

An investigation of hope, academics, environment, and motivation as predictors of persistence in higher education online programs

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Abstract

Predictors of persistence previously found useful in distinguishing successful from unsuccessful distance learners were assembled in a 60-item survey. The survey was completed by 259 learners enrolled in associate's, bachelor's, or master's level distance learning courses in accounting, business administration, information services, criminal justice, nursing, management, and education. The survey measured variables related to academics, environment, motivation, and hope as predictors of persistence, where persistence was defined as continuing beyond the first three classes in one of the three degree-granting programs. Persisters ($N=209$) tended to score higher on environmental measures of Emotional Support, Self-efficacy, and Time and Study Management than non-persisters ($N=50$). Surprisingly, high scores on a measure of Learner Autonomy (independent learning) were associated with non-persistence in the online programs. The findings were interpreted in the context of the cohort model used in the online programs attended by the students surveyed in the study.

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The explosive growth of distance education during the 1990s profoundly altered and reshaped postsecondary institutions. The footsteps down the hallowed halls of academia are rapidly being replaced with keystrokes zipping through cyberspace. Online learning during the 90's experienced expansive growth that has carried over into the 21st century. The World Wide Web has quickly expanded the manner and ways that postsecondary institutions provide a quality education. The growth rate of online learning has been phenomenal during the last few years with online enrollment growing faster than traditional student enrollment (Oblinger & Hawkins, 2005) and gaining recognition as the postsecondary wave of the future (Klett, 2004). The turn-of-the-century perception of online learning as a potential watershed for colleges and universities has quickly been realized (Kiernan, 2003; Leonard & Guha, 2001; Meyer, 2002).

This considerable growth has led institutions to experience a demographic change as significantly older students are entering and re-entering postsecondary education. Such changes have brought a greater emphasis on the particular needs, characteristics, lifestyles, motivations, enrollment patterns, and unique roles and responsibilities of these adult learners (Kilgore & Rice, 2003). This growing population of adult learners views online learning as a flexible and valuable option now available to them as they balance demanding work, family, and other responsibilities.

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As a result of these changing patterns, institutions that have traditionally catered to 18–25-year-old students have responded by trying to eliminate or minimize barriers that affect electronic learners. With dropout rates of distance education students estimated to be 10–20% higher than those for in-person learning (Carr, 2000; Diaz, 2002), greater effort has been expended to retain the online learners, since this represents a significant financial and professional concern to these institutions. Berge and Huang (2004) note, “Retention of students at the course, program, or degree level has been a timeless concern of educators. The lack of retention, or dropout, has historically challenged educational systems and seems to be especially acute in distance learning” (p. 2). Stated by Rovai (2002), “Persistence, that is, the behavior of continuing action despite the presence of obstacles, is an important measure of higher education program effectiveness” (p. 1).

1. Theoretical framework

Institutions and researchers have shown an increased concern for the readiness potential of online learners (Kerr, Ryneason, & Kerr, 2006). A review of the research indicates that successful and persistent electronic learners have need of specialized learning skills, which are not as essential for the traditional brick-and-mortar student. The concern regarding the retention of online students is clearly stated by Bocchi, Eastman, and Swift (2004):

There are a variety of reasons for this higher attrition rate [as compared to traditional brick-and-mortar rates], including students’ feelings of isolation, difficulty adjusting to a self-directed approach, and their finding that such courses are more rigorous than anticipated and that faculty members and students lack experience with online learning. (p. 246).

2. Characteristics of persistent online learners

In the specialized learning environment of web-based instruction, the ability to work independently, sustain one’s focus on personal and academic goals, maintain motivation in spite of conflicting commitments, and demonstrate computer proficiency are among some of the qualities and life approaches that increase successful completion. A review of research related to a number of these factors is necessary to understand the purpose of this study and future directions of persistence studies of online learners.

Much research of online learning targets the preparedness construct, including various aspects of preparation that may be associated with, and predictive of, retention and persistence among online learners. It is recognized that successful students prone to persist are prepared students, and that preparation comes in different forms. Previous academic records have been the traditional standard, often supplemented by national standardized examinations, application essays and personal interviews. More recent research suggests that students thriving in an all-Internet learning environment appear to possess qualities and approaches to life in addition to being academically prepared, including attributes such as student engagement, self-directedness, computer self-efficacy, self-discipline, time management skills, motivation and commitment, goal- and relevancy-orientations, and individualistic learning styles (Diaz, 2000; Howell, Williams, & Lindsay, 2003; Leasure, Davis, & Thievon, 2000; Meyer, 2002; Moore, Sener, & Fetzner, 2006; Morris, Wu, & Finnegan, 2005; Parker, 2003).

2.1. Learning orientation

Loubeau and Heil (2000) note that much of the research during the 1990s focused on the technical and computer preparation of students, barriers that impact successful completion, and the development of screening tools to help identify levels of preparedness for online learning. These areas were given attention because the online learning method of instruction necessitates mature self-discipline and demonstrated competencies in learning and study strategies (Romano, Wallace, Helmick, Carey, & Adkins, 2005; Sankaran, Sankaran, & Bui, 2000; Sizoo, Malhotra, & Bearson, 2003). Additionally, researchers have indicated that student characteristics, such as the level of student engagement, independent learning style, self-motivation, and effective time management, influence student grades and retention in online learners (Cauffman, 2000; Diaz, 2000; Morris, Finnegan, & Wu, 2005; Thiele, 2003).

Sizoo et al. (2003) believe students in a distance-learning format will need to be self-disciplined and have effective learning skills. These researchers examined the learning strategies of in-class and DE learners and suggested sources

and methods of acquiring necessary skills, which may be lacking. Overall, they believed perceived readiness (or lack of) has bearing on persistence and retention issues of online learners. Along this line, Northrup, Russell, and Burgess (2002) assessed 52 graduate students in an online master's program. They noted the essential importance of these students' self-monitoring their progress in order to survive in the online courses.

