Academic motivation and self-regulation: A comparative analysis of undergraduate and graduate students learning online

Anthony R. Artino Jr. a,⁎, Jason M. Stephens b,1

Abstract

To succeed in autonomous online learning environments, it helps to be a highly motivated, self-regulated learner. The present study explored potential differences between undergraduate (n = 107) and graduate students (n = 87) in their levels of academic motivation and self-regulation while learning online. In particular, this study provides a comparative analysis of undergraduate and graduate students’ motivational beliefs (task value and self-efficacy), use of deep processing strategies (elaboration and critical thinking), and motivational engagement (procrastination and choice behaviors). As hypothesized, graduate students learning online reported higher levels of critical thinking than undergraduates. Moreover, after controlling for experiential differences, a logistic regression analysis indicated that graduate student membership was predicted by higher levels of critical thinking and lower levels of procrastination. On the other hand, undergraduate membership was predicted, somewhat paradoxically, by greater task value beliefs and greater intentions to enroll in future online courses. Implications for online instructors and suggestions for future research are discussed.

1. Introduction

Online learning has become an accepted, even expected part of higher education (Larreamendy-Joerns & Leinhardt, 2006; Moore & Kearsley, 2005; Tallent-Ruennels et al., 2006). Evidence of the explosive growth in online learning and its firm establishment is abundant. For instance, the most recent Sloan Consortium (Allen & Seaman, 2008) survey revealed that online enrollments rose by more than 12% from 2006 to 2007. The survey of more than 2500 colleges and universities nationwide reported that 3.94 million students (or approximately 22% of the overall higher education student body surveyed) were enrolled in at least one online course in the fall of 2007. Furthermore, the 12% growth rate for online enrollments far exceeds that of the overall higher education population (1% growth). All told, the number of students learning online has more than doubled in the five years since the Sloan Consortium first conducted their extensive survey of postsecondary institutions (Allen & Seaman, 2008). Clearly, online learning has undergone massive expansion in the last five years, and many experts anticipate that online enrollments will continue to outpace traditional enrollments for the foreseeable future (Allen & Seaman, 2008; Larreamendy-Joerns & Leinhardt, 2006).

As online enrollments have grown, so too has scholarly interest in students’ academic motivation and self-regulation in online courses (Dabbagh & Kitsantas, 2004; Green & Azevedo, 2007). Academic motivation has been operationalized in numerous ways from a wide variety of theoretical perspectives (for an overview, see Graham & Weiner, 1996), but generally academic motivation refers to students’ movement toward and engagement in learning activities. Motivated learners are characterized by low latency and high perseverance with respect to task engagement; that is, they move quickly at the opportunity to learn and stick with it, even in the face of difficulty. Self-regulated learners are characterized as committed participants who efficiently control their own learning experiences in many different ways, including organizing and rehearsing information to be learned; monitoring their thinking processes and seeking help when they do not understand; and holding positive motivational beliefs about their capabilities and the value of learning (Boekaerts, Pintrich, & Zeidner, 2000; Schunk & Zimmerman, 1998). Self-regulated learning has also been described as an active, constructive process whereby students set goals for their learning based on past experiences and the contextual features of the current environment (Pintrich, 2000). These learning goals then become the standards against which academic progress is compared (Green & Azevedo, 2007).

With the explosion of online learning, practitioners and researchers alike have come to understand that to be successful in online courses, it helps to be a highly motivated, self-regulated learner (Azevedo, 2005; Dabbagh & Bannan-Ritland, 2005; Dabbagh & Kitsantas, 2004). The need for high levels of academic motivation and self-regulation is due,
in part, to the relatively autonomous nature of online learning environments compared to traditional classroom contexts. As Dabbagh and Kitsantas (2004) have argued, “in a web-based learning environment, students must exercise a high degree of self-regulatory competence to accomplish their learning goals” (p. 40); whereas in a traditional classroom, the instructor tends to exercise considerable control over the learning activities. What is more, several educational psychologists (e.g., Green & Azevedo, 2007; Pintrich, 2003; Schunk, Pintrich, & Meece, 2008) have indicated that there may be important developmental differences in students’ self-regulation, differences that warrant further empirical investigation. For example, Green and Azevedo (2007) have encouraged researchers to ask whether there might be a developmental progression within self-regulated learning. In their words, “research in this area would perhaps not only allow us to more clearly examine individual phenomena in SRL [self-regulated learning] but also provide clues as to how good SRL behaviors might be taught” (Green & Azevedo, 2007, p. 364). Such developmental differences, if they do exist, could have important educational implications for instructors, determining, for example, the cognitive demands of learning activities faculty design, as well as the type and level of scaffolding teachers provide during instruction.

