Can Factors Related to Self-regulated Learning and Epistemological Beliefs Predict Learning Achievement in Undergraduate Asynchronous Web-based Courses?

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Abstract

This study examined the effects of self-regulated learning (SRL) and epistemological beliefs (EB) on individual learner levels of academic achievement in Web-based learning environments while holding constant the effect of computer self-efficacy, reason for taking an online course, and prior college academic achievement. The study constituents included 201 undergraduate students enrolled in a variety of asynchronous Web-based courses at a university in the southeastern United States.

Data was collected via a Web-based questionnaire and subjected to the following analyses: separate exploratory factor analyses of the self-regulated learning and the epistemological beliefs question items, correlations between the independent variables and the dependent variable, and linear regression of final course grades with all the variables in the model.

Analysis of the data revealed that three independent variables (GPA, Expectancy, and GPA_Exp) were significant predictors in the model of learning achievement in asynchronous online courses. Discussion of the study's predictive model follows.

Key Words: self-regulated learning, epistemological beliefs, asynchronous Web-based learning, online learning, expectancy for learning, regression analysis, learning achievement, allied health, health information management.

Introduction

Increasingly, allied health and HIM programs taught at public institutions of higher learning are adding asynchronous Web-based instruction to their undergraduate degree programs.

Although online learning has been hailed as the next revolution in access to higher education, many undergraduate learners (late adolescent students between the ages of 18 and 25 years of age) who function well in traditional on-campus classrooms may not be ready for the demands of asynchronous Web-based learning (AWBL). This is because online learning requires more learner control and self-direction than traditional classroom-based instruction. These demands are representative of higher levels of intellectual development that "may well be unattainable during the late adolescent years".[1]

There is little research from the asynchronous online learning literature that examines the relationship between learner control and self-monitoring and successful learning in AWBL environments. However, recent research in educational psychology has identified two characteristics that appear to be related to academic success in learner-controlled environments such as online courses. These characteristics are self-regulation of learning and epistemological beliefs about knowing and learning.[2-4]

Self-regulated learning (SRL) is an element of social cognitive learning theory that states that learner behaviors and motivations as well as aspects of the learning environment affect learner achievement.[5-7] Some experts have argued that self-regulation of learning (SRL) has a positive influence on academic success.[8-12]

Epistemological beliefs (EB) are beliefs held by individuals about knowledge and learning.[13, 14] Researchers in this area contend that the more sophisticated students' beliefs are about knowledge and learning, the more successful they should be in thinking and problem solving.[14-16]

The majority of the research literature for each genre (SRL and EB) is composed of theoretical work that has made convincing arguments for why each construct should influence learner achievement. On the other hand, empirical studies that have been conducted in both traditional classroom and computer-based settings have yielded limited results concerning the effects of either SRL or EB on student achievement.

These limited results may be because the majority of such research has examined each construct (SRL and EB) separately from the other. Yet, Flavell and Hofer argued that self-regulated individuals who actively self-monitor their learning also tend to have sophisticated beliefs about knowledge and learning.[17, 18] One would expect, then, that combining an individual's level of self-regulated learning with his epistemological belief profile might be more effective in predicting learner performance than relying on either measure alone. Therefore, a better understanding about how subfactors related to SRL and EB affect learner achievement may be realized if both constructs are included in the same study.

Purpose of the Study

There are relatively few studies that have used predictive modeling in order to explain the effect of self-regulated learning (SRL) and epistemological beliefs (EB) on learner achievement in asynchronous Web-based environments. Most studies in this area have looked at either SRL or EB but not both in the same model. In addition, these investigations have varied in the number and types of covariate factors included in the final models. For example, the asynchronous online learning literature indicates that other factors such as reason for taking an online course, self-efficacy for using computer technology, and prior academic achievement influence learning achievement in online courses.

The purpose of the current study, then, was to examine the effects of SRL and EB on individual levels of achievement in an asynchronous Web-based learning environment while controlling for the effects of the covariate factors listed above.

Research Question

The research question was as follows: What is the predictive ability of self-regulated learning; epistemological beliefs; and reason for taking an online course, computer self-efficacy, and prior academic achievement (GPA) on final grade in asynchronous undergraduate online college courses?

