
STUDENT PERFORMANCE FACTORS IN ECONOMICS AND ECONOMIC EDUCATION

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ABSTRACT

As professional college educators we are constantly concerned about the factors that influence student performance in the classroom. Utilizing a standard regression analysis and a loglinear model, we examined the role of six factors including: sex, days absent during the semester, number of hours completed, age and hours taken in economics. The study was first conducted in 1991 and repeated again in 1998. The significant factors were sex, with males outperforming females in economics and number of days absent. There was one important exception that was both alarming and challenging and that is the fact that students receiving a grade of C or less are missing significantly more class than in 1991. The importance of attendance seems to be lost on many students as the number of absences continues to climb. We need to encourage regular attendance since we know that is reflected in final grades and overall performance.

INTRODUCTION

As professional college educators we are constantly concerned about the factors that influence student performance in the classroom. In 1991 three professors at two Arkansas Universities, Dr. Larry R. Dale and Dr. Jerry Crawford from Arkansas State University and Mrs. Betty Jones from Henderson State University conducted some research into a variety of factors that we thought might influence student behavior. We used two different techniques, a standard regression analysis and a loglinear model to learn the significance of five factors. The characteristics examined included; sex, days absent during the semester, hours accumulated, age, additional courses taken in economics.

We decided to use the same models to retest students in similar situations nearly a decade later to learn if the results would prove different.

RESEARCH DESIGN

In the second study we used all of the original five independent variables and added a sixth - major. The second study included several attitudinal factors such as; enjoyment of the course, useability of the information and grade expected with randomly selected test subjects. All of the attitude factors were rated on a five-point scale from strongly agree to strongly disagree with three representing no opinion. These factors were correlated to the dependent variable of a final grade. The students completed the questionnaire one week before the final exam was administered. An analysis of all equation variables is expressed in the functional relationship; (see table 1 for an explanation)

$$y = a + x1 + x2 + x3 + x4 + x5 + x6 + x7 + x8 + x9 + x10$$

Table 1	
Explanation of the Equation	
Symbol	Variable
y	Student's final course grade
Characteristics	
x1	Instructor
x2	Student's Age
x3	Sex
x4	Year in School
x5	Previous Courses in Economics
x6	Course in which student is currently enrolled
Attitudinal Factors	
x7	Enjoyment of the class
x8	Usability or applicability of the course
x9	Grade Expected
x10	Days Absent

For the purposes of this study we deliberately left out the factors of current GPA and ACT scores, which were not readily available to all instructors. Instead,

the final grade was chosen as the critical dependent variable against which the independent variables would be measured.

In the 1991 study, nine different class in seven varied areas of economics from two different Universities in Arkansas and three different instructors were the subjects of this study. A total of 256 students were included in the study conducted in the Spring semester of 1990. Forty-three students came from Henderson State University in two Economics for Teachers classes taught by Mrs. Betty Jones. Dr. Jerry Crawford, at Arkansas State University, taught: Microeconomics (Principles) 30 students; Intermediate Microeconomics with 13 students and Economics for Teachers with 18 students. Dr. Larry R. Dale taught two courses in Economics for Teachers, with 115 students and Comparative Economics, an upper division course for Economics and Business Administration majors, with 41 students.

In the second study ten different class in four varied areas of economics, from two different instructors were the subjects of this study involving a total of 428 students. Dr. Jerry Crawford, at Arkansas State University, taught: Microeconomics (Principles) 181 students; Macroeconomics with 62 students and Economics for Teachers with 22 students. Dr. Larry R. Dale taught two courses in Economics for Teachers, with 95 students and Comparative Economics with 46 students.

The researchers were interested in exploring the values and characteristics that contribute to the success of students under these widely varied circumstances. Conclusions drawn from that study proved interesting. First we needed to make sure that there was no difference in student performance related to the different instructors or institutions. A chi square test of means proved that there was no significant difference between the instructors at the .01 level. There was a significant difference between classes taught, even by the same instructors. Students enrolled in the Economics for Teachers group performed significantly better than students in the basic principles course. All three of the instructors received relatively high ratings with no significant difference by individual instructor.

In the 1991 study, the only significant factors proved to be the grade expected, sex, and the number of days absent. The more recent study determined that sex and the number of days absent were still significant. In addition, hours accumulated also proved significant.

In the first study, the expected grade near the end of class was a relatively good indicator of the student's evaluation of their performance in the course and of the course itself (Seiver 1983, 33). Students who perform better should have a more positive attitude toward the course and instructor. A high correlation between expected grade and grade received is also an indication that the instructor has done a good job of informing students about their performance. Although students had not taken the comprehensive final, which is a significant part of their aggregate grade, their mean grade ranking was only .31, about one third of the grade, higher

than the grades actually received. We decide to leave this factor out of the 1998 study because of its proven track record in predicting performance.

