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An Initial Evaluation of Factors Affecting Students' Preparedness for Economic Learning

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Abstract

There is continuing interest in factors influencing students' success in economics courses at the college level - success that will depend, in part, on their preparedness for economic learning. In this study factors contributing to the preparedness of students for economic learning were investigated. We hypothesized that gender, maturity of the student, and previous economics study in high school all play a role. Students' preparedness was measured using the score received on a standardized test of economic knowledge administered at the beginning of the semester. Results suggest that although gender and maturity play a very minimal role in the level of preparedness, the most important factor is previous economics study in high school.

Introduction

A recurrent theme in the literature is interest in the factors influencing students' performance in economics courses, particularly in introductory economic courses. Various studies have examined the relationship between performance in introductory courses and gender and/or if the student had economics in high school. Use of standardized tests of economic knowledge have facilitated these investigations, allowing researchers to examine the variables that influence the stock and flow of economic knowledge. First differentiated by Siegfried (1979), the stock of knowledge refers to the amount of understanding at a specific point of time, whereas the flow of economic knowledge represents the level of knowledge gained over a period of time, and is referred to as learning. This differentiation is important in terms of identifying the

variables affecting students' performance.

The findings from previous studies examining the factors influencing students' performance give conflicting results. Many studies indicate that when multiple choice exams are used to evaluate performance, men perform statistically better than women (Heath, 1989; Walstad and Soper, 1989), especially at the college level (Ferber et al., 1983; Gohmann and Spector, 1989; Lumsden and Scott, 1987; Watts and Lynch, 1989). Two-thirds of the studies relating gender to the level of economic understanding (stock of knowledge) in Siegfried's (1979) detailed literature survey found that males performed statistically better than females. However, when essay exams are used to evaluate performance, women outperform their male counterparts (Ferber et al., 1983; Lumsden and Scott, 1987). Other studies (Rhine, 1989; Watts, 1987; Williams et al., 1992) reported no significant difference in exam performance due to gender. Research also suggests (Buckles and Freeman, 1983; Jackstadt and Grootaert, 1980; Heath 1989) that gender differences appear during adolescence, but after adolescence economic knowledge accumulates at equivalent rates for both genders. This implies that gender differences are established in high school, differences which may exist well into college.

Studies investigating the relationship between students having taken high school economics and their performance in college economics courses suggests that high school economics has a positive influence on the stock of knowledge at the beginning of the course, but the influence diminishes as one measures performance over an entire semester (Moyer and Paden, 1968; Peterson, 1992; Saunders, 1970). This raises the question of whether gender differences exist in college economic classes and whether having had a high school economics course influences a student's preparedness for economic learning.

In summary, an important determinant of a student's success in learning economics, or any other subject, is their preparedness for learning the new material. There are various factors influencing a student's preparedness including the maturity of the student (discussed later) and previous exposure to or experience with the subject matter. Additionally, gender and natural ability, or affinity for the subject matter, may play a role in learning economics.

Purpose and Objectives

The objective of this study was to investigate the factors that influence the readiness for economic learning (stock of economic knowledge). Although there are many important factors influencing students' preparedness (i.e., psychological, socioeconomic, intelligence, and learning styles, etc.) that could be considered in any investigation, this study focused on three factors. Specifically, the study

sought to determine if readiness is attributable to gender, the maturity of the student (as measured by class standing, e.g., freshmen, sophomore, etc.), and/or previous economics courses. We hypothesized that the higher the class standing, the more prepared the student, in terms of having been exposed to more world experiences, as well as having the necessary study habits and class experience that help prepare students for new subject matter. Previous economics courses were expected to have a positive effect on the student's preparedness for economic learning. Gender, if our results are consistent with previous studies (this was a multiple choice test), should result in men having a higher level of preparedness.

Although much of the literature discussed the influence of gender and high school economics on students' performance, the majority of these studies evaluated students' performance in classes composed of both economics and non-economics majors. Since students choosing to study economics as a career may be assumed to have a pre-disposition or an affinity for economics, the mixture of majors and non-majors may bias the analysis or cloud the results. What differentiates this study from most of the others is that the class was composed entirely of non-majors. Although students may switch majors after taking this course, which fulfills a general studies requirement, the class is designed for non-majors. Additionally, many of these earlier studies measured students' stock of economic knowledge at the conclusion of the economics course. In this study, we evaluated the stock of economic knowledge at the beginning of the course to determine the level of preparedness.

Methodology

The Test

A measure of the preparedness for economic learning is the stock of economic knowledge at a given point in time. In this study, the Test of Economic Knowledge (TEK) (Walstad and Soper, 1987) was used to measure students' preparedness. The TEK is an exam composed of multiple choice questions covering economic concepts in four distinct categories: fundamental economic concepts, microeconomic concepts, macroeconomic concepts, and international economic concepts. Questions about scarcity, productivity, opportunity costs, and economic systems are addressed in the fundamental economic concepts category. The category covering microeconomic concepts includes questions about markets and prices, supply and demand, market structure and competition, market failure, and the role

of government. Questions regarding aggregate supply and demand, unemployment, inflation, monetary and fiscal policy, as well as gross national product are covered in the macroeconomic concept category. Questions about absolute and comparative advantage, trade barriers, exchange rates, and balance of payments are addressed in the international economic concepts.