Participants

The site of the present study was a coeducational public university situated in the southeastern region of the United States. According to registrar records, approximately 2,700 students were enrolled in Web-based undergraduate courses at the university. About a quarter of this group, 629 students, was selected via a random numbers procedure to receive a recruitment e-mail. Finally, 201 individuals from this group completed the study questionnaire. Students ranged in age from 18 to 50 with a mean age of 22.4 S.D. 6.14. Survey respondents were 77 percent female (n = 155) and 23 percent male (n = 46) and comprised a diverse ethnic sample with 74 percent Caucasian, 16.5 percent African American, and 5 percent Native American. The remaining 5 percent of the sample self-reported as either Asian American/Pacific Islander, mixed race, or Hispanic. Of the students sampled, 46 percent (n = 93) had no prior experience taking online courses, while 54 percent (n = 108) had taken at least one online course previously.

Approximately 8.7 percent (n = 17) of the sample were allied health students with HSIM comprising 82 percent (n = 14) of the allied health group. The HSIM cohort did not significantly differ from the target population of online learners according to demographic characteristics such as age and gender. Data collection occurred during the spring 2005 academic semester.

Materials

Data was collected via a Web-based self-report inventory. Survey questions were taken from the following two instruments as a means of collecting data relative to the variables of self-regulated learning (SRL) and epistemological beliefs (EB).

A review of the theoretical research in SRL showed that individuals must display certain fundamental attributes in order to be successful self-regulators of their learning. These include: (a) being intrinsically motivated to reach goals, (b) expecting that one's efforts to learn will result in positive outcomes, (c) expecting to succeed in one's learning, (d) being confident in one's ability to perform and complete an academic task, (e) monitoring one's progress toward goal completion, (f) controlling one's effort and attention, and (g) managing time and place resources for learning and studying. Self-regulated learning theory argues that these conditions must be present before students can successfully employ cognitive strategies in their learning. Moreover, according to Pintrich, Smith, Garcia and McKeachie, the Motivational Strategies for Learning Questionnaire (MSLQ) scales "are designed to be modular and can be used to fit the needs of researchers."[19] Therefore, 24 Likert-scaled question items were taken from the MSLQ and used to assess participant ratings on the self regulated-learning subfactors targeted by the current study.

All 32 Likert-scaled question items from the Epistemological Beliefs Inventory (EBI) were used to assess participant ratings on epistemological belief subfactors targeted by the current study. This instrument was developed by Schraw, Bendixen, and Dunkle.[20]

The survey instrument also included questions related to the covariates as follows: (a) two Likert-scaled question items were included that referenced the study participants' self-efficacy for computer usage, and (b) a short answer question item was included that referenced the study participant's reasons for taking the online course, and (c) each participant's grade point average (GPA) was collected from university registration records. Last, final course grades fell on a scale

from 0–100 and were collected from course instructors at the end of the exam period. Permission to gather this information was obtained from each study participant. Please see Appendix A for a list of the question items from the study survey.

Methods and Designs

A cross-sectional predictive study was used in order to examine the effect of the following factors on learning achievement in asynchronous online undergraduate courses: (a) subfactors of self-regulated learning, (b) subfactors of epistemological beliefs, (c) self-efficacy for computer technology, (d) reason for taking a Web-based course, and (e) prior college academic achievement.

The following steps describe how the data was analyzed to reveal the predictive ability of the SRL and EB subfactors on academic achievement.

1. Despite published claims of validity and reliability for the original instruments, the first step was to run separate factor analyses of the self-regulated learning and epistemological beliefs question items in order to establish their factor structure in the current study. [19, 20] Factor internal reliability coefficients obtained for the self-regulated learning and epistemological beliefs subfactors were then compared with those obtained for the original instruments.

2. Next, a correlation matrix of the independent variables (the SRL and EB subfactors as well as the study covariates) and the dependent variable was generated. An analysis of the matrix determined which of the independent variables were correlated with the dependent variable and which were correlated with each other.

3. Finally, a multiple regression analysis of the predictor variables in the proposed model with the dependent variable (final course grade as a measure of learning achievement) was performed.