The more important figure was the days absent from class, which proved to be significant at the .01 level in both the 1991 and 1998 study. This factor was significant despite a wide range of teacher and institutional attitudes toward absenteeism. Arkansas State University has adopted a strict policy that does not permit instructors to include attendance as a direct factor in determining grades. Henderson permits attendance to be considered. The instructors also had very different policies. Instructor one included attendance as a factor in grading, instructor two takes roll in all classes; while instructor three took roll expressly for the purposes of this study and did not place as great an emphasis on its importance. Despite the variations in instructor attitude toward attendance from very important to casual, there was no significant difference in student attendance among the three instructors. Attendance in class was highly significant (see table 2). Students in the 1991 study receiving a grade of A missed an average of 1.31 days, students receiving the grade of B missed an average of 2.58 days, the grade of C students missed 3.14 days, and the grade of D students missed 3.50 days, while students receiving an F missed an average of 9.67 days. Students in 1998 receiving a grade of A missed an average of 1.32 days, students receiving the grade of B students missed 1.25 days, the grade of C students missed 4.08 days, and the grade of D students missed 4.13 days, while students receiving an F missed an average of 10.81 days. One factor that tested to be significant between the 1990 and 1998-group was the increase in the average number of days missed by students earning a grade of C, D and F. This is a disturbing trend if it holds nationwide. Class attendance is important in predicting classroom performance. The Park-Kerr study found absences significant but less important than other factors, particularly GPA and ACT Scores. Of particular interest is the fact that attendance seems important regardless of instructor style or expectations about attendance. Students tended to miss an average of nearly one day more than in 1990. The one exception was that student receiving the grade of B actually had a better attendance record in 1998.

Sex also was a significant factor, although less important than the other two, at the .01 level, with males outperforming females in economics. Conventional wisdom and statistical studies have indicated that males tend to outperform females in mathematically oriented subject areas for a variety of cultural reasons. The subjects in this study were overwhelmingly female making up 74.53% of the subjects, primarily because of the Economics for Elementary Teachers courses, with a large female contingent. Interestingly though males outperformed females regardless of which course they were taking. This trend was still significant although the difference between the scores of males and females had fallen between 1991 and 1998. This is a sign that women are displaying an increasing aptitude in dealing with economic subject matter.

Table 2 Statistical Data 1991 Study	
Mean Age:	24.64 years
Sex:	74.53% Female
	25.47% Male
Year in School:	mean 3.19 (Junior)
Days Absent:	mean 2.68
Average Days Absent of Students receiving:	grade A; mean 1.31
	grade B; mean 3.10
	grade C; mean 3.14
	grade D; mean 3.50
	grade F; mean 9.67
Straight Multiple Regression Analysis with Final Grade as the Dependent Variable.	

Table 3 Statistical Data 1998 Study		
Mean Age:	25.13 years	
Sex:	72.31% Female	
	27.69% Male	
Year in School:	mean 2.89 (Junior)	
Days Absent:	mean 3.98	
Average Days Absent of Students receiving:		Difference between 1991 and 1998
	grade A; mean 1.32	+0.01
	grade B; mean 1.25	-1.85
	grade C; mean 4.08	+0.94
	grade D; mean 4.13	+0.63
	grade F; mean 10.81	+1.14

These students were significantly older than average with a mean age of 24.6 years. While this may be a general trend in higher education, part of the explanation is found in the number of older students enrolling in elementary education programs, since that course had an average age of 27.12 years as

compared with 21.43 for the other economics courses. Age alone was not a significant determinant of grade achievement in contradiction to the conventional wisdom that would suggest that older students earn higher grades. This may be explained by the fact that many students were older than would be expected. There may be little difference in performance of students aged 25 as compared with those aged 30. Age may prove more important in comparison with survey courses that enroll younger students, which were not a significant part of this study.

The average student in the survey was a junior with an average of 68.45 hours. Since both upper division economics and Economics for Teachers require a minimum of 60 hours as a prerequisite, this is not surprising.

A two-sample t test comparing age and absences did yield a value of 39.78 in the 1991 study and 46.11 in the 1998 study, which proved to be significant. Older students were absent more frequently than younger students. This may be explained in terms of additional work and/or homemaking responsibilities on the part of the older female student. While the two correlated, the level of significance was not great enough to be reflected in the final grade. Older students can make up days missed and achieve similar grades.

TABLE 4 Straight Multiple Regression Analysis with Final Grade as the Dependent Variable.	
1991 Study	
	Days Absent, Sex and Grade Expected Significant (x9) Significant at .01 level.
	All other dependent variables not significant.
1998 Study	
	Days Absent, Sex and Year in School Significant at .01 level.
	All other dependent variables not significant.
Confirmed by f-test and t-test along with loglinear model.	