2. Purpose of the study

The present study explored potential developmental differences in self-regulated learning, as described above. In particular, this study examined whether there were motivational and self-regulatory differences between undergraduate and graduate students enrolled in several online courses. Beginning with the latter, we hypothesized that graduate students would exhibit more adaptive self-regulated learning profiles (i.e., greater use of elaboration and critical thinking strategies and less procrastination) than their undergraduate counterparts. This hypothesis is rooted in the purported developmental nature of self-regulation, as well as the notion that graduate students have greater experience as learners at the university level. As such, we expected graduate students to be more intrinsically motivated to learn (having chosen to pursue an advanced degree; Schunk et al., 2008). For the latter two reasons (more university experience and greater intrinsic motivation), we also expected graduate students to report significantly higher levels of academic motivation (i.e., greater task value and self-efficacy beliefs, as well as greater continuing motivation to enroll in future online courses). Ultimately, identifying such differences could help faculty as they attempt to employ effective online teaching strategies for students who may have varying levels of academic motivation and diverse self-regulatory capacities.

3. Method

3.1. Participants

Participants for this study included a convenience sample of 194 students from a large public university in the northeastern United States. Of these students, 87 (45%) were undergraduates and 107 were graduate students. Participants were enrolled in several different courses in the departments of educational psychology and information sciences; all courses were delivered completely online through WebCT. The sample included 95 women (49%) and 99 men. Within the undergraduate sample, there were 33 women (38%) and 54 men; whereas the graduate sample included 62 women (58%) and 45 men. The mean age of the undergraduate participants was 29.1 years (SD = 9.1, range 19–47), and the mean age of the graduate students was 34.6 years (SD = 9.8, range 21–59). As suggested by the rather high mean age of the undergraduate sample, the distribution was not normal but rather was bi-modal. Specifically, 39 students (45%) in this sample were so-called “traditional” undergraduates (ages 18–24); whereas 46 students (55%) identified themselves as working adults (ages 25–47). These “non-traditional” undergraduates were enrolled in online courses through the school of continuing studies.

In terms of experience with online learning, 71 undergraduates (82% of the undergraduate sample) reported that they had completed one or more online courses in the past; whereas only 60 graduate students (56% of the graduate sample) reported the same level of experience with online learning. This variable and students’ personal ratings of their experience with online technologies (ranging from 1 = extremely inexperienced to 7 = extremely experienced) were used as descriptive and control variables (see Tables 1 and 2, respectively).

3.2. Procedures and instrumentation

During the last three weeks of the semester, participants completed an anonymous, online survey. The first part of the survey was composed of 32 items; all items employed a 7-point Likert-type response scale ranging from 1 (completely disagree) to 7 (completely agree). The items in this section were further subdivided into six subscales that were adapted from previously published instruments. All previous instrument-validation studies employed a variety of data analytic techniques to investigate validity and reliability evidence for the subscales, including exploratory factor analysis, confirmatory factor analysis, and reliability analysis. Finally, the variables used in this study were created by computing means of the items associated with a particular subscale (see the Appendix for a list of the items in each subscale).

### Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall (N = 194)</th>
<th>Undergraduate (n = 87)</th>
<th>Graduate (n = 107)</th>
<th>t-statistic</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online tech. experience</td>
<td>5.82 (1.39)</td>
<td>6.31 (1.30)</td>
<td>5.43 (1.33)</td>
<td>−4.63*</td>
<td>−0.67</td>
</tr>
<tr>
<td>No. of completed online courses</td>
<td>3.53 (3.45)</td>
<td>4.87 (4.19)</td>
<td>2.44 (2.16)</td>
<td>−4.91**</td>
<td>−0.79</td>
</tr>
<tr>
<td>Motivational beliefs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task value</td>
<td>5.72 (1.22)</td>
<td>5.83 (1.31)</td>
<td>5.63 (1.15)</td>
<td>−1.11</td>
<td>−0.16</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>5.70 (1.03)</td>
<td>5.59 (1.07)</td>
<td>5.79 (1.00)</td>
<td>1.39</td>
<td>0.19</td>
</tr>
<tr>
<td>Deep processing strategies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elaboration</td>
<td>5.28 (1.12)</td>
<td>5.04 (1.30)</td>
<td>5.47 (0.92)</td>
<td>2.60</td>
<td>0.39</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>5.10 (1.28)</td>
<td>4.70 (1.39)</td>
<td>5.43 (1.08)</td>
<td>4.08*</td>
<td>0.60</td>
</tr>
<tr>
<td>Motivational engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procrastination</td>
<td>3.02 (1.59)</td>
<td>3.25 (1.73)</td>
<td>2.83 (1.45)</td>
<td>−1.80</td>
<td>−0.27</td>
</tr>
<tr>
<td>Choice (continuing motivation)</td>
<td>4.88 (1.68)</td>
<td>5.40 (1.59)</td>
<td>4.45 (1.63)</td>
<td>−4.06*</td>
<td>−0.59</td>
</tr>
</tbody>
</table>