Results

While students from all four class levels participated in this study, juniors and seniors accounted for about two-thirds (64.7 percent) of the sample. Final course grades ranged from 0–100 (M = 86.36, SD = 13.31) with 55.7 percent earning a grade of 90 or above. GPA of the sample population ranged from 1.00–4.00 (M = 3.00, SD = 0.63). It is possible that previous experience with learning online could have had an impact on the study's results. Therefore, an independent samples t test was used to determine whether there was a significant difference in learning achievement (mean final course grade) between those students who had never taken an online course before and those students who had already taken at least one online course. This analysis revealed that there was no significant difference between the two groups (t (199) = 1.4; p = 0.17).

Separate exploratory factor analyses of the self-regulated learning and epistemological beliefs survey items yielded the following factor structures: three SRL subfactors—expectancy, intrinsic goal orientation, and resource regulation; four epistemological beliefs subfactors—innate ability, quick learning, simple knowledge, and omniscient authority. These subfactors paralleled those yielded by the original instruments and their reliability estimates can be compared to their counterparts in the original instruments. Please refer to data Table 1.

Survey participants fell into three categories according to their reason for taking an online course during the spring 2005 semester. Of the respondents, 47.8 percent (n = 96) stated that learning online was more convenient for them than taking a traditional face-to-face course, while

33.8 percent (n = 68) reported that they had no option. "No option" meant that at the time the student registered, either the course was only offered online or there were no face-to-face course sections available. A smaller number of students, 18.4 percent (n = 37) gave a reason related to their curiosity or interest in learning via the electronic medium. See data Table 2.

Student responses to two survey questions about self-efficacy for the use of computer technology were added together and the sum represented the student's overall self-report score for computer self-efficacy (M = 6.38, SD = 1.18). Prior academic college achievement was measured using the current semester GPA. The mean GPA for the sample was 3.01 and the SD 0.63. See data Table 1.

Interaction term. In the current study, GPA and expectancy for learning were found to be moderately correlated (r = .3) (see data Table 1). This r value as well as literature-based evidence for their positive correlation drove the decision to create an interaction term, consisting of the cross product of the variable that measured prior college academic achievement (GPA) and the variable that measured individual expectancy for learning (ExpSE_sum).[5,7,21-24] This new variable was labeled GPA_Exp and was included in the predictive model.[25]

Mean standard deviations, Pearson correlations, and coefficient alpha reliability estimates for the study's independent variables appear in data Table 1. Coefficients ≥.1 were considered indicative of a correlation between a particular predictor variable and the dependent variable. Therefore, based on this criterion, the following bivariate correlations revealed five predictor variables significantly related to learning achievement: (a) interaction of GPA and expectancy (r = .52), (b) prior college achievement as measured by GPA (r = .40), (c) expectancy (r = .39), (d) effort regulation (r = .32), and (e) quick learning (r = -.16). All of these correlations were significant at least at p < .05, and all were in the predicted directions.

Using multiple regression, final course grades were regressed on the linear combination of all the variables in the model. These eleven variables included (a) prior academic achievement (GPA), (b) computer self-efficacy (Comp_SE), (c) intrinsic goal orientation (IGO_sum), (d) resource management (TPEffreg), (e) expectancy (ExpSE_sum), (f) quick learning (QL_sum), (g) innate ability (IA_sum), (h) omniscient authority (OA_sum), (i) simple knowledge (SK_sum), (j) reason for taking an online course (reason_ol), and (k) the interaction between GPA and expectancy (GPA_Exp). Data Table 3 depicts the prediction of final grade based on the full model.

The linear combination of the independent variables significantly predicted final course grade in asynchronous undergraduate online courses (adj. R^2 = .35, p<.001). See data Table 3. Three of the eleven independent variables were significant (P<.0001) predictors of undergraduate learning achievement in asynchronous online courses; these predictors were prior college learning achievement (GPA), expectancy for learning (ExpSE_sum), and the interaction of prior college learning achievement with expectancy for learning (GPA_Exp).

The magnitude of contribution for each significant predictor was determined by its associated standardized regression coefficient (Table 3); they were GPA (2.2, p<.0001), expectancy (1.7, p<.0001), and GPA_Exp (-2.4, p<.0001). The differences between the absolute values for these three coefficients did not appear to be widely divergent. Thus, it appeared that none of these three independent variables had a greater effect than the others in predicting the dependent variable.