Loomis (2000) investigated the relationship between individual study and learning styles with academic performance. He gave the Learning and Study Strategies Inventory (LASSI) to 28 students in a Research Methods class (Communication and Journalism department). By or shortly after the mid-term exam, five of the students had dropped the course (82% retention rate). He identified several factors as contributors to academic performance in this online course: time management, study skills (with particular emphasis on attitude and ability to identify main ideas), and the ability to focus attention on assignments. Academically successful students effectively used study aids, but time management skills correlated the strongest with the final grade.

Brenner (1997) analyzed students' cognitive styles in distance education courses at a community college. The students were assessed for field dependence and field independence. The grades in the course did not reveal a statistical difference between these two cognitive styles. However, Brenner did conclude that effective distance learners must possess self-discipline, self-planning, and self-organization.

Osborn (2001) tested the reliability and validity of a brief assessment instrument to identify at-risk, Web-based, distance education students. Among the variables that discriminated between completers and non-completers were study environment, recognized as allocating a place and time to accomplish tasks related to the course, and computer confidence, recognized as a level of comfort in approaching tasks that involve the use of a computer.

In Diaz and Cartnal's (1999) study comparing learning styles of online students ($N=68$) with an equivalent on-campus class ($N=40$), the Grasha–Riechmann Student Learning Style Scales (GRSLSS) was utilized. The students enrolled in the distance education class were significantly more independent learners than those comprising the on-campus class ($p<.01$). However, in Aragon, Johnson, and Shaik's (2002) exploratory empirical study examining the relationship of learning style and learning outcomes of students in online and face-to-face environments, no statistical difference was found between the two groups. Among other instruments included in the research, the Independent Learner subscale of the GRSLSS was also used. However, the sample size was much smaller ($N=19$) in each group. Further investigation of the independent learning preference as it relates to retention in E-learning is needed.

2.2. Environmental factors

Environmental considerations are also deemed important factors in satisfaction and persistence of online students (Lim, 2001). Substantial preparation and support are seen as important influences on student achievement outcomes (House, 1999). Technical preparation, personal and familial support, financial and work concerns, and freedom to engage and dedicate the necessary time and energy into succeeding in an online learning format all appear to be environmental considerations influential to retention in web-based, distance education.

Non-traditional students differ from the traditional college-age students in some significant ways (Howell et al., 2003). In writing about 32 trends affecting distance education, the authors believe students in distance education tend to be practical problem solvers. They also believe students' "life experiences make them autonomous, self-directed, and goal-and relevancy-oriented—they need to know the rationale for what they are learning. They are motivated by professional advancement, external expectations, the need to better serve others, social relationships, escape or stimulation, and pure interest in the subject" (Student/Enrollment Trends, Number 3). However, Howell et al. also note that these students face many demands on various fronts, including time and scheduling, money, and long-term commitment constraints. They also express that these students experience insecurity concerning their ability to succeed in distance learning.

The practical and significant need for adequate technical preparation on the part of the learner is well documented (Osika & Sharp, 2003). Osika and Sharp highlight the increasing demands placed on higher education students to not only master course material, but also demonstrate effective use of technology. After surveying faculty, an inventory of the minimum technical competencies expected of students in Web-based instruction was constructed. Summarizing the technical needs of students, Lorenzetti (2003) states, "Online students' needs are different — they need different kinds and intensities of support" (p. 1).

Loubeau and Heil (2000) focused on the readiness of health administration students for distance learning education, specifically technology readiness. A 25-item survey was utilized as a measure of students' familiarity with Internet basics

and web browsing, use of e-mail, and discussion groups. The availability of computer access, on and off campus, was also measured. Of the 98 students from which the data was collected, 83% perceived some computer knowledge deficiencies with 39% seeing themselves as needing extensive computer training. The presenters stated three learning objectives. One was the need to recognize the limitations of student preparedness; another was the need to identify specific computer skill deficiencies in students; and the third was the need for remediation before beginning distance education.

Lorenzetti (2003) presents the concern for online students to have technological and computer support. The author stresses, “Administrators [related to DE] need to fully consider the anxiety levels of students who are already nervous about studying remotely” (p. 1). In her mind, if technological and computer support needs remain unmet, “students may go away underserved — perhaps to another university, perhaps out of continuing education entirely” (p. 1).

Lim (2001) had a total of 235 adults enrolled in Web-based distance education at five institutions complete questionnaires. She concluded that computer proficiency and self-efficacy had a positive effect on satisfaction and seemed to give learners increased confidence in the ability to handle the academic demands of DE. The level of computer proficiency was found to be a significant factor affecting satisfaction and future participation in this distance-learning format. Learners with high computer self-efficacy tended to indicate greater satisfaction. The author believes her study suggested that adult learners with higher levels of computer efficacy also tended to have a higher academic self-concept.

Song, Singleton, Hill, and Koh (2004) believed their study of 76 graduate students’ online learning experiences indicated that most learners agreed that course design, learner motivation, time management, and comfortableness with online technologies impact the success of an online learning experience. Participants indicated that technical problems, a perceived lack of sense of community, time constraints, and the difficulty in understanding the objectives of the online courses as challenges (p. 59).

In essence, support considerations and technological preparation are seen as vital.

As stated earlier, Osborn (2001) found computer confidence (defined as a level of comfort in approaching tasks that involve the use of a computer), in addition to allocating a place and time to accomplish tasks related to the course, to be a positive means of differentiating completers from non-completers in DE courses. In addition, Mollison (2000) indicated finances and time are major concerns of adult students. Continuing his thought, candidates for online or distance education courses should have the qualities necessary for completion — discipline and self-motivation.

