Assessing learning outcomes in college introductory economics courses: A case study

John Richards Mundy
University of Nevada, Las Vegas

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ASSESSING LEARNING OUTCOMES
IN COLLEGE INTRODUCTORY ECONOMICS COURSES:
A CASE STUDY

by

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A thesis submitted in partial fulfillment of the requirements for the

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Master of Arts

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ABSTRACT

Assessing Learning Outcomes
In College Introductory Economics Courses
A Case Study

by

John Richards Mundy

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Many issues affecting economic education remain unresolved within the profession. Much scholarly attention in recent years relates to the teaching of college introductory economics principles in courses. This thesis analyzes the learning outcomes of students taking introductory college economics principles courses. Little basic research has been performed on the assessment of how students actually learn the concepts of economics. This thesis takes a unique approach to the assessment of learning outcomes. Following a pre- and post-test survey, students were scored on the basis of both their economic attitude sophistication, and their knowledge of content. The results were regressed against a set of demographic characteristics that may predict positive learning outcomes. The results indicate that there are factors that contribute to successful learning outcomes. The conclusion identifies recommendations that can assist in helping students more readily grasp principles of economics.
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CHAPTER ONE

INTRODUCTION

As the social science discipline of economics enters the 21st century, many issues affecting economic education remain unresolved within the profession. One important topic that has received much scholarly attention in recent years relates to the teaching of economics principles in college introductory courses. There has been a great deal of research on the teachers themselves, their backgrounds, their methods and styles, and many other substantive aspects of teaching introductory principles courses. Apart from the teachers, research also has been conducted on the students in introductory economics principles classes. Many economists and educators have studied the traditional elements of the mechanics of learning as they apply to students of economics. This thesis will differ from traditional studies found in the literature. It will focus on the factors that determine learning outcomes for students enrolled in introductory courses. This thesis will not serve as a measuring device for instructors of college principles courses; rather it will seek to analyze understand, enumerate, and elaborate on the ways that students can attain a successful learning outcome.

The analysis will follow several classes of students enrolled in introductory microeconomics principles courses at the University of Nevada Las Vegas (UNLV), and at the Community College of Southern Nevada (CCSN) during the Fall semester 1999.
Students in these classes participated in voluntary pre- and post-tests conducted during that semester. More details will follow in Chapter Three regarding the exact methodologies used in the study. As will be explained in the Literature Review, which follows in Chapter Two, this thesis will differ from other research by combining three aspects of economic education research that are generally examined solely or only in tandem. Those three topics are: 1) the demographic profiles of the observation group, 2) the economic attitude sophistication of the observation group, and 3) the results of the change(s) in knowledge learned from taking the course. Details on all three elements of inquiry will be discussed in Chapter Three.

The purpose of this thesis is to assess the learning outcomes from these student groups and to analyze the outcomes in the context of the factors self-reported as to their backgrounds, their attitudes, opinions, and economic sophistication, and the knowledge gained during the course of a semester in microeconomics principles. The problem question is: what are the factors that contribute to learning economics concepts and how do they work to facilitate positive learning outcomes? The null hypothesis is that there will be no difference from the means of nationally normed surveys. The alternative hypothesis is that there will be statistically significant differences.

Chapter Two will provide a review of the relevant literature in economic education, essentially since the early to mid-1980s. This review will examine factors that other authors have researched in the pursuit of data and information about how students successfully navigate college introductory economics. The review will discuss categories and issues as diverse as prior high school or college economics/mathematics background, class size, gender, self-reported high school and college GPAs, attendance
patterns, study habits, personal attitudes and opinions, and a dozen others. Following a review of student issues and dimensions, a discussion of the literature as it relates to instructor methods, styles, techniques, and procedures as they collectively relate to student outcomes, will be conducted. Also, Chapter Two will review the recent past, current trends and prospective new innovations that are evolving in classroom instruction and outcome theory and practice.

Chapter Three will describe the methods employed in setting up the survey, constructing the survey, the process of gaining informed consent, conducting the survey, and collecting the data. Issues related to reliability, validity, causality, and generalizability will be discussed. The selection of the sample will be explained. Finally, models to be used for analyzing the data will be presented.