Interaction term. Figure 1 compares the relationship between the independent variable (Exp) and the dependent variable (Fin Gr) where GPA is low (below the median) and where GPA is high (above the median). This figure demonstrates that when GPA is below the median, the slope of expectancy for learning on FinGr is steeper than when GPA is equal to or greater than the median. This suggests that expectancy for learning exerts a greater effect at lower values of GPA

than it does at higher values of GPA. Furthermore, this figure also suggests that GPA's impact on final course grade is mitigated at higher levels of expectancy for learning.

Conclusion

In this study, the best predictors of learning achievement in undergraduate asynchronous online courses were prior college academic achievement (GPA), expectancy for learning (ExpSE_sum), and the interaction term based on the cross product of prior academic achievement and expectancy (GPA_Exp). In addition to being the most important independent variables in the model, these three variables also correlated most strongly with the dependent variable compared to other independent variables in the model.

The study's results yielded a parsimonious solution to the original study research question and indicated that although there were multiple factors that were bivariately correlated with learning, only one of the original self-regulated learning subfactors and none of the epistemological beliefs subfactors was a predictor of learning achievement in asynchronous online undergraduate courses. For example, although quick learning was weakly correlated with the dependent variable, FinGR (-.16), it was more highly correlated with expectancy (r = -.34). Likewise, even though effort regulation was fairly correlated with FinGr (r = .32), it was more highly correlated with the other self-regulated learning subfactor, expectancy (r = .50). Therefore, it appears that quick learning and effort regulation probably shared variance in common with expectancy and, as a result, were weaker predictors of final grade than was the expectancy for control of learning subfactor. As a result, expectancy acted as an "umbrella" term that represented the other correlates of the dependent variable (FinGR) in the predictive model of learning achievement in asynchronous online undergraduate courses.

This study's findings suggest that expectancy, or an expectation that one will experience positive outcomes in one's learning, is a central driving force for self-regulation.[23, 26] Moreover, Bandura and others have underscored the role played by individual self-efficacy in facilitating expectancy for learning.[21, 27] Therefore, an individual with strong expectancy for learning possesses the "can do" attitude required to succeed in learning. Such an attitude is the product of positive reinforcement and explains the mutually positive or synergistic relationship not only between prior academic achievement and expectancy, but also between expectancy and other self-regulated learning and epistemological beliefs subfactors.

For example, it would appear that because expectancy was the only subfactor to make it into the predictive model, it acted as a global factor or "proxy" that represented the other SRL subfactor (effort regulation) and the epistemological belief subfactor (quick learning) in the predictive model. This observation is reasonable because strong expectancy for learning depends on having other positive attitudes and behaviors consistent with success in learning. It is as though once an individual expects positive outcomes for his learning and takes responsibility for his learning, he will do what it takes (such as regulate his effort accordingly and apply appropriate time and study management strategies) in order to be a successful learner.

Thus, it is unlikely that a multiple regression equation that already contained expectancy would need other variables like quick learning and effort regulation in order to improve the accuracy of its predictive power; any variance in final grade due to effort regulation and quick learning had probably already been accounted for by expectancy. As a result, the effort regulation and quick learning variables were redundant and consequently displayed nonsignificant beta weights.

College has traditionally been a stage of education where individuals must assume greater responsibility for their learning compared to the primary and secondary schooling experiences.[28, 29] Moreover, today's college student is faced with an even greater need to be able to assume

responsibility for his learning because more undergraduate courses and programs are being delivered via asynchronous online environments. This study's findings suggest that individuals with the greatest expectancy for learning, regardless of their prior academic achievement, were the most successful asynchronous online learners. Nevertheless, expectancy for learning appears to be a learner characteristic that is molded and shaped by previous academic learning experiences.[21, 26, 30] Therefore, in order to ensure academic learning success, it behooves responsible educators to ensure that students who enter college are armed with strong expectancy for controlling their learning.