Note. Bonferroni adjustment was used to control for inflation of type I error associated with multiple comparisons: α = 0.05/8 = 0.006. Cohen’s d = \(\frac{(M_U - M_G)}{SD} \sqrt{\frac{n_U n_G}{n_U + n_G}}\). The online technologies variable was measured on a 7-point Likert-type response scale ranging from 1 (extremely inexperienced) to 7 (extremely experienced). The number of completed online courses ranged from 0 to 17. The remaining variables were measured on a 7-point, Likert-type agreement scale.

* p < .006.
** p < .001.
The six subscales included the following:

1. **Motivational beliefs** (adapted from the Motivated Strategies for Learning Questionnaire [MSLQ]; Pintrich, Smith, Garcia, & McKeachie, 1993):
   a. **Task value** – students’ judgments of how interesting, useful, and important the course content was to them (6 items, $\alpha = .92$), and
   b. **Self-efficacy for learning and performance** – students’ perceptions of expectancy for success and confidence in their ability to perform the learning tasks (7 items, $\alpha = .91$).

2. **Deep processing strategies** (adapted from the MSLQ; Pintrich et al., 1993):
   a. **Elaboration** – students’ use of elaboration strategies (e.g., paraphrasing and summarizing; 5 items, $\alpha = .87$), and
   b. **Critical thinking** – students’ use of critical thinking strategies (e.g., applying previous knowledge to new situations or making critical evaluations of ideas; 5 items, $\alpha = .87$).

3. **Motivational engagement** (adapted from Wolters, 2003, 2004):
   a. **Procrastination** – students’ level of academic disengagement or tendency to put off getting started on the work required for their online course (5 items, $\alpha = .90$), and
   b. **Choice** – students’ intentions to enroll in future online courses, which has also been referred to as continuing motivation (see Maehr, 1976; 4 items, $\alpha = .88$).

The second part of the survey was composed of background and demographic items, including two individual items that assessed students’ online technologies experience and the number of online courses they had previously completed.

4. Results

4.1. Descriptive statistics

Table 1 presents descriptive statistics for the eight variables measured in the present study. As indicated, five of the six subscale variables (task value, self-efficacy, elaboration, critical thinking, and choice) had means above the midpoint of the response scale (range 4.88–5.72) and standard deviations ranging from 1.03 to 1.68. Additionally, all five of these variables showed a slight negative skew. On the other hand, descriptive statistics for the procrastination variable indicated a mean slightly below the midpoint of the response scale (3.02) and a standard deviation of 1.59. The frequency distribution for the procrastination variable had a slight positive skew.

4.2. Group comparisons: t tests

Independent-samples t tests were conducted to explore differences between undergraduate and graduate students on the eight variables measured. To control the type I error rate, a Bonferroni adjustment was used ($\alpha = .05/8 = .006$). Results from these analyses, also presented in Table 1, revealed statistically significant group differences on four of the eight variables. As hypothesized, graduate students reported higher levels of critical thinking than undergraduates ($p < .006$; $d = .60$). Undergraduates, by contrast, reported having completed more online courses in the past ($p < .001$; $d = -.79$), more experience with online technologies ($p < .006$; $d = -.67$), and greater intentions to enroll in additional online courses in the future ($p < .006$; $d = -.59$). Effect sizes for the four statistically significant findings were moderate to large (Cohen, 1988).

4.3. Group comparisons: logistic regression

Logistic regression was used to investigate the unique contribution of these differences in predicting students’ group membership (undergraduate = 0; graduate = 1). Table 2 provides a summary of the logistic regression analysis. As indicated, the addition of the eight predictors to the model resulted in improvements in all measures of model fit (Menard, 2000). For example, the likelihood ratio chi-square test was used to assess the contribution of the eight predictors to the model. Results indicated that the eight predictors statistically significantly improved model prediction. As hypothesized, graduate students were more likely to procrastinate in their online courses and, somewhat paradoxically, were also more likely to report that they valued the course content and wanted to take more online courses in the future.