2.3. *Motivational factors*

The persistent online learner appears to need not only certain academic qualities and environmental support, but also a high motivation level (Morris, Wu et al., 2005). Aviv (2004) presents various reasons distance learners appreciate the online learning environment. The most frequent reasons specified included studies, career, weekday, family/work, interaction, and online. For the most part, the learners appreciate the online learning environment for factors that are associated with their own life situations and personal motivation.

In their article regarding academic persistence, Bird and Morgan (2003) particularly evaluated issues, themes, and concerns of prospective adult distance education learners. Among others, motivation was listed as a key theme. The motivational factors influential in persistence were clearly defined goals, belief in one’s ability to achieve such goals, and the anticipation of significant meaning when the goal is accomplished. In total, their survey of adult learners and their enrollment decisions in DE uncovered six themes: fears, motivation, family support, academic preparedness, suitability of programs, and identity change.

Academics and motivation are tied together in Visser, Plomp, Amirault, and Kuiper (2002). They studied the impact of motivational intervention on 81 international students from 5 different continents and 22 countries. Finding that motivational messages effectively increased the proportion of students who completed the courses as compared to previous years, they implored instructional designers and instructors to understand motivational principles and use that knowledge to help students overcome frequent motivational issues surrounding the distance learning community.

For his doctoral dissertation, Jamison (2003) focused on motivation-related variables when he surveyed 333 adult community college students with a 54-item Web-based instrument. While focusing exclusively on motivation-related variables such as goal activation, goal salience, goal alignment, emotional activation, and responsive environment, he was successful in correctly classifying course completers and non-completers. The predictive model developed using discriminant analysis was able to correctly classify student completion in more than 90% of the cases.

Leasure et al. (2000) conducted a comparison study of students in the nursing field. Student outcomes were compared between students in traditional courses and those using Web-based learning technology. No significant difference in examination scores or course grade was found between the two groups. They did find that the learners who reported themselves as self-directed and able to avoid procrastination and maintain their own pace were the most appreciative of the Web-based courses.

2.4. Hope construct

In addition to the above factors, Snyder's conception of hope was alleged to have promise as an additional variable in the prediction of persistence (Snyder et al., 1991). Snyder and his colleagues have devised an adult dispositional Hope scale that is derived from his hope model. Snyder (1995) defined hope as the "process of thinking about one's goals, along with the motivation to move toward (agency) and the ways to achieve (pathways) those goals" (p. 355). Hope as a construct was developed in the context of goal-setting behavior (Snyder et al., 1991). The concept of hope as "individuals' perceptions regarding their capacities to (1) clearly conceptualize goals, (2) develop the specific strategies to reach those goals (pathways thinking), and (3) initiate and sustain the motivation for using those strategies (agency thinking)" (Snyder, Lopez, Sholey, Rand, & Feldman, 2003, pp. 122–123) is a strengths-based concept within the emerging positive psychology field and might have promise as a predictor of retention.

Embodying some of the definition of hope, Kemp (2002) outlined a correlation study in which she correctly classified 66% of the 121 students in the sample as either persisters or non-persisters. Three predictors of persistence were used as independent variables: resilience, life events, and external commitments. The dependent variable was persistence and defined as successful course completion. Successful course completers tended to score higher on three skills relating to persistence: confidence to make the most of bad situations, ability to make things better, and persistence at working through difficulties. Kemp concluded with the following thought, "Knowledge of students' resiliency skills (and by extension their 'risk quotient') allows distance educators to target interventions to those most in need. Understanding the conditions under which resiliency skills will generalize to differing activities in academic contexts offers valuable possibilities for intervention and instructional strategies that may help students build both competence and the necessary accompanying self-perceptions of competence" (p. 78).

3. Research question

This study was designed to answer the following research question:

To what extent do measures of students' hope, as well as academics, motivation, and environment, predict persistence in online learning?

4. Method

4.1. Participants

The participant pool consisted of all students beginning enrollment in the Adult and Professional Studies online, degree-completion programs of a growing university in the Midwest. These students were pursuing a degree at the associate's, bachelor's, or master's level in a broad range of areas, such as accounting, business administration, information services, criminal justice, nursing, management, and education. The web-based questionnaire was made available to 407 students. One-half way through the first course in each program, students were given the opportunity to participate in the study. Most received a small incentive of five bonus points for participating. The ultimate sample of 259 participants appeared to closely match the population of the university's online students. Of the complete sample utilized, 209 were classified as persisters, and 50 were classified as non-persisters.

4.2. Instrumentation

The online survey designed for this study was a compilation of 60 items, the majority of which came from previously published studies (see Table 1). The majority of the items listed in Table 1 were chosen from previously