Recommendations for Future Research

1. Consider the role that other factors external to the learner might have had on influencing student final course grade. Future research should be done in order to learn about other factors that may influence learning achievement in online undergraduate courses and how they may facilitate self-regulated learning and sophisticated epistemological beliefs. For example, it is reasonable to recommend that future studies of learner achievement in asynchronous online courses investigate how the learning environment (instructor and/or instructional design of the course) impacts learner achievement.

2. Employ other research methodologies in order to study the role that SRL and EB play in explaining learning achievement in online courses. Researchers are calling for mixed methods research because both constructs, SRL and EB, are recognized as complex entities and, as such, may require a range of methodologies in order to better understand their influence on learning.[28, 31] For example, it is known that triangulation of qualitative and quantitative methods can help confirm a theory to a greater degree than can either method used in isolation.[32] Thus, findings from both quantitative research methodologies based on survey data collection and qualitative research strategies based on interviewing and observation can help to either confirm or contradict hypotheses regarding the connection between self-regulated learning and/or epistemological belief subfactors and learning achievement. Therefore, a future replication of this study should include qualitative as well as quantitative techniques of data collection and analysis.

3. Finally, repeat this study with a larger sample of HIM students. As more HIM programs move toward online course delivery, it is useful to understand which learner-associated factors influence learning achievement in asynchronous Web-based courses.

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Notes

1. Turnbull, E.D. "Investigating the Potential for Improving Experiential Undergraduate Curriculum through the Concept of Personality." Unpublished doctoral dissertation. University of Western Sydney, Sydney, 2003.

2. Hartley, K. and Bendixen, L. "Educational Research in the Internet Age: Examining the Role of Individual Characteristics." *Educational Researcher* 30(9), (2001, December): 22-26.

3. Kember, D. "Beliefs about Knowledge and the Process of Teaching and Learning as a Factor in Adjusting to Study in Higher Education." *Studies in Higher Education* 26, no. 2 (2001): 205-221.

4. Zimmerman, B. J. "Attaining Self-regulation: A Social Cognitive Perspective." In M. Boekarts, P. R. Pintrich, M. Zeidner (Editors). *Handbook of Self-regulation.* San Diego, CA: Academic Press, 2000: 13-35.

5. Bandura, A. *Social Foundations of Thought and Action: A Social Cognitive Theory.* Englewood Cliffs, NJ: Prentice Hall, 1986.

6. Ormrod, J. *Human Learning.* Third edition. Upper Saddle River, NJ: Prentice Hall, 1999.

7. Zimmerman, B. J. "Developing Self-fulfilling Cycles of Academic Regulation: An Analysis of Exemplary Instructional Models." In Schunk, D. H. and B. J. Zimmerman, (Editors). *Self-regulated Learning: From Teaching to Reflective Practice*. Guilford Press: New York, 1998: 1-19.

8. Garavilia, L. S. and M. E Gredler. "Prior Achievement, Aptitude and Use of Learning Strategies as Predictors of College Student Achievement." *College Student Journal* 36, no. 4 (2002): 616-625.

9. Pintrich, P. R. and E. V. De Groot. "Motivational and Self-regulated Learning Components of Classroom Academic Performance." *Journal of Educational Psychology* 82, no. 3 (1990): 3-40.

10. Pressley, M. and E. S. Ghatala. "Self-regulated Learning: Monitoring Learning from Text." *Educational Psychologist* 25, no. 1 (1990): 19-33.

11. Schunk, D. H. "Self-regulation of Self-efficacy and Attributions in Academic Settings." In Schunk, D. H. and B. J. Zimmerman, (Editors). *Self-regulation of Learning and Performance: Issues and Educational Implications*. Hillsdale, NJ: Erlbaum, 1994: 75-99.

12. Williams, J. E. and C. M. Hellman. "Investigating Self-regulated Learning among First Generation Community College Students." *Journal of Applied Research in the Community College* 5, no. 2 (1998): 83-87.

13. Schommer, M. "The Influence of Age and Education on Epistemological Beliefs." *British Journal of Educational Psychology*, 68 (1998): 551-562.

14. Hofer, B. K. "Personal Epistemology as a Psychological and Educational Construct: An Introduction." In Hofer, B. K. and P. R. Pintrich (Editors). *Personal Epistemology: The Psychology of Beliefs about Knowledge and Knowing*. Mahwah, NJ: Lawrence Erlbaum Associates, 2002: 3-14.