Chapter Four will analyze the collected data. The analysis will be divided into three parts. First, tables of the frequency distributions between various student profile elements will be presented. All participants filled out a thirteen-question demographic profile that elicited information about their academic background, personal characteristics, and societal categories. Next, the frequency distributions will be arrayed against the pre- and post-test results of economic attitude sophistication and microeconomics content. This analysis will also include the calculated gain scores. It is anticipated that certain characteristics such as age, gender, prior math background, previous economics courses taken, etc., will show significant results. Third, regression models of the significant variables will be constructed and tested in the attempt to isolate the factors that can predict successful learning outcomes.
Chapter Five will summarize the results of the analysis. This chapter will make conclusions about the results and offer recommendations for improving outcomes. Additionally, there will be recommendations regarding the need for specific further research in the field of economic education. Given the nature of this topic, while the intent is to look at outcomes from a new perspective, it is hoped that the conclusions reached can make a contribution to the state of knowledge regarding economic education at the college introductory principles level.
CHAPTER TWO

REVIEW OF THE LITERATURE

This chapter examines economic education literature that is current and contributes to the body of knowledge in economic education. For reference, this thesis examines literature from the 1980s and 1990s, with only one or two exceptions from 1979. The output of economic education academic and education professionals over the previous two decades was deemed most relevant to the hypothesis of this thesis. The purpose of this thesis is to assess the learning outcomes of students taking introductory college microeconomics principles courses. The hypothesis itself relates to the empirical assessment of those outcomes in a survey of classes in microeconomics principles taken during the fall 1999 semester. Students participating in the survey were enrolled in classes at the Community College of Southern Nevada and at the University of Nevada Las Vegas.

Relevant literature related to assessing outcomes was researched covering thirty-five different dimensions. The contributions of over fifty authors are associated with this thesis. Many of them wrote on more than one subject as part of a cross-sectional analysis of student learning outcomes, instructor, and instructional methods for teaching college introductory microeconomics principles courses. Research on this thesis uncovered a wealth of information in the field of economic education.
Much of it, however, is somewhat oblique and only marginally contributory to the assessment of how students learn economics concepts. Many authors, at least in the field of economic education, in their desire to publish, are pursuing topics that while certainly unique, are at best tangential to the still unsolved mystery of how students learn economic concepts.

The literature review begins with general statements regarding the current health of economic education and instruction in the United States. The literature review will discuss a few measures of determining or predicting successful outcomes for students enrolled in economics principles introductory courses. Later in the chapter, the research will divide logically into two pathways. The content of the thirty-five dimensions, mentioned above, and contributed by more than fifty different principal authors, falls into two major sub-groups. The first sub-group to be discussed in this literature review will be student-related learning dimensions. Following that review will be a discussion of instructor-related learning dimensions. The review chapter concludes with a preview of the methodologies employed in gaining information from and about the student survey sample and the statistical analyses performed in the pursuit of assessing relevant correlation, causation, and/or predictive estimation of the learning outcomes realized by the students participating in the survey.

As mentioned in the introduction, while many economists have been concerned about the teaching of economics at the principles level in college, those same economists and educators may indeed be wondering about the current state of health of economics as a teaching discipline. They may be wondering about the health of economics because of the general declining trend in nationally normed test scores, declines in classroom
examination scores by students across America, and for some colleges at least, declines in the numbers of economics majors. (Becker and Watts, 1995) The proportion of Baccalaureate Degrees awarded in economics fell during the 1950s, from approximately 3.5% to 1.8%. This proportion rose in the 1960s only to fall again in the early 1970s, hitting a low of 1.5% of all degrees granted in 1975. The proportion resumed climbing and reached 2.4% in the late 1980's, but has been falling steadily every year since. (Becker and Watts, 1995 pp. 355-56) According to Becker, such a trend must turn up or it will lead to retrenchments and closings of departments of economics. Writing earlier, Becker wrote of the necessity of conducting surveys as to how and why economics students choose the classes that they take, especially economics majors. (Becker, Highsmith, et al. 1991, p. 28) Becker and his colleagues were speculating as to the ultimate goals and intent of students declaring economics as a major, changing the major and ending up in business or another social science.

