A Study of Variables that Predict Dropout from Distance Education

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Abstract

A need exists for research to determine predictors of dropout from distance education since attrition rates in distance education far exceed attrition rates in classes taught in a traditional format. This problem is of particular importance because governmental funding to institutions of higher education is often based on attendance. Ninety-four students from three community college courses were the sample for this study. In addition to completing the human subjects paperwork, the students completed two instruments: The Rotter's Internal-External Locus of Control Scale and A Student Information Sheet. A correlation and discriminant analysis were performed to identify predictors of dropout. It was determined that locus of control and source of financial assistance, and in particular self-pay, were able to predict dropout with nearly 85 percent accuracy. The results of this study are important as counselors and faculty now have a basis on which to advise students either into traditional or distance formatted courses for best possible completion.

Introduction

Distance education as an alternative to face-to-face instruction has witnessed steady growth in higher education since its beginnings in the mid 1800s. This growth was evidenced by the fact that in 1990 nearly 30 percent of all adult students in the United States were receiving education in some distance format (Cook, 1997). This influx of adults taking distance education courses has occurred in part because of the proliferating demands of our technological society and in part because of the complexity of modern life. The tradition toward more online courses is highlighted in a recent Forbes magazine article "I got my degree through E-Mail" (Gubernick & Ebling, 1997). The authors observed that in a matter of four years, 1994 to 1998, the Peterson's College Guide indicated a growth in cyberschools from 63 to well over 800.

While society calls for lifelong learning, employment and family responsibilities call for adults to seek forms of education other than traditional, face-to-face instruction. Distance education affords adults the required formal education while allowing for flexible scheduling.

With the growth of distance education has come the problem of exceedingly high attrition rates. Carter (1996) found rates to exceed 40 percent in some institutions. In an attempt to identify causes for non-completion in distance education, numerous studies have centered on application of a variety of traditionally-based theoretical models to the distance education setting. One study (Sweet, 1986) used Tinto's model to study 356 distance learners at the Open Learning Institute in British Columbia. Tinto (1982)
hypothesized that student background characteristics in addition to other variables could be used as indicators of persistence. Sweet, however, concluded that student characteristics, such as age and gender, accounted for only 11 percent of the variances in persistence of distance education students.

Persistence in distance education is a complex phenomenon influenced by a multitude of variables. Gender, age, locus of control, grade-point average and mode of delivery are only a few that have appeared in recent literature (Altmann & Armbasich, 1982; Cooper, 1990; Fields and Lemay, 1989). The studies have, however, generally focused on a single variable or a limited combination of variables. Both qualitative and quantitative research is needed in order to combine a wide variety of variables to determine the extent to which the variables can predict dropout in distance education. This study will present research done using locus of control, gender, number of distance education courses completed, age, financial assistance, and number of hours employed as predictive variables for dropout from distance education courses.

**Justification**

There is a critical need for colleges to be able to predict with some accuracy the potential dropout rate of distance education students. By pinpointing possible student characteristics that lead to high rates of attrition, faculty and counselors are given an advanced opportunity to interact with students who are possible non-completers. Careful placement and enhanced review techniques, especially early in the course, could be implemented to further assist students in prolonging their academic career.

**Research Question**

The central problem was the prediction of student dropout in distance education courses. Until now, much of the research has been limited to the relation between single variables and completion rates. The combining of multiple variables as possible predictors of dropout has generally been overlooked. The research question for this study was:

Can locus of control, gender, number of distance education courses completed, age, financial assistance, and number of hours employed predict dropout from distance education courses?

**Research Setting**

The Maricopa Community College District in Phoenix, Arizona, U.S.A. offers undergraduate education to over 100,000 students annually. Of those 100,000 students approximately 21 percent register for distance education courses offered through numerous delivery modes: audiocassettes, interactive television, television, computer conferencing, correspondence and electronic forums. The courses taught in the distance education format vary from semester to semester depending on student interest and faculty availability.