15. Schommer, M. "Effects of Belief about the Nature of Knowledge on Comprehension." *Journal of Educational Psychology* 82, no. 3 (1990): 498-504.

16. Bendixen, L. and K. Hartley. "Successful Learning with Hypermedia: The Role of Epistemological Beliefs and Metacognitive Awareness." *Journal of Educational Computing Research* 28, no.1, (2003): 15-30.

17. Flavell, J. H. "Metacognition and Cognitive Monitoring." *American Psychologist* 34 (1979): 906-911.

18. Hofer, B. K. "Personal Epistemology Research: Implications for Learning and Teaching." *Journal of Educational Psychology Review* 13, no. 4 (2001): 353-382.

19. Pintrich, P. R. et al. *A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ).* Ann Arbor, MI: The University of Michigan, 1991: 3.

20. Schraw, G., L. Bendixen, M. E. Dunkle. "Development and Validation of the Epistemic Belief Inventory." In Hofer, B. K. and P. R. Pintrich (Editors) *Personal Epistemology: The Psychology of Beliefs about Knowledge and Knowing.* Mahwah, NJ: Lawrence Erlbaum Associates, 2002: 261-276.

21. Bandura, A. *Self-efficacy: The Exercise of Control.* New York: W. H. Freeman & Company, 1997.

22. Pajares, F. "Gender and Perceived Self-efficacy in Self-regulated Learning." *Theory into Practice* 41, no. 2 (2002): 116-125.

23. VanZile-Tamsen, C. "The Predictive Power of Expectancy of Success and Task Value for College Students' Self-regulated Strategy Use." *Journal of College Student Development* 42, (2001): 233-241.

24. Zimmerman, B. J. "Dimensions of Academic Self-regulation: A Conceptual Framework for Education." In Schunk, D. H. and B. J. Zimmerman (Editors), *Self-regulation of Learning and Performance: Issues and Educational Applications.* Hillsdale, NJ: Erlbaum, 1994: 3-21.

25. Jaccard, J and R. Turrisi. "Interaction Effects in Multiple Regression," Second edition. *Quantitative Applications in the Social Sciences* (Series). Thousand Oaks CA: Sage publications, 2003.

26. Boekarts, M., P. R. Pintrich, and M. Zeidner. *Handbook of Self-regulation.* San Diego, CA: Academic Press, 2000.

27. Williams, P. E. and C. M. Hellman. "Differences in Self-regulation for On-line Learning between First and Second Generation College Students." *Research in Higher Education* 45, no. 1 (2004): 71-82.

28. Perry, R. P. "Academic Control and Action Control in the Achievement of College Students: A Longitudinal Field Study." *Journal of Educational Psychology* 93, no. 4 (2001): 776-789.

29. Thompson, B. R. and P. R. Geren. "Classroom Strategies for Identifying and Helping College Students at Risk for Academic Failure." *College Student Journal* 36, no. 3 (2002): 398-402.

30. Hofer, B., S. Yu, and P. Pintrich. "Teaching College Students to Be Self-regulated Learners." In Schunk, D. H. and B. J. Zimmerman (Editors), *Self-regulated Learning from Teaching to Self-reflective Practice.* New York: The Guilford Press, 1998: 57-85.

31. Patrick, H. and M. J. Middleton. "Turning the Kaleidoscope: What We See When Self Regulated Learning Is Viewed with a Qualitative Lens." *Educational Psychologist* 3 (2002): 27-39.

32. Risjord, M.W., S. B. Dunbar, and M. F. Maloney. "A New Foundation for Methodological Triangulation." *Journal of Nursing Scholarship* 34, no. 3 (2002): 269-276.