Overall demographic features were not significant predictors of success in the course as measured by the final grade, which is consistent with other studies on these same factors (Park and Kerr 1990, 110). The previous number of courses in economics was also not relevant to a final grade received, which surprised the investigators but supports other recent studies (Park and Kerr 1990, 110). A partial explanation for this is that 68% of the students did not have any previous courses in economics making that factor insignificant in their performance. This was

particularly true in the Economics for Teachers course, where 87% of the students had no previous experience in formal economics training. We did not investigate these phenomena in the 1998 study.

The attitudinal factors were not significant in relationship to student grades. Students seemed to enjoy the economics class regardless of the grade they expected to receive or did receive. Student rating on the usefulness or applicability of the course is also not significant, again because of the high rating that factor received. It was interesting that the students enrolled in the Economics for Teachers courses were significantly more likely to rate that course highly relevant [4.78 as compared to 3.89 on a five-point scale] or applicable than were students in more traditional economics courses. This is consistent with the fact that such courses are supposed to contain some instruction in teaching methodology and basic cognitive content. This supports similar findings at other institutions (Dale 1983).

TABLE 4 Continued Regression Statistics				
Variable	1991 Study		1998 Study	
	Correlation	Significant	Correlation	Significant
Days absent	.004	yes	.001	yes
Instructor	.250	no	NA	
Sex	.010	yes	.009	yes
Year in School	NA		.007	yes
Age	.610	no	.19	no
Major	NA		.02	no
Previous Courses	.030	no	NA	
Course Enrolled in	.030	no	NA	
Grade Exp.	.006	yes	NA	
Usability	.017	no	NA	
No significant difference exists between the data derived by using the standard correlation matrix or F and T-Test, and that derived from the use of loglinear modeling.				

Several studies have examined the qualitative analysis of affective measures related to classroom performance in economics classes. A multinomial logit model was applied to factors determining performance in a money and banking class using attendance records, overall valuing of the course, commuting distance, age, sex, prior courses, hours spent at outside work, GPA and ACT scores as the dependent

variables (Park and Kerr 1990). A second study (Mehdzadeh 1990) uses loglinear analysis of categorical data to examine the significance of factors in determining student ratings of professors. Several have examined additional factors that influence instructor ratings (Kelly 1972; Mirus 1973; Spector and Mazzeo 1980 and Seiver 1983) using a variety of statistical techniques. The consensus seems to be that some variation of loglinear modeling is the most effective method of examining correlations of such qualitative measures. This was used in our testing procedures since loglinear models do not require distinguishing between response variables and independent variables as with logit models, both of which are considered in this study. Interestingly enough there appeared to be no significant difference between the results produced using the loglinear model and a standard regression analysis, F and T tests regression analysis for this study.

CONCLUSIONS

The conclusions of the 1991 study are not significantly different from those indicated in 1998, with one important exception. Class attendance is still a significant predictor of success in economics. The one element of the study that was both alarming and challenging is the fact that students are missing more class than in 1991, particularly at the lower levels. The importance of attendance seems to be lost on many students as the number of absences continues to climb. We need to encourage regular attendance since we know that is reflected in final grades. Students who come to class regularly simply out perform those who do not. The pressure on students to attend college is always a challenge for those who must work in order to pay the fees. When jobs affect attendance they have a devastating effect on performance.

REFERENCES

- Becker, W. E., Jr. (1990). Determinants of academic performance: A multinomial logit approach. *Journal of Economic Education*, 21, (Spring), 101-11.
- Becker, W. E., Jr. (1990). Loglinear models and student course evaluations. *Journal of Economic Education*, 21, (Winter), 7-20.
- Clark, C. & Lampert, M. (1986). The study of teacher thinking: Implications for teacher education. *Journal of Teacher Education*, 37(5), 27-31.
- DeCanio, S. J. (1986). Student evaluations of teaching: A multinomial logit approach. *Journal of Economic Education*, 17 (Summer), 165-76.

- Feinberg, S. E. (1983). *The Analysis of Cross-Classified Categorical Data*. 2d ed. Cambridge, Mass.: MIT Press.
- Fizel, J. L. & J. D. Johnson. (1986). The effect of macro/micro course sequencing on learning and attitudes in principles of economics. *Journal of Economic Education*, 17, (Spring), 87-98.
- Glaser, R. (1988). Cognitive and environmental perspectives on assessing achievement. In *Assessment in the Service of Learning: Proceedings of the 1987 ETS Invitational Conference*. Princeton, NJ: Educational Testing Service.
- Harris, N. D. (1988). Where do the learners figure in the design? In W. H. Mathias (Ed.), *Aspects of Educational Technology XX*. London: Kogan Page.
- Harris, N. D. & Bell, C. D. (1986). *Evaluating and Assessing for Learning*. London: Kogan Page.
- National Center for Research on Teacher Education (1988). Teacher education and learning to teach: A research agenda. *Journal of Teacher Education*, 39(6), 27-32.