**Procedures**

Data on the independent variables was collected using two instruments: A student information sheet and Rotter's Locus of Control Scale (Rotter, 1966). Distance education students completed the forms during orientation meetings held prior to the inception of the semester.

The sample for this study was comprised of approximately 100 distance education students registered for credit, Fall, 1998, in one of the three classes. Although these courses were offered in both traditional and distant format, this study focused on the
students who were enrolled in the three non-traditional sections. (See Table 1).

**Table 1. Distance Education Sample**

<table>
<thead>
<tr>
<th>Delivery Mode</th>
<th># of Students</th>
<th>Course Number</th>
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<tbody>
<tr>
<td>Audiocassette</td>
<td>21 students</td>
<td>Sociology 101d</td>
</tr>
<tr>
<td>Computer Conf.</td>
<td>41 students</td>
<td>English 101d</td>
</tr>
<tr>
<td>Correspondence</td>
<td>32 students</td>
<td>English 102d</td>
</tr>
</tbody>
</table>

Each of the distance courses met on campus the first night of class. During this orientation, students were given an overview of the technology to be used, the syllabus for the course, and a discussion of expectations. It was during this orientation that this research study was presented to the students. They were asked to volunteer their participation and were told their involvement would in no way effect their grade. Of the 102 students enrolled, 94 agreed to participate.

The courses offered in the distance format followed the same syllabus as the tractional classes. Assignments included readings, summary of articles, quizzes and tests. All work was submitted electronically throughout the semester. Students worked at their own pace with assignments due weekly. The final test was offered online the last day of class only.

Instructors provided the researcher with the last six digits of Social Security numbers of students who did not complete or receive credit for the course. This information was available throughout the semester at three week intervals.

**Instruments**

While a number of scales have been developed to study locus of control, Rotter's (1966) scale dominates the literature. Internal-external (I-E) locus of control is hypothesized to be a bipolar construct. The locus is internal if a person perceives events to be contingent upon his or her own behavior; the locus is external when events are perceived to be contingent upon luck, fate, the control of others, the environment or anything else not under his/her control (Marsh and Richards, 1986).

Locus of control is seen as an important variable for learner success. Support from the research indicates a need to continue study of locus of control "because of its influence on achievement as a predictor of persistence in higher education" (Visor et al. 1995).

In addition to the Locus of Control scale (Rotter, 1966), a student information sheet solicited specific demographic information from the students. This information was used not only to classify the students but also as variables in the discriminant analysis to predict persistence.

**Review of Literature**

Review of the literature offers an overview of the current research related to the independent variables in this study as predictors of non-completion in distance education. Those variables that appeared in the literature as having the most significant correlation with completion were locus of control, age, and, number of distance education courses completed. Learners with an internal locus of control, defined as one who holds the belief that the outcome of a situation is contingent on his or her own behavior, appear to have higher rates of completion (Dille and Mezack, 1991).

Researchers hypothesized this to be the case as internals put in the necessary hours and hard work because they expect this effort to effect their success (Altman and
Arambasich, 1982; Rotter, 1989). It, therefore, appears logical, based on the research, that an internal locus of control, which is believed to be a determinant of self-efficacy, is also a factor in self-directed learning. Kerka (1996) wrote that self-directed learning is associated with an internal locus of control. Martin (1990) supports this theory in the statement "one effective approach to lifelong learning is to become a self-directed learner by taking control of both the methods (means) and content (objectives) of one's own learning." While the debate continues in terms of psychological control and academic success, Uba (1997) supports the notion that an internal locus of control, self-efficacy, and self-directedness are related and are important elements of student success in distance education.

Age, as an indicator of dropout, has also shown limited yet significant results when used as an independent variable in studies with distance education students (Cooper, 1990). Finally, the number of distance education courses previously completed seemed to significantly relate to future success in distance education. This hypothesis was supported by several studies which found that first time students often lacked the necessary independence and time management skills needed for persistence (Eisenberg and Dowsett, 1990; Ehrman, 1990).