Table 1
Cronbach alphas and corrected item–total correlations

Source	Response item	Alphas	Corrected item–total correlations
	Hope scale	.79	
	<i>Pathways — 4 items</i>	.66	
A	I can think of ways to get out of a jam.		.33
A	There are lots of ways around any problems.		.49
A	I can think of many ways to get the things in life that are most important to me.		.48
A	Even when others get discouraged, I know I can find a way to solve the problem.		.48
	<i>Agency — 4 items</i>	.70	
A	I energetically pursue my goals.		.45
A	My past experiences have prepared me well for my future.		.40
A	I've been pretty successful in life.		.57
A	I meet the goals that I set for myself.		.54
	Academics scale	.74	
	<i>Time and study management — 6 items</i>	.75	
B	I usually study where I can concentrate on my course work.		.46
B	I make good use of my study time in my courses.		.60
B	I find it hard to stick to a study schedule. (R)		.46
B	I have a regular place set aside for studying.		.47
B	I make sure I keep up with the weekly readings and assignments for my courses.		.52
B	I often find that I don't spend very much time on my courses because of other activities. (R)		.55
	<i>Meta-cognitive self-regulation — 3 items</i>	.39	
B	When I become confused about something I'm reading in my course work, I go back and try to figure it out.		.25
B	I try to change the way I study in order to fit the course requirements and the instructor's expectations.		.24
B	When I study for my courses, I set goals for myself in order to direct my activities in each study period.		.26
	<i>Learner autonomy — 5 items</i>	.50	
C	I prefer to work by myself on assignments in my courses.		.27
C	I learn a lot of content in my classes on my own.		.33
C	I feel very confident about my ability to learn on my own.		.32
C	I like classes where I can work at my own pace.		.25
C	When I don't understand something, I first try to figure it out for myself.		.24
	Environment scale	.75	
	<i>Computer/Internet self-confidence — 3 items</i>	.67	
D	I have real concerns about communicating electronically. (R)		.52
E	I sometimes wonder if I have sufficient computer keyboarding skills for doing online work. (R)		.58
E	I feel comfortable composing text on a computer in an online learning environment.		.43
	<i>Fiscal support — 4 items</i>	.59	
G	I sometimes wonder if finances might delay or interfere with completing my degree. (R)		.36
G	I believe the current financial burden of my education will be worth it.		.40
G	I sometimes wonder if my education is really worth all the investment that I'll put into it. (R)		.44
G	I am satisfied that I will be able to meet my financial needs while I pursue my degree.		.36
	<i>Emotional support — 3 items</i>	.43	
G	Overall, my support group of family and friends encourages me to complete my program of study.		.20
G	I sometimes wonder if I'll need more support than I am getting right now. (R)		.34
G	I have concerns that online learning will be a lonely experience. (R)		.28
	Motivation scale	.73	
	<i>Intrinsic goal orientation — 3 items</i>	.59	
B	I prefer course material that really challenges me so I can learn new things.		.42
B	I prefer course material that arouses my curiosity, even if it is difficult to learn.		.50
B	The most satisfying thing in my program of study is trying to understand the content as thoroughly as possible.		.30
	<i>End goal orientation — 3 items</i>	.60	
G	I have comfortably arranged my life and activities around my desire to meet my educational goals.		.40
F	Learning helps me achieve challenging personal goals.		.47
F	I use learning as a vital resource in accomplishing my professional or personal goals.		.46
	<i>Self-efficacy for learning and performance — 4 items</i>	.58	
B	I am certain I can understand the most difficult material presented in the readings for this degree program.		.45
B	I question if I can do an excellent job on the assignments and tests in this program. (R)		.39
B	I expect to do well in this program.		.46

Table 1 (continued)

Source	Response item	Alphas	Corrected item–total correlations
	<i>Self-efficacy for learning and performance — 4 items</i>		
B	Considering the difficulty of this program, the teachers, and my skills, I think I will do well in completing this degree.		.42
	<i>Compliant learner — 6 items</i>		
F	The instructor is the best person to monitor, evaluate, and determine how well I learn.	.75	.51
F	The instructor helps me stay on task and meet course objectives.		.44
F	I do well on a course if I rely on the instructor.		.34
F	I rely on the instructor to assess my learning achievement.		.49
F	I know that the instructor can show me the best way to evaluate achievement of my learning goals.		.64
F	The instructor can plan my best learning approach for accomplishing training objectives.		.52

(A) Snyder (1995); (B) Duncan and McKeachie (2005); (C) Riechmann and Grasha (1974); (D) McVay (2001); (E) Bernard et al. (2004); (F) Martinez (2005); (G) Created for this project. (R) indicates reverse coding of the item response for scoring.

validated instruments. The original Hope scale (Snyder, 1995) was composed of four items each for the agency and pathways subscales. Babyak, Snyder, and Yoshinobu (1993) conducted confirmatory factor analysis to test the psychometric properties of the Hope scale and concluded that a two-factor solution best represented the item responses. Snyder reported acceptable reliability with Cronbach Alphas of .74 and .84, and test–retest reliabilities (3 to 10 weeks) over .80. These two, four-item Hope subscales appeared to show appropriate internal consistency and temporal stability for the purposes of the study.

Pintrich and McKeachie originally developed the Motivated Strategies for Learning Questionnaire (MSLQ) with 81 items, 6 motivation subscales, and 9 learning strategy scales (Duncan & McKeachie, 2005). It has been utilized throughout the world and translated into multiple languages. Duncan and McKeachie state, “The MSLQ has proven to be a reliable and useful tool that can be adapted for a number of different purposes for researchers, instructors, and students” (p. 117). Duncan and McKeachie indicate that the 15 scales can be used together or singly. Internal consistency estimates of reliability are within acceptable ranges with 12 of the scales having Cronbach Alphas of .68 or above (items chosen to be included in this research were selected from scales with Alphas from .74 to .93).

The Grasha–Riechmann Student Learning Style Scales (GRSLSS) assesses six student-learning styles: Independent, Dependent, Avoidant, Participant, Collaborative, and Competitive (Riechmann & Grasha, 1974). A 5-point Likert scale format is used in the original GRSLSS with 15 items for each scale with test–retest reliabilities ranging from .76 to .83 ($N=269$).

Bernard, Brauer, Abrami, and Surkes (2004) developed a 38-item questionnaire to assess the achievement outcomes of online learning success, with 13 of the items derived from McVay (2001). Factor analysis produced four scales in a sample of 167 students prior to their beginning an online course, labeled Confidence in Prerequisite Skills, General Beliefs about Online Learning, Self-management of Learning, and Desire for Interaction with Others. Six of the eight items for the Confidence in Prerequisite Skills scale were initially used in this study. This scale had a Cronbach Alpha of .79 and corrected item-total correlations from .35 to .63.

The Learning Orientation Questionnaire (LOQ) is a 25-item, online survey to measure how adults generally approach learning and performance (Martinez, 2005). Scores are used to identify gaps between the potential learning and performance proficiency and actual learning and performance proficiency. Several universities and corporations have used it, and it has been field tested by over 15,000 subjects. In a sample of 1277 subjects, the internal-consistency reliability coefficient for the utilized subscale was .79. A correlation of .85 was obtained during a test–retest reliability analysis.