Writing in 1999, Alberta Robb and Leslie Robb hypothesized regarding two further possible reasons for declining majors in economics. In a recent Canadian study, it was found that high school students who were required to take economics for several secondary programs in that country, often must take a college introductory economics course in the first year. In the Robb study two years of forced economics generated a certain burn-out level of attrition in potential Canadian economics majors. The second reason, which will be discussed in much greater detail later, found that women are significantly less likely than men to become economics majors. (Robb, A. and Robb, L. 1999, pp. 3, 13)
A logical progression at this point would be to ask since we know that economics majors have been in proportional decline for some time, what are the determinants of success for pre-majors and others in college introductory courses? This question is pertinent because if students are dropping, failing, or otherwise disconnected with the subject, it is not likely that they will proceed to become economics majors. Anderson and Benjamin (1994) write that it might be possible to predict success in university introductory courses based on information about prior achievement and background as indicated by the student’s record in the final year of high school. They conducted a large survey of almost 4,000 high school students in 1987 and 1988 who went on to be enrolled in first year economics principles course in college. That survey weathered a near 40% attrition rate. Nevertheless, their regression estimates were significant enough to merit concluding that having a prior high school background in economics and calculus reduced the probability that students would drop the principles course during the first semester. Anderson also speaks to the effects of gender playing a role in his survey as well. (Anderson and Benjamin, 1994 pp. 101 - 111) In another study Becker and Watts focused on teaching methods with an emphasis on retaining students by adopting creative, experimental, and other new teaching methods. There will be more discussion on this study in a later section as the emphasis was on method while the goal was clearly on retention. (Becker and Watts, 1995 p. 698) Michael Salemi, (1996), also spoke to the issue that teaching methods, strategies and styles had a great deal to contribute to student interest and the willingness to major in the subject. (Salemi, Saunders and Walstad, 1996, p. 460)
In two other examples describing the determinants of success, Cohn and Cohn have written on issues related to student's backgrounds (including mathematics) and study habits. In one study the Cohns examined if students are capable of reproducing graphs drawn on the board or shown on an overhead projector. One purpose of the inquiry was to discover whether the accuracy of graphs in student's notes affects success on tests in which graphs are included. Another purpose was to determine the extent to which instructor handouts containing graphs presented in a lecture (but not usually available to the student elsewhere, such as in the textbook) facilitated learning. Cohn used an experimental lecture including such handouts as the instrument in a survey to determine the accuracy of the two assumptions. Prior to the experimental lecture, students completed a questionnaire. Information requested included age, gender, major, course load, mathematics background, and an open question regarding the student's ability to read or interpret graphs. Findings were not altogether surprising given the relationship of graphs to the subject of economics and the Cohns' generalized feelings about the preparation of students coming out of high school. The Cohns' results found that average accuracy scores on graphs are fairly low and that many students draw inaccurate graphs in their notes. Further, they also found that students who draw more accurate graphs perform significantly better. Additionally instructor-supplied graphs are beneficial for students who draw inaccurate graphs. (Cohn, E. and Cohn, S. 1994)

In another study by Cohn et al., the authors looked at the concept of student note taking and working memory as learning devices when studying principles of economics. Observing grade results from one semester's cohort of students enrolled in principles of economics at the University of South Carolina, Cohn and his co-authors were perplexed
to find that of 1,325 students, over 25% of those students received grades under C (F, D, or D+). These grades are considered unacceptable for those majoring in business, economics, and related disciplines. To investigate this situation, Cohn et al., other economists and educational analysts studied the factors that influenced achievement in economics principles courses. Earlier findings suggest that mode of instruction, class size, and student attitudes might be important, as are gender, ability, and other characteristics. (Becker et al. 1991; Lumsden and Scott, 1987; Siegfried and Walstad, 1990; Williams, Waldauer, and Dougal, 1992) Cohn et al., (1995) found little attention has been devoted to the potential impact of variables such as note-taking and memory on learning in the principles of economics course.

Note-taking is a common activity in a college setting, and a large percentage of students has been observed taking notes. The research of Cohn et al. focused on two major functions of note taking: encoding and external storage. The encoding function involves the transformation and reorganization of material as a means of learning from the act of note taking itself. The external storage function involves the use of notes for the purpose of review as a means of learning. Working memory is the active part of long-term memory. A person has quick access to working memory, it is more volatile than long-term memory and it has a limited capacity. Further research on this subject yields the fact that one might compare a person’s long-term memory to a computer’s hard disk. Working memory can be compared to a computer’s (limited) RAM storage capacity for processing data and information, except that RAM is physically separated from a hard disk, whereas working memory is a subset of long-term memory.
Working memory which is used for the maintenance, manipulation, and integration of information across time, clearly seems to be important in note taking. When listening and taking notes, students must attend to the lecturer, abstract important information, and then hold and manipulate a presentation of that information while recording notes.

