A Predictive Validity Study of The Revised Mcvay Readiness for Online Learning Questionaire

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Abstract

The McVay Revised Readiness for Online Learning questionnaire was given to 116 traditional on-campus and 31 distance education students. The students were enrolled in an introductory class in computer applications on an urban campus of a mid-western community college. Multiple regression equations were developed with the survey scores and the student's declared major to determine the extent to which the questionnaire score predicted final semester grades. Although the student's declared major explained most of the variance in their final semester grades, the questionnaire score explained 10% of the observed variance in the final grade in the distance education student group. The questionnaire score was not statistically significant for traditional on-campus students. A suggested cutoff score for the questionnaire was calculated and implications for administrative practice are outlined. Recommendations for further research are suggested.

Introduction

There is a general consensus that the number of students receiving an education through distance learning has continued to grow steadily (Saba, 2005). In 2008 the National Center for Education Statistics (NCES) reported that course enrollments in distance education increased from 3.1 million in the academic year 2000-01 to 12.2 million enrollments. The number of entire programs has increased as well. Among institutions offering any distance education courses, the NCES reported that the proportion offering degree programs completed entirely via distance education increased between 2000-01 and 2006-07 from 30% to 32%. Certificate programs increased slightly from 16% to 17% during the same period. Although various technologies can be used to transmit educational content, the dominant delivery system used is the Internet coupled with browser-based technology (Compora, 2003; Howell, William, & Lindsay, 2003).

Additionally, online learning is growing in the area of corporate and workplace training. Bersin (2005) indicated that online learning continued to grow in 2005 by 25% and comprised 33% of all workplace training. Sugrue and Rivera (2005) reported that online training increased from 35% to 38% in large organizations, and from 24% to 27% in relatively small organizations from 2002 to 2003.

Although distance education enrollment has been growing, the high dropout rates have been concerning to many business organizations and institutions of higher education. A number of researchers have suggested that the retention rate for distance education students in higher education is lower than for traditional face-to-face students (Nash, 2005; O'Brien & Reneer, 2002; Scalese, 2001). According to Meister (2002), 70% of adult learners enrolled in corporate online courses fail to complete the course. The lower retention rates for distance education students would suggest that some type of pre-assessment might be useful in identifying students that could have potential problems in a distance education environment.

Several researchers have discussed the need for self-assessments for potential distance education students (Biner, Bink, Huffman, & Dean, 1995; Buchanan, 1999; Lorenzetti, 2005b; Maki & Maki, 2003; Restauri, 2004; Valasek, 2001). Kidder (2004) reported that 48% of faculty surveyed indicated that pre-assessment of students' technological skills was not present, but that pre-assessment was important to the success of on-line classes. A total of 77% reported pre-assessment is important, while only 29% recorded that it was present in their institution. However, commonly-used readiness questionnaires given to students prior to the start of a course may not be useful in selecting students who will do well in and be satisfied with technology-mediated courses (Hall, 2008; Maki & Maki, 2003).

Purpose of the Study

The purpose of this study was to determine the extent to which the McVay Revised Readiness for Online Learning questionnaire could serve as a predictor of student performance in distance learning classes. This instrument, originally developed by McVay (2000, 2001), focuses on student behavior and attitudes as predictors of online learning. It was subjected to reliability and validity studies by Smith, Murphy, & Mahoney (2003). The analysis yielded a two-factor structure that was readily interpretable in a framework of existing theory and research. Factors identified were "Comfort with e-learning" and "Self-management of learning." Smith, Murphy, & Mahoney suggested changes to 5 of the 13 items to improve reliability. A revised version of the instrument was retested by Smith (2005). Smith verified the original two-factor structure and concluded that the instrument may have useful applicability to research and practice in the area of student dispositions and preferences associated with online learning. Smith acknowledged that more work would be needed to establish its value as a predictor of online learning success.

The current iteration of the Revised McVay Readiness for Online Learning questionnaire consists of 14 Likert scale questions. Numerical values are assigned to the Likert question responses, beginning with 1 point assigned to "Rarely" and incrementing to 4 points assigned to "All of the Time." This translates to a total score range of 14 to 56. The survey is designed such that the higher the total score, the greater the presumption for success in a distance education course. A copy of this instrument is provided in Appendix A.

McMillan and Schumacher (2001) define face validity as "a judgment that the items appear to be relevant" (p. 241). An examination of the survey reveals that the items included have the appearance of relevancy to individual traits and skills believed necessary for success in distance education (Buchanan, 1999; Noah, 2001). Yet face validity is considered the weakest form of construct validity (Trochim, 2006, Face Validity section, ¶ 1). Predictive validity is the "*ability to predict something it should theoretically be able to predict*" (Trochim, 2006, Predictive Validity section, ¶ 1). Predictive validity is determined by establishing the relationship between scores on an assessment and some measure of success in the situation of interest. The criterion of successful future prediction makes predictive validity stronger than face validity.