5. Reliability analyses

Four scales were scored from the survey — Academics, Environment, Motivation and Hope. A fifth scale, Compliant Learner, was added into the survey and analyzed with the subscales. The survey consisted of the eight-point response scale provided for the Hope scale items. While the items presented in Table 1 groups the items according to their scale, the survey used in the research presented the items in a different order to minimize response bias due to similar content in adjacent items.

Item-total correlations were used to maximize the internal consistency reliability of the original scales comprised of items selected from the literature to measure each of the constructs. The original scales produced Cronbach Alphas of

.79 for the eight-item Hope scale, .72 for the 18-item Academics scale, .75 for the 14-item Environment scale, .68 for the 12-item Motivation scale, and .69 for the eight-item Compliant Learner scale. While these Alphas suggest moderate internal consistency reliabilities for the original scales, inspection of the correlations between the scale items and the total scale scores revealed several items with near-zero item-total correlations. These items were removed, and the Alphas were recalculated for the remaining items in each scale. If the Alpha improved or remained the same, scores for the shortened scales replaced the original scores and were used to test the study's hypothesis.

The eight item Hope scale was retained in its entirety with Alpha = .79. The Academics scale was reduced from 18 to 14 items with Alpha increasing from .72 to .74. The Environment scale was reduced from 14 to 10 items, and Alpha remained the same at .75. The Motivation scale was reduced from 12 to 10 items, and Alpha increased from .68 to .73. The Compliant Learner subscale was reduced from 8 to 6 items, and the Alpha increased from .69 to .75. These changes reduced the original 60-item survey to the 48 items shown in Table 1. Table 1 shows the items comprising these subscales, the Cronbach Alphas for each scale and subscale, and the corrected item-total correlations.

In addition to the main scales shown in Table 1, subscales were scored for the constructs of hope, academics, environment, and motivation. The Hope subscales were Pathways and Agency; Academics subscales were Time and Study management, Meta-Cognitive Self-regulation, and Learner Autonomy; Environment subscales were Computer/Internet confidence, Fiscal Support, and Emotional Support; and Motivation subscales were Intrinsic Goal Orientation, End Goal Orientation, and Self-efficacy for Learning and Performance.

The highest Cronbach Alpha for the Academics subscales was .75 for Time and Study Management, followed by .50 for Learner Autonomy, and .39 for Meta-cognitive Self-regulation. Cronbach Alphas for the Environment subscales of Computer/Internet, Fiscal Support, and Emotional Support were .67, .59, and .43, respectively. The Motivation subscales ranged from a high of .60 for the End Goal subscale to a low of .58 for Self-efficacy, with the Intrinsic Goal Orientation subscale of .59 in the middle. The Hope scale Cronbach Alphas were .66 for the Pathways subscale and .70 for the Agency subscale.

6. Procedures

The university uses a cohort model of grouping students together into classes and offers various options for completing an associate's, bachelor's, or master's degree in the areas of accounting, business administration, information services, criminal justice, nursing, management, and education. The university provides both on-site and online options for all but one of the programs included in the data collection. Instructors use the face-to-face delivery mode for the on-site option, with the Internet as the delivery mode for the online option. Course descriptions, learning objectives, and numerous assignments are the same in either option. Yet, the online programs incorporate asynchronous discussions that are carried out over the period of a week at a time; thus, the focus and activities for the on-site programs are quite often different from those of the online programs. Students choose which program most fits their need and – provided an on-site course is available nearby – may opt to take a course in a different delivery format or change programs altogether.

During the data collection period, once a student was enrolled in a program of study and consented to participate in the research project, he or she was asked to complete the survey in an online, web-based format that was accessible using standard Web browsers. Responses were captured into an output file and converted to SPSS. The students learned of the opportunity to participate in the study via a workshop document that outlined the required activities expected of the students, as well as the optional activity of participating in this research project. The URL for the web-based questionnaire was indicated in the respective workshop documents. This document appeared approximately midway through the first course in each student's respective program. While just a few of the programs refrained from offering bonus points for completing the survey, five bonus points were offered to the majority of the students, and references to this effect were included in both the workshop document and the Informed Consent document (i.e., the first Web page of the questionnaire).

7. Results

7.1. Demographics

Table 2 presents the demographic characteristics of the sample. Females outnumbered males two to one, and the majority of the students were between 30 and 39 years of age. More than 80% were Caucasian with Black/Non-Hispanic making up the next largest group. Nearly one quarter of the sample was taking classes on the master's level,

Table 2
Demographics

	Numbers of learners (<i>N</i> =259)	Percent
<i>Gender</i>		
Male	87	33.6
Female	172	66.4
<i>Age</i>		
20–29	65	25.1
30–39	119	45.9
40–49	60	23.6
50 and over	13	5.0
Unknown	1	.4
<i>Race/Ethnicity</i>		
American Indian	3	1.2
Asian or Pacific Islander	5	1.9
Black, non-Hispanic	32	12.4
Caucasian	214	82.6
Hispanic	4	1.5
Unknown	1	.4
<i>Academic pursuit</i>		
Associates	80	30.9
Bachelors	117	45.2
Masters	62	23.9
<i>Status</i>		
No employment/full-time learner	7	2.7
Full-time employee/full-time learner	181	69.9
Full-time employee/part-time learner	54	20.8
Part-time employee/part-time learner	5	1.9
Part-time employee/full-time learner	10	3.9
Part-time learner	3	20.0
<i>Online experience</i>		
One or more course online	98	37.8
First time online learner	161	62.2

slightly under a third was taking classes on the associate's level, and just over 45% was pursuing courses leading to a bachelor's degree. Nearly two-thirds of the students had no prior experience with online classes and almost 70% reported being employed fulltime while pursuing their degree.