Although locus of control, number of distance education courses completed, and age appear to receive the most attention in the current literature (Dille and Mezack, 1991; Kerka, 1996; Cooper, 1990), a true picture of attrition cannot be developed without a review of variables such as gender, financial assistance and the number of hours of employment. The literature indicates a slight trend in distance education toward females as persisters. Martin (1990) offer evidence that distance education for many women is a "liberating and confidence building experience" (p. 8). Martin also found only about 1 percent increase in dropout for males over females, again supporting the very marginal influence of this variable.

Financial assistance has shown limited influence on non-completion as well. Research by Astin (1991) reported that full-time employment was negatively associated with persistence while Iwai and Churchill (1992) found that students who were independent and paid for their own education were older and had already experienced success in higher education, therefore, concluding that financial assistance was not a factor. Astin (1991) also reported that students who had full parental support were non-completers in only 2 percent of the cases studied.

Methodology

The students in this study had a choice of delivery modes. First, these classes were offered in a traditionally taught format where student and instructor were located at the same site. Students attended the course twice per week at a predetermined time. The schedule for assignments and tests was determined prior to the course by the instructor and was presented in the course syllabus.

The second mode was that of distance education. Each of the three distance education courses was delivered to the students in one of three formats. For example, the Sociology course was available only on audiocassette. The student received a packet of cassettes and a notebook of printed assignment sheets. The students were directed to listen to each lesson several times and then complete the written assignment for that lesson. Although students could present all completed lessons on the last day, December 8, they were encouraged to mail assignments to the instructor weekly. The second format, print or correspondence was used for English 101 students. All instruction was presented in text-based format for this course. Finally, the students in the second level English course, English 102, were given instruction using computer conferencing.
Herein, students received instruction and sent assignments using electronic mail.

Although the college offered the courses in both traditional and distant formats, only data from the distance education groups were used to establish possible predictors of dropout. During the semester in which the study was conducted, the traditional classes had a less than 3 percent dropout rate while the distance education sections exceeded 17 percent. This study was conducted to identify reoccurring personal characteristics which could be established as predictors of attrition.

**Procedures and Analysis**

Data from the Locus of Control Scale and the Student Information sheet were used to determine which variable or variable combinations could be considered as predictors of dropout from distance education. The statistical analysis began with the calculation of means and frequencies. Next, a correlation analysis determined the relationship between each of the independent variables and the dependent variable, status of completion. Results of the analysis indicated that locus of control and source of financial assistance were significantly (p<.05) correlated with the dependent variable. Using the results of the correlation analysis, a stepwise regression analysis was performed to determine the strength of each variable as a possible contributor to dropout. During the stepwise regression analysis, the variable of locus of control was used in Step 1. As a result of the significance level (p<.05) produced by locus of control in the regression analysis, this variable was reserved for inclusion in the discriminant analysis. Source of financial assistance was the second variable to be examined. The contingency coefficient that resulted allowed this variable to also be reexamined in the discriminant analysis.

To distinguish between the groups, a collection of discriminating variables that measure characteristics on which the groups are expected to differ were selected. The mathematical objective of discriminant analysis is to weight and linearly combine the discriminant variables in some fashion so that the groups are forced to be as statistically distinct as possible. By combining several characteristics of the student, such as locus of control or age, this statistical analysis attempted to identify a single dimension on which completers were clustered at one end of the spectrum and non-completers at the other. Discriminant analysis was appropriate for this study because its function was to classify individuals into one of two groups, completers and non-completers, on the basis of a set of variables.

In addition to the statistical analysis presented above, a qualitative analysis was utilized to expand the scope of understanding. A telephone interview with non-completers was conducted to verbally determine the reasons for their dropout. Interviews were scripted and analyzed to determine trends in attrition.