Appendix A

Undergraduate Online Survey

Demographic Items

1. What is your e-mail ID?
2. Gender: Male, Female
3. Age_____
4. Ethnic background (Non-Hispanic Black, Hispanic, Non-Hispanic White.
Asian/Pacific Islander, Native American, Mixed Race)
5. Class level (freshman, sophomore, junior, senior)
6. What is the name and section number of the Web-based course that you are taking this
    semester? (if taking more than one course, complete this for the course that is
    required for either a major or minor course of study).
7. Is this course taught 100 percent online with no scheduled on-campus sessions?
8. Why are you taking this course online as opposed to in a campus-based classroom?
9. The item that best describes how I feel about my ability to overcome computer- and
    technology-related problems:
    1. Not at all confident
    2. Somewhat confident
    3. Confident
    4. Very confident
10. The item that best describes how I feel about my ability to use computer technology
    such as the Internet, e-mail, and chat:
    1. Not at all confident
    2. Somewhat confident
    3. Confident
    4. Very confident

Self-regulation of Learning Items

Please indicate how true each of the following statements is of you. There are no right or
wrong answers, just answer as accurately as possible. Use the scale below to answer the
questions. If you think a statement is very true of you, select "7"; if a statement is not at
all true of you, then select 1. If the statement is more or less true of you then find the
number between 1 and 7 that best describes you.
              1   2   3   4   5   6   7
Not at all true of me   Very true of me

   19. In a class like this, I prefer course material that really challenges me so I can learn
        new things.
   20. If I study in appropriate ways, then I will be able to learn the material in this
        course.

21. I believe I will receive an excellent grade in this class.
22. During the times that I am logged onto the course site, I often miss important points because I am thinking of other things.
23. I usually study in a place where I can concentrate on my course work.
24. I often feel so lazy or bored when I study that I quit before I finish what I planned to do.
25. I prefer course material that arouses my curiosity, even if it is difficult to learn.
26. It is my own fault if I don't learn the material in this course.
27. I'm confident I can do an excellent job on the assignments and tests in this course.
28. When I become confused about something I'm reading for class, I go back and try to figure it out.
29. I make good use of my study time for this course.
30. I work hard to do well in class even if I don't like what we are doing.
31. The most satisfying thing for me is trying to understand the content as thoroughly as possible.
32. If I try hard enough, then I will understand the course material.
33. I expect to do well in this class.
34. I often find that I have been reading for class but don't know what it was all about.
35. I find it hard to stick to a study schedule.
36. When course work is difficult, I give up or only study the easy parts.
37. When I have the opportunity, I choose course assignments that I can learn from even if they don't guarantee a good grade.
38. If I don't understand the course material, it is because I didn't try hard enough.
39. Considering the difficulty of this course, the online format, and my skills, I think that I will do well in this class.
40. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.
41. I rarely find time to review my notes or readings before an exam.
42. Even when course materials are dull and uninteresting, I manage to keep working until I finish.

Epistemological Beliefs Inventory

Please indicate how strongly you agree or disagree with each of the statements listed below. Please circle the number that best corresponds to the strength of your belief.
Strongly   1   2   3   4   5   Strongly Agree
Disagree

43. It bothers me when instructors don't tell students the answers to complicated problems.
44. Truth means different things to different people.
45. Students who learn things quickly are the most successful.
46. People should always obey the law.
47. Some people will never be smart no matter how hard they work.
48. Absolute moral truth does <u>not</u> exist.

49. Parents should teach their children all there is to know about life.
50. Really smart students don't have to work as hard to do well in school.
51. If a person tries too hard to understand a problem, they will most likely end up being confused.
52. Too many theories just complicate things.
53. The best ideas are often the most simple.
54. People can't do too much about how smart they are.
55. Instructors should focus on facts instead of theories.
56. I like teachers who present several competing theories and let their students decide which is best.
57. How well you do in school depends on how smart you are.
58. If you don't learn something quickly, you won't ever learn it.
59. Some people just have a knack for learning and others don't.
60. Things are simpler than most professors would have you believe.
61. If two people are arguing about something, at least one of them must be wrong.
62. Children should be allowed to question their parents' authority.
63. If you haven't understood a chapter the first time through, going back over it won't help.
64. Science is easy to understand because it contains so many facts.
65. The moral rules I live by apply to everyone.
66. The more you know about a topic, the more there is to know.
67. What is true today will be true tomorrow.
68. Smart people are born that way.
69. When someone in authority tells me what to do, I usually do it.
70. People who question authority are troublemakers.
71. Working on a problem with no quick solution is a waste of time.
72. You can study something for years and still not really understand it.
73. Sometimes there are no right answers to life's big problems.
74. Some people are born with special gifts and talents.