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### Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>SE</th>
<th>OR</th>
<th>Model fit statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>−2 log likelihood</td>
<td>Likelihood ratio $\chi^2$</td>
<td>Likelihood ratio $R^2$</td>
<td>% correctly classified</td>
</tr>
<tr>
<td>Online tech. experience</td>
<td>−0.67***</td>
<td>0.16</td>
<td>0.51</td>
<td>175.78</td>
</tr>
<tr>
<td>No. of completed online courses</td>
<td>−0.23**</td>
<td>0.07</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>Task value</td>
<td>−0.76**</td>
<td>0.25</td>
<td>0.47</td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>0.11</td>
<td>0.26</td>
<td>1.12</td>
<td></td>
</tr>
<tr>
<td>Elaboration</td>
<td>0.24</td>
<td>0.31</td>
<td>1.27</td>
<td></td>
</tr>
<tr>
<td>Critical thinking</td>
<td>0.81**</td>
<td>0.27</td>
<td>2.25</td>
<td></td>
</tr>
<tr>
<td>Procrastination</td>
<td>−0.28*</td>
<td>0.13</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>Choice (continuing motivation)</td>
<td>−0.40**</td>
<td>0.14</td>
<td>0.67</td>
<td></td>
</tr>
</tbody>
</table>

Note. $b =$ unstandardized regression coefficient; OR = odds ratio. Percent correctly classified in the null model = 55.2.

$p < .05, **p < .01, ***p < .001.$
5. Discussion

The current investigation examined potential differences in the academic motivation and self-regulation of undergraduate and graduate students enrolled in several online courses. We hypothesized that graduate students would report higher levels of academic motivation and more adaptive self-regulated learning behaviors than their undergraduate counterparts. Taken together, findings from this comparative study revealed that undergraduate and graduate students did in fact differ in a number of important ways, but not always as expected.

Specifically, the results partially supported the hypothesis that the graduate students would exhibit more adaptive self-regulated learning profiles. Though less experienced with online technologies and learning, graduate students reported greater use of critical thinking strategies and, when accounting for all other variables, were more likely to report lower levels of procrastination. These latter characteristics are consistent with effective academic self-regulation (Pintrich, 1999; Wolters, 2003).

In fact, students who utilize critical thinking strategies—that is, those who apply previous knowledge to new situations and make critical evaluations of new ideas—tend to realize superior learning outcomes when compared to other less-critical students (Schunk & Zimmerman, 2008). Furthermore, previous work in traditional university settings has revealed that students who are highly self-regulated also engage in procrastination to a lesser degree than other students (Wolters, 2003).

In contrast, we were surprised to find that undergraduates, who were more likely to procrastinate than the graduate students, were also more likely to report greater task value beliefs and greater continuing motivation to enroll in future online courses. Although empirical findings are mixed, students who procrastinate are generally thought to be less motivatedally engaged (Ferrari, Parker, & Ware, 1992; Wolters, 2003). One possible explanation for this unexpected result may originate from the sample demographics: a slight majority of the undergraduates surveyed were non-traditional (ages 25 – 47). These non-traditional students (working adults) likely make greater sacrifices—both in terms of wages and leisure time lost—than other undergraduates, and even many graduate students. Accordingly, one might expect these non-traditional undergraduates to report greater motivation (as measured by greater task value and continuing motivation). Of course, it is important to note that the graduate students surveyed in this study were by no means unmotivated. In fact, their reported levels of task value and continuing motivation were still well above the midpoint of the response scale ($M = 5.63$ and 4.45, respectively). Nonetheless, the unanticipated finding that undergraduates were more likely to procrastinate, yet appeared to be more motivated, was somewhat paradoxical and may warrant further investigation. What is more, future studies may want to explore potential differences in the motivational attributes of traditional versus non-traditional undergraduates, as speculated above.

