoted in several ways, including guiding and encouraging students to set challenging, proximal goals and scaffolding students' metacognitive self-regulation by providing them with timely, honest, and explicit feedback (Bandura, 1997; Pintrich & Schunk, 2002). Although none of these suggestions are unique to online learning, they are considered by many to be "best practices" for all educators (American Psychological Association, 1997; Bransford et al., 2000).

Study Limitations

The results of the present study were strictly correlational in nature; therefore, one cannot infer causality from the observed relationships. Although the results suggest fairly robust relations between the measured variables, the direction of influence between the motivational factors and SRL strategies is a bit ambiguous, and thus more controlled research is needed before definitive pathways can be established.

Another limitation was the application of a self-report instrument to measure students' motivational orientations and use of learning strategies. Like any survey, the MSLQ has reliability and validity limitations. In particular, social desirability bias is considered a significant threat to the construct validity of any self-report instrument. Future research that includes more direct, behavioral indicators of individuals' use of learning strategies would help clarify how students' motivational characteristics relate to their capacity to apply SRL strategies in online environments.

Conclusion

Despite methodological limitations, results from the present study provide insight into the relationships between motivational components and self-regulation. Consistent with social cognitive models of SRL (Pintrich, 1999; Zimmerman, 2000), findings support the view that students' use of learning strategies in an online course can be explained, in part, by their motivational beliefs and attitudes toward the learning task. These findings suggest that faculty of online courses should design their instruction and learning requirements in a manner that helps learners not only appreciate the value or importance of content or skills but also supports and scaffolds their attempts to master them.

Future research should continue to explore the relationships between students' motivational characteristics, their use of cognitive and metacognitive learning strategies, and, ultimately, their academic achievement in online situations. The use alternative research methods, such as content analysis of online discussion boards, might be especially useful in exploring the relations between students' reported level of self-regulation and the extent to which their online interactions indicate deep processing and knowledge construction. Additionally,

future research should investigate whether online interventions designed to enhance motivation and scaffold self-regulation can also improve academic performance.

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