Out of the total sample of 259 participants, 30.9% were pursuing their associate's degree, and 23.9% were pursuing their master's degree. The largest number of participants was pursuing a bachelor's degree (45.2%). The university's continuation rate was 80.0%, 84.5%, and 72.6% for the online associate's, bachelor's, and master's programs, respectively. While it is a combined 80.7% continuation rate for the three programs, those pursuing their bachelor's degree achieved a noticeably higher persistence rate than did those pursuing a master's degree. Table 3 shows the means and standard deviations of the four scales in the persister and non-persister groups.

7.2. Analysis

An independent-samples *t* test was conducted to evaluate the hypothesis that students persisting in their respective programs would have higher mean scores than non-persisters on the scales for Hope, Academics, Environment, and Motivation. Using a one-tailed test, only the Environment means showed a statistically significant difference between the persistence group and the non-persistence group, $t(257)=1.86, p=.03$. Non-significant differences were obtained for the Academics means ($t(257)=.64, p=.26$), Motivation means ($t(257)=1.14, p=.13$), and Hope means ($t(257)=-1.13,$

Table 3
Statistics of students by persistence and total scale scores

	Persisters (N=209)	Non-persisters (N=50)
<i>Hope</i>		
M	53.82	54.76
SD	5.83	5.15
<i>Academics</i>		
M	97.82	96.89
SD	9.86	10.52
<i>Environment</i>		
M	61.87	58.84
SD	10.30	10.39
<i>Motivation</i>		
M	61.67	61.02
SD	5.31	6.84

$p = .13$). To evaluate whether the 12 subscales would have higher mean scores for persisting students, independent-samples t tests were conducted, and the one-tailed results are presented in Table 4.

7.3. Prediction of persistence

To complete the statistical analysis of persistence, a discriminant analysis was performed to assess prediction of group membership. Discriminant analysis can be used to predict membership on the basis of quantitative predictor variables. The 12 subscales were entered together as the independent variables or predictors, and the dependent variable (also known as the criterion variable) was group membership as either persisters or non-persisters. The overall Wilks' Lambda indicates significant differences in means on the predictors between the two groups, $\Lambda = .91$, $\chi^2(12, N=259) = 23.39$, $p = .025$. This indicates that there are differences between the persisters and non-persisters across the 12 predictor variables in the given

Table 4
T-test for equality of means

Subscale	t	df	Significance
<i>Hope scale</i>			
Pathway	-1.20	257	$p = .12$
Agency	-.64	257	$p = .26$
<i>Academics</i>			
Time and study management	1.78	257	$p = .04^*$
Meta-cognitive self-regulation	.49	257	$p = .31$
Learner autonomy	-2.00	257	$p = .03$
<i>Environment</i>			
Computer/Internet self-confidence	1.16	257	$p = .13$
Fiscal support	1.08	257	$p = .14$
Emotional support	2.30	257	$p = .01^{**}$
<i>Motivation</i>			
Intrinsic goal orientation	.05	257	$p = .48$
End goal orientation	.46	257	$p = .32$
Self-efficacy	2.00	257	$p = .02^*$
Compliant learner	-.52	257	$p = .33^a$

* $p < .05$, one-tailed. ** $p < .01$, one-tailed.

^a Levene's test for equality of variances was significant, $p = .04$.

population. A significant *lambda* means “one can reject the null hypothesis that the two groups have the same mean discriminant function scores and conclude the model *is* discriminating” (Garson, n.d., Wilk’s lambda, ¶ 1). Table 5 provides a summary of the predictor variables ordered by absolute size of their discriminant loadings. Also known as structure coefficients or structure correlations, Garson notes that discriminant loadings are the correlations between a given subscale and the discriminant scores that are associated with the discriminant function. These coefficients in Table 5 indicate the relative ability of each of these subscales to discriminate between persisting and non-persisting students. Based on these coefficients, the subscales Emotional Support, Self-efficacy, and Time and Study Management were the most influential in the discrimination, as was Learner Autonomy with a negative relationship. The resulting canonical correlation of .30 indicates 9% of the variance in the criterion is accounted for by the 12 predictor variables.

The means on the discriminant function demonstrate a difference between the two groups. The persisters ($M = .15$) had a significantly larger mean than did the non-persisters ($M = -.64$). The discriminant function correctly classified 81.5% of the students in terms of successfully continuing in their chosen academic program past their first three courses, a percentage essentially equal to the base-rate prediction ($209/259 = 80.7\%$). As a means to address the cross-validation issue and take into account chance agreement, a kappa coefficient was computed. Kappa is an alternative statistic that “evaluates the percent of cases correctly classified except that it corrects for chance agreement” (Green & Salkind, 2003, p. 283). The kappa coefficient can range from $a - 1$ to $a + 1$, with values that are greater than 0 indicating a better than chance-level of prediction and values that are less than 0 indicate poorer than chance-level of prediction. A value of 0 indicates a chance-level prediction and a 1 indicates a perfect prediction. The kappa obtained for this sample was .11, a positive but rather small value. Finally, to assess how well the classification procedure might predict in a cross-validation sample, an estimate of the percent of persisters/non-persisters correctly classified was conducted by using the leave-one-out technique. The leave-one-out classification technique is a form of cross-validating the given classification table. Using this method, each case is classified as a persister or non-persister using the discriminant function based on all cases except the given case. Garson (n.d.) indicates that this gives a better estimate of what classification results would be in the population. Utilizing this leave-one-out technique, a correct classification was made in 79.2% of the cases. Because these prediction rates were essentially equal to the base rate of 80.7%, the findings suggest that the discriminant function, despite the four significant predictors, was not a strong predictor of persistence.