5.1. Implications for online learning

Due to the non-experimental nature of this investigation, concrete implications for online educators are somewhat difficult to extract and can only be offered provisionally. Even so, results from this study provide support for Green and Azevedo’s (2007) claims concerning the developmental nature of academic self-regulation. In view of these findings, online educators may do well to provide their undergraduate and graduate students with differential support; that is, different types and amounts of regulatory guidance and scaffolding during online learning activities. Specifically, the following suggestions are provided:

1. Provide explicit instructional support and structure. Although, as this study revealed, undergraduates may be more experienced with online technologies and learning, they may also require more explicit support and structure from the instructor, as indicated by their lower levels of critical thinking and greater tendency to procrastinate. Examples of explicit support and structure include reflective prompting aimed at helping students self-monitor their understanding (Davis & Linn, 2000); clear and detailed syllabi and assignment instructions; and more intermediate assignment deadlines to facilitate task completion (Liu, Bonk, Magiuka, Lee, & Su, 2005). In general, these instructional tactics are designed to encourage learners to better regulate their own learning in online contexts (McLoughlin, 2002) and to discourage their use of maladaptive academic behaviors, such as procrastination.

2. Develop students’ self-efficacy. Another approach to encouraging self-regulation and discouraging procrastination is to address students’ self-efficacy for learning online. Research with college undergraduates in traditional classrooms has indicated that students with higher self-efficacy tend to procrastinate less often than others (Ferrari et al., 1992; Wolters, 2003). Thus, although undergraduates in the present study reported similar levels of self-efficacy as their graduate counterparts, interventions aimed at promoting self-efficacy in online settings may be an effective means of reducing procrastination. Two instructional strategies that have been known to enhance students’ self-efficacy for learning in both traditional and online contexts include helping learners identify and set challenging, proximal goals (Locke & Latham, 1990; Dabbagh & Kitsantas, 2004) and providing students with timely, honest, and explicit performance feedback (Bandura, 1997; Bangert, 2004; Wang & Lin, 2007).

3. Scaffold online discussions. A primary goal of online discussions is to encourage students to challenge, reform, and synthesize their current views of knowledge through in-depth interactions with others (Garrison, Anderson, & Archer, 2001). However, findings from numerous studies of online discussion forums have indicated that students’ interactions are often quite shallow, and “rarely developed into a higher level of communication where negotiation, co-construction, and agreement occurred” (Tallent-Runkels et al., 2006, p. 100). In the present study, undergraduates reported lower levels of critical thinking than graduate students. This finding suggests that online instructors may do well to provide additional scaffolding for these students, in an effort to enhance their use of critical thinking skills and other deep processing strategies. This type of supplemental scaffolding in online contexts has been described by some as enhanced teaching presence (Anderson, Rourke, Garrison, & Archer, 2001; Garrison et al., 2001; Shea, Li, Swan, & Pickett, 2005). For example, during online discussions, enhanced teaching presence might include some of the following teacher behaviors: setting the climate for learning by modeling appropriate discussion posts; encouraging, acknowledging, and reinforcing student contributions; identifying areas of agreement/disagreement and seeking consensus; critically evaluating posts and requesting clarification and elaboration where necessary; and diagnosing and correcting students’ misunderstandings (Anderson et al., 2001; Shea et al., 2005). Ultimately, teaching practices such as these that facilitate productive discourse may be necessary if online learners—particularly undergraduates—are expected to engage their classmates in meaningful interactions, develop higher levels of critical thinking, and realize other educationally-worthwhile learning outcomes (e.g., reduced procrastination, improved persistence, and overall satisfaction with online learning; Christopher, Thomas, & Tallent-Runkels, 2004; Liu et al., 2005; Shea et al., 2005; Whipp, 2003).

5.2. Limitations and future directions

One important limitation of the present study was the relatively small convenience sample utilized. Although statistically significant differences were found in the respondents’ experience and components of their academic motivation and self-regulation, the nature of the sample limits the extent to which these findings can be generalized to other university students. For instance, it is possible that these results are unique to the individuals surveyed and the specific online contexts investigated here (Shadish, Cook, & Campbell, 2002). Future research should include larger, more diverse samples to improve the external validity of these findings.
Another limitation was the non-experimental nature of the present investigation. For example, it is unclear whether the higher levels of critical thinking reported by graduate students actually represent a developmental difference in these students when compared to undergraduates. Instead, these differences could have been the result of different course requirements; that is, by their very nature, graduate courses may simply require students to utilize more critical thinking strategies to successfully complete online learning activities. On the other hand, undergraduate courses may not require that students demonstrate this type of cognitive processing, thus allowing undergraduates to get away with using more shallow processing strategies, such as rehearsal and rote memorization. If this is the case, then differences observed in the present study may be less about developmental differences in self-regulation and more about dissimilarity in the requirements inherent to graduate and undergraduate courses. That said, Christopher et al. (2004) found that higher level discussion prompts (i.e., prompts that modeled a high level of critical thinking) had no effect on the level of graduate students’ responses, as coded using a rubric developed from Bloom’s Taxonomy of Learning. Clearly, however, more controlled research is needed to further clarify the differences detected in the current study.