Methodology

Introduction

Two versions of the questionnaire were developed. A paper and pencil version was distributed to on-campus education students. A web-based version was developed for use by students enrolled in distance education classes. The questionnaire was then administered during the first two weeks of the semester to distance education and traditional on-campus students enrolled in a first semester introductory course computer at a regional campus of a Midwestern community college located in a larger metropolitan area.

Participants

The participants consisted of 164 community college students enrolled in the CINS 101 Introduction to Microcomputers course. Of the 163 students reporting their gender, 54.6% were female and 45.4% were male. A total of 158 students reported their ethnicity. The ethnic breakdown was 61.4% White Caucasian, 31% African American, 2.5% Hispanic, and 5.1% Multiracial/Other. The average age was 25.8 (SD = 9.0) with a minimum of 15 and a maximum of 53 years.

Returned Surveys

Surveys were distributed to 298 students enrolled in traditional on-campus courses and 240 students enrolled in web-based distance education classes. Valid responses were obtained from 130 traditional on-campus students and 34 web-based distance education students with return rates of 43.6% and 14.1%, respectively.

During the course of the semester several students opted to drop from their courses. Of the original 130 on-campus students that returned surveys 14 later dropped from their courses, leaving 116 on-campus students who received final grades at the end of the semester. Within the distance education group, 3 students dropped their courses, leaving 31 for the final analysis. Table 1 presents the survey return results by declared major for those students who completed their course and received a final grade.

Table 1

Total Returned Surveys by Declared Major

Declared Major	On-campus Instruction	Distance Education
Business	45	13

Technology	4	0
Liberal Arts and Sciences	5	1
General Studies, Undeclared, or Courses Only	34	5
Public and Social Services	15	4
Health Sciences	8	6
Education	5	2
Total	116	31

Students enrolled in the distance learning CINS 101 courses had a statistically higher (M = 45.9, SD = 5.3) score on the Revised McVay Online Learning Readiness Questionnaire than students enrolled in on-campus versions of the same course (M = 40.3, SD = 6.5), $t(162) = 4.65$, $p < .001$. Within the distance education group students receiving a final grade of "C" or higher had a statistically higher (M = 46.7, SD = 4.7) score on the Revised McVay Online Learning Readiness Questionnaire than students receiving a final grade of "D" or "F" (M = 41.6, SD = 5.6), $t(29) = 4.65$, $p = .037$).

Statistical Analysis

This study is an evaluation of the predictive validity of the Revised McVay Readiness for Online Learning questionnaire. To determine the predictive validity a linear regression model was constructed. The general form of the linear regression equation was:

FG = b1McVay + b2x1 + b3x2 + b4x3 + b5x4 + b6x5 + b7x6 + b8x7 + c

FG = Final grade dependent variable
b1 = Regression coefficient associated with the McVay independent variable
McVay = Score from the Revised Readiness for Online Learning questionnaire
b2 = Regression coefficient associated with independent variable x1
x1 = First dichotomous variable representing declared major (see Table 2)
b3 = Regression coefficient associated with independent variable x2
x2 = Second dichotomous variable representing declared major (see Table 2)
b4 = Regression coefficient associated with independent variable x3
x3 = Third dichotomous variable representing declared major (see Table 2)
b5 = Regression coefficient associated with independent variable x4
x4 = First dichotomous variable representing declared major (see Table 2)
b6 = Regression coefficient associated with independent variable x5
x5 = Second dichotomous variable representing declared major (see Table 2)
b7 = Regression coefficient associated with independent variable x6
x6 = Third dichotomous variable representing declared major (see Table 2)
b8 = Regression coefficient associated with independent variable x6
x7 = Third dichotomous variable representing declared major (see Table 2)
c = Constant

The independent variables consisted of the score from the McVay Revised Readiness for Online Learning questionnaire and the student's declared major. The six types of declared majors were coded into the regression equation using six dichotomous variables. The dependent variable was the student's final grade expressed in the form of 0 = F, D = 1, C = 2, B = 3, and A = 4.

Table 2

Values for Dichotomous Variables x2, x3, x4, x5, x6, and x7

Declared Major	Value for x2	Value for x3	Value for x4	Value for x5	Value for x6	Value for x7
Business	0	0	0	0	0	0
Education	1	0	0	0	0	0
Health Sciences	0	1	0	0	0	0
Public and Social Services	0	0	1	0	0	0
General Studies, Undecided, and Courses only	0	0	0	1	0	0
Liberal Arts and Sciences	0	0	0	0	1	0
Technology	0	0	0	0	0	1

A total of six regression models were constructed. The first three models were generated from data obtained from on-campus students. The first on-campus model used all seven independent variables. The second on-campus model contained only the categorical variables representing the student's declared major. The third model contained only the independent variable representing the MacVay Revised Readiness for Online Learning questionnaire score. The remaining three regression models, constructed from data obtained from the distance education students, followed the same format as the three on-campus regression models.