8. Conclusions

There appeared to be three major criteria differentiating retention in this sample. Successful students prone to persist tended to score higher in Emotional Support, Self-Efficacy, and Time and Study Management. The level of perceived emotional support accounted for a large portion of the environmental scale difference between persisters and non-persisters. Having the experience of a supportive group of friends and family and the comfort of knowing that they are not alone in this learning process was a significant function related to students’ persistence. Those who also had high self-efficacy for learning and performance had higher expectations to do well in their program and a strong sense of their own personal ability to succeed in their new learning environment. An additional key factor of successful students

Table 5
Discriminant function structure matrix

Subscale	Correlation
Emotional support	0.46
Self-efficacy	0.40
Learner autonomy	-0.40
Time and study management	0.36
Pathway (hope)	-0.24
Computer/Internet confidence	0.23
Fiscal support	0.22
Agency (hope)	-0.13
Compliant learner	-0.10
Academic self-regulation	0.10
End goal orientation	0.09
Intrinsic goal orientation	0.01

related to their time and study management. The persisters practiced good study habits, kept up with the weekly reading and assignments, and managed their time and activities to a greater degree than did the non-persisters.

It is important to note there were no significant differences between persisters and non-persisters when considering the Academics or Motivation scales as a whole. The findings in this research project did not specifically support previous research that had found a significant relationship (Diaz & Cartnal, 1999; Jamison, 2003; Spitzer, 2000). However, other researchers had not found significant differences as a result of these factors (Aragon et al., 2002; Brenner, 1997; DeTure, 2004; Loomis, 2000).

Three considerations are presented that could potentially guide and/or enhance an understanding of how findings in this research should be interpreted, since some of the results were inconsistent with previous research. One such consideration might be the timing of the survey in relation to a student's returning to academic studies. Tyler-Smith (2006) presents the rationale that the multi-dimensional learning tasks of the first time online learner and the potential for cognitive overload can be factors on early dropouts. Such an effect could presumably influence responses to questionnaire items as well. The timing of the survey occurring approximately halfway in the first course, coupled with the wording of certain questionnaire items, is presumed to have some influence on the survey results.

Second, completing some of the items in the survey may have been difficult, since many took the survey after only three weeks into the program. For example, the three items comprising the Meta-cognitive Self-regulation subscale all had wording involving practice or experience in the current class. This could reasonably account for a large degree of variability in the responses and the lowest internal reliability of the subscales (Cronbach Alpha of .39, see Table 3). In fact, the three subscales with the lowest Cronbach Alphas had all items, or a large percentage of the items, addressing current experience or preparation for learning in this particular course, something the students would have minimally experienced in only the first three weeks of the course. Therefore, it is uncertain whether the items themselves are unreliable, or possibly irrelevant in light of the timing of the survey, or less-than-ideal items not worthy of inclusion.

Third, differential effects in the Compliant Learner and Learner Autonomy subscales could also have been more pronounced. It seems reasonable to surmise that the Compliant Learner subscale could have been inflated due to the timing of the survey. There is presumably much greater dependency on the individual instructor for direction, feedback, and monitoring during the first few weeks of a course than after completing three courses and feeling more comfortable with the instructional method and technology. A potentially stronger rationale could be accounted for by the large percentage of students who were re-entering academia following a significant number of years posthigh school (*Note*: the mean age of the sample of 259 students was 35.4 years with a range from 21 to 63 years of age). Due to this potential and the timing of the survey, limited responses in the Learner Autonomy subscale and possibly inflated responses in the Compliant Learner subscale should be considered.

The finding that Learner Autonomy did help to distinguish persisters from non-persisters in the discriminant analysis (but in the opposite direction expected) is worth further consideration. There was, in fact, a negative trend noted, with an overall tendency for students with lower learner autonomy scores to be in the persister group. In other words, students who liked to think for themselves and were confident in their learning abilities with the preference to work alone on course projects were not more likely to persist in their academic program, but were in fact, more likely to drop out. Rovai (2002) gives an historical perspective on this issue, "Learner autonomy, that is, the concept of independence and self-direction, has been a hallmark of adult education and an assumed characteristic of the non-traditional students enrolled in distance education programs" (p. 12). While Diaz and Cartnal (1999) found that students who were enrolled in two distance education classes were significantly more independent learners than those comprising the equivalent on-campus class, Aragon et al. (2002) did not find a statistical difference between their two groups in terms of learner autonomy. Surprisingly, the opposite effect was found for this sample.

A tentative explanation as to why students with higher Learner Autonomy scores did not persist as frequently is worth considering. To believe that students with high Learner Autonomy (and, quite possibly academic prowess) would not function as well in an online setting seems questionable in light of the historical view of successful completion of distance education. Yet, Bean and Metzner (1985) somewhat address this potential when stating

Environmental variables are presumed to be more important for nontraditional students than academic variables, which leads to the following results. When academic and environmental variables are both good (e.g., favorable for persistence), students should remain in school, and when both are poor, students should leave school. When academic variables are good but environmental variables are poor, students should leave school, and the positive effects of the academic variables on retention will not be seen. When environmental support is good and academic

support is poor, students would be expected to remain enrolled—the environmental support compensates for low scores on the academic variables.... Thus, for nontraditional students, environmental support compensates for weak academic support, but academic support will not compensate for weak environmental support. (p. 491–492).

A possible explanation for the finding that environmental support was a meaningful determinant in persistence over and above academics and motivation may also be a reflection of the influence of the cohort model as chosen by the institution. Students assigned to cohorts begin a program and proceed through it together. The classes are intentionally kept small, and a camaraderie feeling is purposely fostered (A. Beekman, personal communication, November 5, 2006). Of the 28 cohorts represented, the average class size was 12.6 with a high of 18 and a low of 9. The cohort model in an online learning design may be a particular match for these students in these particular programs at this particular time due to the unique student and faculty characteristics, learning environment, program attributes, and external attributes (Lorenzetti, 2003). In fact, Martinez (2003) recommends institutions explore the potential of mismatches between learning orientation and online learning design in their retention efforts. The cohort model and emotional support seemingly provided through this approach may, in part, account for the higher retention rate in this sample when compared to retention rates of other institutions. Also, students with a greater need in this area would likely have benefited more than those with stronger independent learner inclinations.