The test, designed in 1987 by a national committee composed of test experts, economists and classroom teachers, is a valid measure of economic understanding at the 8th and 9th grade level (Walstad and Soper, 1987). Although initially designed for use in evaluating middle school curriculum, this does not preclude its use at other grade levels. However, using the test at other grade levels prevents the examiner from comparing test scores to nationally normed test scores. For this study access to normed scores was not necessary. When used as a pre-test, the test is useful for assessing students' prior knowledge of economic concepts.

The Class

The data used in this study were collected from students enrolled in a general studies economics course at the University of Nebraska at Kearney during the fall 1997 and spring 1998 semesters. The class format is primarily lecture and consists of non-business, non-economics students. (For those students with a declared major, a wide spectrum of non-economic or business majors were represented.) The class is typically dominated by freshmen, although all class ranks are represented. Students were given the TEK as a pre-test during the first week of the semester. Performance on the exam was used as a measure of the stock of economic knowledge, or a proxy for preparedness for economic learning. In addition to test scores, demographic information collected from the students included: gender (male/female); class standing (freshmen; sophomore; junior; senior); and whether the student had economics in high school.

The sample, summarized in Table 1, includes observations on 238 students (47% males, 53% females). Of the 238 students, 112 are freshmen (47%), 84 are sophomores (35%), 30 are juniors (13%), and 12 are seniors (5%). The make up of class standing is fairly even between male/female students. Of the 111 male students 49% are freshmen, 36% are sophomores, 11% are juniors and 4% are seniors. Among the 127 female students, 45% are freshmen, 35% are sophomores, 14% are juniors, and 6% are seniors. Out of the 238 students in the sample, 25% of students had economics in high school (29% of males, 21% of females). Students reporting having had economics in high school varied by year in school with 27% of freshmen, 20% of sophomores, 37% of juniors, and 8% of seniors having had economics in high school. In addition, a larger percentage of the male

students had economics in high school with 14% of freshmen, 8% of juniors, 5% of sophomores, and 1% of seniors. This is compared to the female students (11% of freshmen, 6% of sophomores, and 4% of juniors) having had economics in high school.

Results

Pre-test scores for the class are compared in Table 2. In absolute terms, freshmen performed better on the pre-test than their counterparts and, interestingly, there was an overall 7% decrease in performance from freshmen to senior. However, except for seniors, the freshmen scores were more variable (as measured by the coefficient of variation (CV)). The scores for male students (26.4) were not statistically different from those of their female counterparts (26.3). Students with high school economics had higher mean scores (28.2) than students without high school economics (25.8), a difference that was statistically significant. In addition, scores for students with high school economics appeared to be slightly less variable (lower CV) than for students without high school economics.

The objective of this study was to determine factors affecting preparedness for economic learning. We hypothesized that the level of preparedness (represented by pre-test score (SCOR1)) was affected by gender, class standing, and whether the student had economics in high school. Binary variables (= 1 if true; = 0 otherwise) were used to represent the independent variables gender (MALE, FEMALE), class standing (FR = freshmen; SO = sophomore; JR = junior; and SR = senior), and having economics in high school (ECHS). Since maturity and experience in test taking generally increases with class standing, we expected class standing to have a positive influence on preparedness levels (coefficients on SO, JR, and SR should be greater than zero). Students with economics in high school were expected to have, on average, a higher stock of economic knowledge than students without economics in high school, thus having economics in high school was expected to have a positive influence on preparedness (expect $ECHS > 0$). Given the multiple choice question format of this test, the literature discussed above would suggest an expectation of males performing better than female students. However, we did not have an a priori expectation as to the influence of gender on the level of preparedness.

Ordinary least squares was used to estimate the model: $SCOR1 = f(\text{gender (FEMALE), class standing (SO, JR, SR), high school economics (ECHS)})$. The results from a Chow test indicated that structural differences in performance do not exist between males and females; consequently the model was estimated using the entire sample of students.

The regression results indicated that high school

Table 1. Characteristics of Students in the Sample.

Group	Total	Male	Female
<i>All students</i>	238	111	127
Freshmen	112	55	57
Sophomore	84	40	44
Junior	30	12	18
Senior	12	4	8
<i>Students with high school economics</i>	59	32	27
Freshmen	30	16	14
Sophomore	17	9	8
Junior	11	6	5
Senior	1	1	0

Group	% of Total	% of Males	% of Females
<i>All students</i>			
Freshmen	47%	49%	45%
Sophomore	35%	36%	35%
Junior	13%	11%	14%
Senior	5%	4%	6%
<i>Students with high school economics</i>	25%	29%	21%
Freshmen	27%	14%	11%
Sophomore	20%	8%	6%
Junior	37%	5%	4%
Senior	8%	1%	

Table 2. Comparison of Pre-test Scores by Group.