Figure 1

Relationship of Expectancy and Final Grade where GPA is Low (below the median) and where GPA is high (above the median).
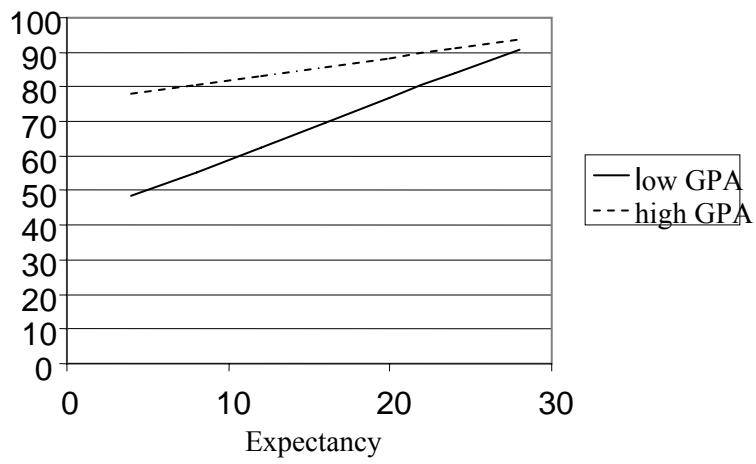
Table 1

Means, Standard Deviations, Intercorrelations, and Coefficient Alpha Reliability Estimates

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
Final Grade	86.36	13.31										
GPA	3.01	0.63	.40***									
Computer Self-efficacy	6.38	1.18	-.09	-.25***	(70)							
Intrinsic Goal Orientation	13.11	3.11	.10	.03	.07	(62)[74]						
Eff/Resource Management	30.83	6.02	.32***	.25***	.09	.28***	(80)[73]					
Expectancy	23.50	3.88	.39***	.30***	.10	.23**	.50***	(85)[81]				
Quick Learning	4.88	1.90	-.16*	-.23***	-.08	-.20	-.43***	-.34***	(67)[58]			
Innate Ability	13.10	3.82	-.007	.05	-.04	-.19**	-.22**	-.11	.35***	(72)[62]		
Omniscient Authority	10.36	2.05	.05	-.06	-.06	.03	.17*	.08	.09	.03	(55)[68]	
Simple Knowledge	9.49	2.26	-.03	-.02	-.02	-.14*	-25***	-.11	.26***	.21**	.25***	(60)[62]
GPAXExpectancy	71.08	20.56	.52***	.84***	-.13	.15*	.45***	.66***	-.35***	-.03	-.006	-.08

Note. N = 201. Reliability estimates appear on the diagonal. Estimates in parentheses are for the current sample after factor analysis, those in brackets are from original researchers' instruments.
*p< .05, **p< .01 , ***p< .001

Table 2

Final Grade Based on Reason for Taking the Course (N = 201)

Reason	*n*	*M*	*SD*	Low	High
Convenience	96	84.83	15.97	0	100
No Other Option	68	87.75	8.46	63	100
Interest in Online Learning	37	87.78	12.86	31	99

Table 3

Prediction of Final Grade Based on the Full Model (N = 201)

	b	SE	β	*t*	*p*
Intercept	-80.93	27.82		-2.91	.004
Grade Point Average	45.23	9.08	2.15	4.98	.0001
Computer Self-efficacy	-0.11	0.69	-.01	-0.16	.87
Intrinsic Goal Orientation	-0.10	0.26	-.02	-0.38	.70
Resource Management	0.16	0.17	.07	0.98	.33
Expectancy	5.84	1.08	1.70	5.40	.0001
Quick Learning	0.67	0.49	.10	1.36	.18
Innate Ability	-.10	0.22	-.03	-0.44	.66
Omniscient Authority	0.02	0.40	.003	0.05	.96
Simple Knowledge	0.09	0.37	.02	0.25	.80
Reason_ol	-2.24	1.53	-.08	-1.46	.14
Grade point average X Expectancy	-1.56	0.36	-2.41	-4.28	.0001

Full Model: $F (11, 189) = 10.98$, $p = .0001$. adj $R^2 = .354$.