Regression Models

The results of the linear modeling are presented in Table 3. Note that the traditional on-campus model using only the McVay questionnaire independent variable was not statistically significant. All of the model variance for the traditional on-campus students can be explained by the categorical variables representing their declared major.

The majority of the observed variance in the final grade percentage for the subset of distance education participants is also explained by the categorical variables. Approximately 45% of the observed variance in the final grade percentage of the distance education participants was explained by the categorical variables. Approximately 10% of the observed variance in the final grade percentage of distance education students was explained by the questionnaire score. Thus, a student's declared major is more predictive of their final grade than their score on the McVay Revised Readiness questionnaire.

Table 3

Comparison of Regression Model Statistics

Regression Model	*n*	*Adjusted R2*	*F*	*p*
On-campus complete regression model	116	.08	$F(7,108) = 2.49$	.021
On-campus categorical variables only	116	.08	$F(6,109) = 2.54$	.024
Distance education complete regression model	31	.53	$F(6,24) = 6.62$	<.001
Distance education categorical variables only	31	.45	$F(5,25) = 5.97$	.001
Distance education questionnaire score only	31	.10	$F(1,29) = 4.33$	.05

Conclusions

Reasons for Considering the McVay Revised Readiness for Online Learning Questionnaire

Despite the fact that a student's declared major was more predictive of their final grade than the questionnaire score, this study suggests that the McVay Revised Readiness for Online Learning questionnaire may have some applicability as a counseling tool for prospective distance education students. First, the questionnaire was only statistically significant for distance education students. The lack of statistical significance for traditional on-campus students indicates that it is not simply measuring general academic competence. The factors of "Comfort with e-learning" and "Self-management of learning" associated with this questionnaire (Smith, Murphy, & Mahoney, 2003) have more relevance with distance education formats.

Second, the argument can be made that only 10% of the variance in final semester grades for distance education classes can be explained by the questionnaire results. Although a higher percentage of the explained variance would be welcome, it has been noted that the Type I Scholastic Achievement Test (SAT I), a considerably longer instrument, only explains 16% of the variance in first year college performance (Kaplan & Saccuzzo, 2009, p. 85).

Third, from an administrative perspective, the McVay Revised Readiness for Online Learning questionnaire has the advantage of brevity. It can be easily used in either paper-and-pencil format or converted for online web delivery. This questionnaire can be completed in less than 10 minutes and could be incorporated into virtually any first-time student orientation process. Like the SAT, the McVay Revised Readiness for Online Learning questionnaire results could be used in conjunction with other academic evaluation tools to help guide and counsel students selecting courses.

Potential Cutoff Score

To calculate a potential cutoff score a t-test was used to determine the 90% confidence interval for the McVay questionnaire scores of distance education students with final grades of a "C" or higher. The result was a cutoff score of 45.

Note that the use of a 90% confidence interval in this study is counter-intuitive to the use of a more traditional 95% confidence interval. The calculation of a 90% confidence interval provides somewhat a "tighter" passing constraint on the McVay scores as opposed to a 95% confidence interval. This is because a 90% confidence interval "drops off" a few additional scores at the lower end as compared to a 95% confidence interval. This provides a somewhat greater assurance that those students receiving a score less than 45 should be referred to a counseling session outlining the technical skills and attitudes needed for success in an online course.

Recommendations for Further Research

The evidence suggests that the McVay Revised Readiness for Online Learning questionnaire may play a role in counseling prospective distance education students. The use of this instrument, particularly by institutions of higher education for counseling or providing advice, should be carefully considered. The questionnaire employs only 14 questions and is both time-efficient and flexible in delivery format. However its brevity contributes to its limited predictive ability. Therefore it should be only one part of an integrated counseling process for students.

Another benefit of this questionnaire may lie in raising awareness for any student considering enrolling in a distance education course. The items listed in the surveys reflect individual traits and technical skills generally believed necessary to be successful in a distance education course. The rising use of the Internet for instructional delivery, coupled with the desire to improve student retention, will generate research and development efforts in the area of advising tools for students considering distance education courses. Four recommendations have been provided.

Recommendation One

The first recommendation would be to perform the above study with a much larger sample of distance education students. Within the sample of distance education students in this study (n =31), the number of students receiving a grade of "D" or "F" was n =5. This undermines the assumption of normal distribution in the t-test calculations for the McVay questionnaire scores for this group.