In consideration of the above, a final assertion is offered regarding the disparity in scores on the Learner Autonomy subscale between persisters and non-persisters. The Learner Autonomy scale appeared to adequately measure what it was intended to measure when one considers that the scale correlated highest with the Self-efficacy scale ($r = .42$, $p < .01$) and lowest with the Compliant Learner ($r = .07$, $p = .26$), an expected finding. Dividing the Learner Autonomy scale scores into quartiles and utilizing a crosstabulation, a comparison of the students scoring the lowest in learner autonomy ($N = 63$) with the students scoring the highest in learner autonomy ($N = 66$) revealed an interesting comparison. The proportion of students who were non-persisters, yet scoring low in learner autonomy was .14; the proportion of students who were non-persisters, yet scoring high in learner autonomy was .27. Thus, the probability of a student's being a non-persister was 1.93 times (.27/.14) more likely to occur if the student scored high in learner autonomy as compared to low in learner autonomy. This does give some support to the explanation that learners high in learner autonomy might become frustrated using this learning model. Consider the following: a new online student, high in learner autonomy, is placed in a cohort of other people. Possibly entering the online learning format thinking it will cater to freedom and independence, this student could be disappointed if not able to be on his or her own as had been expected. Placed into an inter-dependent group, the student might be more prone to consider dropping out than one lower in learner autonomy.

9. Recommendations

In light of the diversity of findings – both in this study and in prior studies of the online student outcomes – the results should not be used to exclude or discourage potential students from becoming effective online learners. Rather, administrators, academic counselors, and instructors should make efforts to develop a broad-based approach toward identifying at-risk students and provide them with appropriate services, such as training opportunities, support, and guidance. There still remains “the need for assessment to detect adult learners who are potentially at risk of failing in their distance learning” (Lim, 2001, p. 43).

The present study appears to justify one central truth echoed by various other distance education retention researchers. “The attrition process is undoubtedly a complex one. A theory that could fully explain every aspect of the attrition process would contain so many constructs that it would become unwieldy if not unmanageable” (Kember, 1989, p. 279). Rather than support the idea that only a few factors affect student persistence, it can be seen from the literature review and this study that there are often many viable characteristics, reasons, and circumstances that are brought to bear when analyzing persistence decisions. Acknowledging Berge and Huang (2004), “Reviewing the research and theoretical literature has shown the complexity and multi-dimensional nature of the retention phenomenon” (p. 11) and efforts would be well spent further quantifying the extent and influences of these variables.

The analysis used 12 variables to account for 9% of the variance in explaining or predicting retention in online learners (similar results found in Dupin-Bryant, 2004). The set of factors that predicted student persistence among this sample may not necessarily apply to other populations of distance learning students in other institutions. In light of the complex nature of the adult learners, continued effort must be expended to explain more of the variance, both from the

standpoint of the characteristics and circumstances of the student, as well as the technology methods and institutional factors that have bearing on student retention. Rovai (2002) states the reason for the continued and daunting task that remains, “There is no simple formula that ensures student persistence. Adult persistence in an online program is a complicated response to multiple issues. It is not credible to attribute student attrition to any single student, course, or school characteristic. There are numerous internal and external factors that come into play, as well as interactions between factors” (pp. 12–13).

The finding that learners high in independent thinking and autonomy were more prone to drop out of online learning rather than persist was both surprising and unique. Past researchers of distance education and online learning had found either a significant difference for success if the learners were independent or no difference at all. That independent learners were slightly more prone to drop out of online learning appears to bring into question the accepted axiom, “Successful DE learners are independent learners.” Quite possibly, the *method* of distance learning can have a significant bearing. The hypothesis that the cohort model could be a *sustainer* of compliant learners, while at the same time a *contester* of independent learners, bears further study. Further research of institutions using the cohort model of online instruction is warranted.

While this study sought to address weaknesses found in other multivariate studies, such as a limited range of measures and the use of single items to measure broad concepts (see Berge & Huang, 2004), only moderate benefits were obtained. The improvement of a number of items within various subscales could enhance the effectiveness of the questionnaire. The Cronbach’s Alphas for the main scales were acceptable with a high of .79 for the Hope scale and a low of .74 for the Academics scale. However, a few of the subscales had significantly lower Alpha scores. Internal consistency for the subscales ranged from a low Cronbach Alpha of .39 to a high of .75. Adding more items to certain subscales could prove beneficial. Additionally, consideration of revised wording in light of the given timing of the survey is warranted and would presumably further the standardization of such measures.

In the short history of the online programs at the institution from which the sample was drawn, the graduation rate is approximately 60%. Since the retention rate for this representative sample after three courses in the respective programs was just over 80%, presumably another 20% or so are likely to drop out before completing the degree. For this institution, Bauman’s (2002) conclusion that most drop out before finishing the first three courses is not totally consistent (see also Willging & Johnson, 2004). It can reasonably be presumed that roughly half of non-persisters drop out in the first three courses, and the other half drop out after the first three courses. Based on this sample, the institution and others using similar models of instruction may want to consider specialized efforts focused on retaining this “other half,” a significant population of non-persisters, since such students have already demonstrated a reasonable degree of success in the program. In fact, an institution’s attrition management plan should take into account different approaches and services to dropouts early in the program versus dropouts occurring later in the program’s sequence. A follow-up study of this sample could provide further insights. Future researchers should consider the potential benefit of using longitudinal research designs and the incorporation of more institutions.

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