**Results**

A correlational analysis using the independent variables and the status of completion indicated that only one variable was significantly correlated with attrition. That variable was the score on the Rotter's Locus of Control Scale (Rotter, 1966). The correlation between the locus of control score and course completion was the strongest (r=.5907) of all variables combinations studied at the .05 level. The second strongest correlation occurred with Source of Financial Assistance (r=.5309). Both variables were analyzed using a discriminant analysis to further test their predictive ability.

**Table 2. Correlation Using Independent Variables and Status of Completion (D)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Locus of</th>
<th>Gender</th>
<th>Age</th>
<th>No. Courses</th>
<th>Fin.Assist.</th>
<th>Status</th>
</tr>
</thead>
</table>
This study determined that two variables, locus of control and source of financial assistance, could predict nearly 85 percent of dropout from distance education. Locus of control as a single, independent variable was able to predict dropout with an accuracy of 80 percent using discriminant analysis (Table 3).

### Table 3. Results of Discriminant Analysis with Distance Education Sample (D)

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>Predicted</th>
<th>Group Membership</th>
</tr>
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<tbody>
<tr>
<td>Drop</td>
<td>84.4%</td>
<td>15.6%</td>
</tr>
<tr>
<td>Complete</td>
<td>15.0%</td>
<td>85.0%</td>
</tr>
</tbody>
</table>

Percent of cases correctly classified: 84.4%

This finding corresponds to research conducted by Rotter (1989) that found locus of control to have a direct bearing on students' completion of coursework. Rotter reported, for example, that students with internal locus of control were more focused on their educational goals than those with external locus of control.

Interviews with non-completers added credence to the predictive ability of this variable. Students who did not complete gave rationales based on external causes such as employment, family, and lack of computer equipment. It may be speculated that the students with external locus of control did not assume the personal responsibility for their own educational success.

The second independent variable that proved to be significant was that of source of financial assistance and in particular self-pay. Although this variable alone offered little help in predicting dropout, when source of financial assistance was recoded using "Dummy Coding" (Nie, 1975) and combined with locus of control, the two in combination were able to predict nearly 85 percent of the dropout. Dummy coding involves the assignment of the weights 1 and 0 to represent membership in the categories of the categorical variable. Because the variable, source of financial, had three categories, self-pay, parent and other, it was imperative for this study to determine which source of financial assistance had the highest correlation with completion status.

Review of the interview scripts for external, self-paying students indicated that outside pressures of job and family took precedence over the loss of tuition monies and the importance of completion. These students tended to allow outside pressures to determine their educational decisions more often than the internally controlled student who was also self-paying.

**Summary**

The purpose of this study was to determine the extent to which locus of control, gender, age, number of distance education courses completed, financial assistance, and number...
of hours worked could predict dropout in distance education courses.

The data was collected from a voluntary sample of community college students enrolled in one of three courses: English 101d, English 102d or Sociology 101d. Although each course was offered in traditional format and through a distance education format and followed the same syllabi and examination schedule, only the distance students were studied.

This study determined that a student's locus of control and source of financial assistance may act as predictors of their non-completion in distance education. These findings are supported by research (Cooper, 1990; Altmann & Arambasich, 1982) which found that internal locus of control, self-efficacy and self-directiveness are related to a student's success in distance education. More research, however, is needed to review various modes of distance education delivery, two year versus four year institutions and the course content being offered.

A good deal is already known about the problems and needs of the distance education student because the number of adults engaged in this form of education runs into the millions worldwide. As more and more institutions of higher education expand to include the distance education format, information is needed to support the distant learner and, thus reduce the high rate of non-completion.

Attrition cannot be attributed to one cause but must be considered as coming from a combination of factors. This study has identified important predictors of non-completion and has sifted-out others that did not show significant effects. The findings may prove to be of value to future researchers and instructors who are involved in the future of distance education.

References