Finally, most of the instructional recommendations provided in this article require more empirical testing in online environments to validate their efficacy. Future studies that utilize experimental designs might be especially useful in exploring whether online interventions, such as adaptive scaffolding during online discussions, can differentially impact undergraduate and graduate students’ use of critical thinking and other deep processing strategies. Additionally, the use of alternative approaches, such as longitudinal, design-based research methods (Bannan-Ritland et al., 2003), could be particularly useful in exploring these relations.

6. Conclusions

Even the most cursory attention to recent trends in higher education will illustrate the growing importance of online learning in today’s world. Despite its importance, only a few studies have examined how different groups of students actually go about learning in these highly autonomous educational settings. Consequently, practitioners and researchers alike know very little about the beliefs and behaviors that contribute to academic success in online environments (Abrami & Bernard, 2006; Bernard et al., 2004).

The present study addressed this under-researched area by exploring potential differences in the motivation and self-regulation of undergraduate and graduate students learning online. Taken together, findings from this study suggest that undergraduate and graduate students come to online courses with different levels of online experience and exhibit different levels of motivation and self-regulation while learning online. Thus, it seems reasonable to propose that faculty should closely consider their online audience, adjusting the type and amount of structure, support, and scaffolding they provide during online instruction. Moreover, these findings underscore the notion that online instructors should base their pedagogical decisions, in large part, on students’ experience, motivational beliefs, and self-regulatory competence in online situations. Ultimately, by explicitly addressing these learner-centered factors, instructors will be in a superior position to positively impact their students’ online learning and performance.

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The first author is a military service member. The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government.

Appendix A. Survey instrument

All subscales utilized the following response scale:

<table>
<thead>
<tr>
<th>Completely disagree</th>
<th>Mostly disagree</th>
<th>Tend to disagree</th>
<th>Neutral</th>
<th>Tend to agree</th>
<th>Mostly agree</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Motivational beliefs (adapted from the MSLQ; Pintrich et al., 1993)

Task value
1. I think I will be able to use what I learn in this course in other courses.
2. It is important for me to learn the course material in this class.
3. I am very interested in the content area of this course.
4. I think the course material in this class is useful for me to learn.
5. I like the subject matter of this course.
6. Understanding the subject matter of this course is very important to me.

Self-efficacy
1. I believe I will receive an excellent grade in this class.
2. I’m certain I can understand the most difficult material presented in the readings for this course.
3. I’m confident I can learn the basic concepts taught in this course.
4. I’m confident I can understand the most complex material presented by the instructor in this course.
5. I’m confident I can do an excellent job on the assignments in this course.
6. I’m certain I can master the skills being taught in this class.
7. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

Deep processing strategies (adapted from the MSLQ; Pintrich et al., 1993)

Elaboration
1. 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.
2. I try to relate ideas in this subject to those in other courses whenever possible.
3. When reading for this class, I try to relate the material to what I already know.
4. I try to understand the material in this class by making connections between the readings and the concepts from the online activities.
5. I try to apply ideas from course readings in other class activities such as online discussions.

Critical thinking
1. I often find myself questioning things I hear or read in this course to decide if I find them convincing.
2. When a theory, interpretation, or conclusion is presented in the online discussions or in the readings, I try to decide if there is good supporting evidence.
3. I treat the course material as a starting point and try to develop my own ideas about it.
4. Whenever I read an assertion or conclusion in this class, I think about possible alternatives.
5. I try to play around with ideas of my own related to what I am learning in this course.

Motivational engagement (adapted from Wolters, 2003, 2004)

Procrastination
1. I often find excuses for not starting the work for this course.
2. I delay studying for this course, even when it is important.
3. I postpone doing the work for this class until the last minute.
4. I promise myself I will do something for this course, then put it off anyway.

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5. I frequently put off getting started on the readings and assignments for this course.

Choice
1. I look forward to taking more online courses in the future.
2. I won’t take another online class unless it is required. (reverse coded)
3. I plan to avoid taking any class that involves online learning. (reverse coded)
4. If I had a choice, I would take an online course rather than a traditional face-to-face course.

References

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