Group	N	Mean^z	Std. Dev.	CV^y	Range
Freshmen	112	26.63	5.33	0.20	24
Sophomore	84	26.51	4.55	0.17	21
Junior	30	25.67	4.74	0.18	17
Senior	12	24.92	6.16	0.25	24
Male	111	26.44	5.33	0.20	22
Female	127	26.32	4.77	0.18	30
With High School Economics	59	28.17	4.92	0.17	19
Without High School Economics	179	25.79	5.64	0.19	30

^zMaximum score 40 points^yCoefficient of variation

economics was an important determinant of pre-test scores (only this coefficient (ECHS = 2.47; $t = 3.235$) was statistically significant) and had a positive influence on preparedness (ECHS > 0). Results indicated that students with high school economics scored over 9% higher on the pre-test than those without high school economics. Gender did not appear to influence pre-test scores. The positive but insignificant coefficient (0.142) on the gender variable (FMALE > 0) even weakly suggests that women performed slightly better than men, at least in our sample, even though it was a multiple choice test (disagreeing with much of the literature earlier). Student maturity also appears to have no influence on pre-test scores. The negative but insignificant coefficients on the junior (-1.212) and senior (-1.28) variables (JR < 0; SR < 0) weakly suggests that the juniors and seniors have a lower level of preparedness, as measured by pre-test scores, for economic learning than did freshmen or sophomores (SO). A possible explanation is that, since the pre-test is not used as part of the student's course grade, students did not take it seriously and so did not exert the effort normally put into test taking, or alternatively, juniors and seniors may have been taking this first year class as a "fill in requirement," hence interest level may be low. It is also possible that incoming freshmen have more confidence in test-taking than previously thought in the literature, especially for those students having taken economics in high school.

Summary and Conclusions

This initial study investigated, through measuring the stock of economic knowledge at the beginning of the semester, three factors affecting students' preparedness for economic learning. The results indicated that taking high school economics did play a role in determining preparedness. However, the results indicated that gender differences in performance, at least at the beginning of the semester, were not as pronounced as previously identified in the literature. A fruitful area of research would be to ascertain if this preparedness of the student translates into higher levels of economic learning.

Many factors affecting students' performance in economic courses, such as socioeconomic factors, intelligence, learning styles, gender, and college major are identified in the literature. This study focused only on three variables (gender, maturity, and previous economics courses) and the results suggest that other factors beyond those examined in this study, and many interactions among these factors, may contribute to students' preparedness, another area of potentially useful research.

Since, unlike most studies in the literature, this sample is composed of only non-majors, it raises the possibility that differences in economic understanding identified in other studies may be attributable to the student's major. If there are indeed differences in economic understanding due to the student's major, a possible bias exists when evaluating students' performance in classes where majors and non-majors are mixed. This topic warrants further development and investigation.

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They Shoot Bison, Don't They? Discussing Ethics in Conservation Courses.

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Abstract

The ethical implications of conservation actions are worth discussing in environmental science and conservation courses. Consideration of ethics sharpens student critical-thinking skills, and illustrates the difficulty of designing conservation strategies in the real world. In this paper a framework for briefly introducing ethics philosophy in a large-enrollment environmental science class is presented, along with a case study in which these philosophies can be discussed. The case study involves the current policy of killing wild bison (*Bos bison*) that leave Yellowstone National Park in winter. Bison that wander onto cattle wintering grounds are viewed by local ranchers as potential sources of the disease brucellosis. Exposure of cattle to this disease would be economically devastating to the regional cattle industry. Students are asked to weigh the needs of

local ranchers, the National Park Service, recreational users of the Yellowstone region, and the bison themselves in considering the ethics of the current management policy.

Introduction

When presenting potential solutions to conservation problems, instructors in environmental science or conservation courses may focus on either or both of two approaches. Many instructors may concentrate on technical aspects of possible solutions -- in effect, emphasizing what can be done. On the other hand, instructors may be less inclined to focus on ethical considerations involved in solving conservation problems, thus there might be less effort to explore what should be done. There are several reasons why some instructors might shy away from consideration of ethical aspects of conservation issues. For most instructors, undergraduate philosophy classes were taken a long time ago, and therefore the moral reasoning behind the conservation ethic may be less familiar. In addition, lecturing students on a specific moral justification may open the instructor to charges of bias. On the other hand, trying to cover all possible moral stands on an issue may be confusing to both the students and the lecturer, and leave little time to consider other aspects of the issue. In a large (>50 students) lecture course, it may seem difficult to open the class period to an intense discussion of ethics, especially if the discussion could quickly degenerate into polarized stands.

The ethical aspects of conservation issues deserve

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