Recommendation Two

Another recommendation for further research would be to explore the use of other existing assessments as potential predictors of student performance in distance education courses. One additional set of tools that could be considered are those instruments associated with measuring the Big Five personality factors. Several inventories have been developed to measure the Big Five Personality Factors. Among these inventories include the Big Five Inventory (BFI; Benet-Martinez & John, 1998), the International Personality Inventory Pool (IPIP; Pennsylvania State University, n.d.), and the NEO Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992).

Recommendation Three

Another suggestion for further research is to investigate the possibility of improving the predictive validity of the existing questionnaire. Items could be added reflecting additional factors having face validity in the area of distance education success. A follow-up factor analysis and predictive validity study would then be conducted on the revised questionnaire.

Recommendation Four

The final recommendation is to develop a completely new survey instrument.

Limitations

The generalizability of this study is constrained by the following limitations:

1. Return rates will reflect what is expected for in class surveys and for Internet-based distance education surveys.
2. Participants may not respond honestly to each survey item.
3. The participant pool was limited to students enrolled in community college courses.
4. The participant pool was a convenience sample drawn from students self selecting into on-campus or distance education courses.
5. The overall sample size for distance education students was relatively small.
6. The sample size of distance education students receiving a final grade of "D" or "F" was small.

Implications for Practice

The rising enrollments in distance education classes coupled with lower retention of distance education students have led researchers to discuss the need for self-assessments for potential distance education students (Biner, Bink, Huffman, & Dean, 1995; Buchanan, 1999; Lorenzetti, 2005a; Maki & Maki, 2003; Restauri, 2004; Valasek, 2001). The McVay Revised Readiness for Online Learning questionnaire has both face and content validity in terms of the conventional wisdom associated with individual traits and skills deemed necessary for success in distance education. This questionnaire does have some predictive validity which, when combined with its brief format, provides administrative advantages in its use as a advising tool for prospective distance education students.

Institutions of higher education without an instrument of measuring student readiness for distance education should consider adding this tool to existing processes to prepare potential distance education students for academic success and improve retention in distance education courses. Institutions should continue their current practices with regard to academic pre-assessment of incoming students, regardless of the method of instruction. Institutions should also provide orientation sessions for students seeking to enroll in distance education courses. In a study of predictors of student success in online classes, Wojciechowski and Louann (2005) found that participation in an optional orientation session prior to taking the online class had the second highest relationship to the final grade received in that class, for both the overall student population (r = .338; p < .001), as well as within the group of students earning a grade of "C" or better (r = .240; p = .012). In a study of 478 distance education students, 57% of those receiving a "D", "F", or an incomplete ("I") in a distance education course felt that an orientation to distance learning prior to the start of the course would have been beneficial (Nash, 2005). Restauri (2004) believes such orientation sessions should be mandatory for distance learning students.

Some institutions, such as the community college in this study, currently offer a mandatory general orientation session for all incoming students. This session is designed to introduce students to general study skills, time management skills, and services available for academic success. It may be possible to incorporate additional content related to success in distance education courses. This could include introducing the basic technical skills identified for success (Dupin-Bryant, 2004; Osika & Sharp, 2003) along with any study skills, time management skills, or services considered unique to the distance learning environment. Those institutions without such an orientation should consider implementing such sessions.

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Appendix A

Student Readiness for Online Learning

This survey is designed to assist you in rating your current readiness to pursue online education courses. The feedback from this survey may assist you in the areas where you need to focus prior to enrolling in an online degree program. Answer honestly by rating your agreement with each statement. Mark under the answer that best matches your feelings.

1. I am able to easily access the Internet as needed for my studies.
    A. Rarely
    B. Sometimes
    C. Most of the Time

D. All of the Time

2. I am comfortable communicating with others over the Internet.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

3. I am willing to communicate actively with my classmates and instructors electronically.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

4. I am willing to set aside an amount of time each week to effectively engage in study.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

5. I feel that online learning is of at least equal quality to traditional classroom learning.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

6. I feel that using my background and experience in my studies will be beneficial to new learning.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

7. I am comfortable with online written communication.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

8. When it comes to learning and studying, I am a self-directed person.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

9. Reviewing what I have learned in a course helps me with new learning.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

10. In my studies I am self-disciplined and find it easy to set aside reading and homework time.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

11. I am able to manage my study time effectively and easily complete assignments on time.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

12. As a student, I enjoy working by myself with minimal support or interaction.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

13. In my studies I set goals and have a high degree of initiative.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time

14. I believe I am the only one responsible for my learning.
A. Rarely
B. Sometimes
C. Most of the Time
D. All of the Time