The objective for Cohn et al was to examine the relations among note taking techniques and functions, memory, and learning in economics principles courses. The results suggest that memory and note taking may have an effect on learning. The researchers drew several practical implications from this study. Because learning depends on working memory capacity, it is important that instructors present material in such a way that they do not tax the working memory capacities of their students. Hence, an instructor might monitor the pace and density of information presented to students in any one class period. In addition, the researchers found that the results suggest that instructors who distribute notes and insist that students refrain from taking notes so they can pay more attention to the lecture may be deceiving themselves. Providing students with instructor-supplied notes may not provide the advantage that some instructors might expect. Cohn suggests an alternative technique that could be investigated in future studies. The research suggests that the instructor presents an idea or concept for a specified time span (such as ten minutes) and requests students to listen without taking notes. Following the specified time span students are asked to write notes for five minutes. The instructor then summarizes the concept that ought to be included in the notes. (Cohn, E., Cohn, S., and Bradley, 1995)
The College Board offers two Advanced Placement (AP) economics exams – microeconomics and macroeconomics – designed to test students' knowledge and understanding of the content covered in a typical first-year one-semester college course. An important element of the AP program is a comparison of high school students' performance on AP exams with that of college students who have completed their requisite college course. The College Board regularly conducts comparability studies in which college professors are asked to administer the AP exams to their students and grade them using their own grading standards. Melican (1997) was interested in the cross-validity of the AP exams. She conducted her own admittedly smaller survey using eleven universities for the micro exam and seven for the macro exam. The purpose was to: 1) evaluate the validity of the cut points currently used to determine the AP grades for high school students, 2) compare the general level of AP candidates' exam performance with that of college students enrolled in courses for which credit and advance placement are typically sought, 3) compare the grading of the AP exam with the grading of exam performance in the colleges, and 4) assess the validity of AP grades for identifying students capable of doing college level work in the course for which credit for advanced placement is sought.

The results that she found were interesting, however, they probably are not generalizable due to the small sample size. She found that on average, the AP candidates obtained higher multiple-choice/free-response composite scores than did the group of college students. The average micro exam score for AP students in this study was higher than the average scores of the college students at nine of the eleven colleges. For macro, the AP students had higher total scores than did students at four of the seven colleges. In
her conclusion she found that AP students receiving corresponding grades of 3 and 4 on the AP exam displayed superior performance to the college students who ultimately received a grade of C or B on the college introductory course exam. AP students who received a grade of 5 displayed a much higher performance level than the college students who received a final grade of A. The suggestion is that, given the small sample size, the grading standards for the AP exams are more stringent than those used by college instructors. (Melican, Debebe, and Morgan, 1997)

This thesis identifies a few general factors that collectively have been called predictors or determinants of success for students undertaking the study of economics. Of those few issues just discussed, all demonstrate interrelationships between student and instructor. Whether the student is taking high school economics, advanced placement economics, algebra, or calculus in high school, or enrolling in economics principles classes at the introductory level in college, the student-instructor relationship is crucial. At every step, the methodologies of instruction employed by teachers of economics, either facilitate or can lead to negating successful outcomes for students. Of course, students bear the ultimate responsibility of attending class, taking notes, paying attention, studying, and passing examinations; however, the process is almost always facilitated by the relationship between the student and the instructor.

Almost any topic in the research of how students learn is going to demonstrate some interrelationship between the two parties. However, many have their focus on either the student or the instructor as the prime mover in terms of effect and/or affect. Therefore, this literature review will diverge into two broad pathways. One pathway will
present student-related learning dimensions, and the other pathway will present instructor-related learning dimensions.

Student-Related Learning Dimensions

Former Federal Reserve Governor and Vice Chairman Alan Blinder, writing a commentary in the summer 1991 issue of the *Journal of Economic Education*, complained about the state of research in economic education. While his commentary does not represent research per se, his reputation grants him standing among his peers, and his views on the state of research in economic education are insightful as well as piercing. "When we make curricular changes at Princeton, which is not often, we are guided by hunches, not by scholarly evidence. I doubt that we do any worse on this score than other departments. The reason is simple. In research universities at least, the incentives are always to keep current on research, not on teaching. Teaching is a sideline and, all too often, an afterthought. I fear that the researchers in economic education may be whistling in the dark. If so, the fault lies with the whistlees, not the whistlers." (Blinder, 1991)

Blinder was focusing on the concept that education researchers were constantly looking at dimensions of economic knowledge. Blinder felt that economic knowledge is a multi-dimensional output, no one-dimensional measure can capture everything. Following, he complains that he finds that many of the results reported in the literature on economic education are interesting and if people would pay attention, important. But many conclusions seem to rest on only one or two studies. Blinder feels that researchers
in the field need to produce more evidence if they are to convince the profession that they are on to the truth.

Therefore, Blinder proposed a short list of dimensions that should be researched by scholars in economic education, with the yield that a high level of replication would get the attention of the profession. The first dimension for Blinder that should be studied in greater depth is the value of high school preparation. He feels that the AP test in economics is a valuable assessment device. He wonders if the AP course in high school affects college performance or if AP scores predict college performance. The second topic that Blinder was concerned about is the effect of class size on learning (a subject that I will discuss in greater detail later in this section). The third subject that Blinder believes should be more extensively researched by economic education scholars would be whether either macro or micro should be taught first or, should there be any particular order of courses. On this subject Blinder has some definite opinions. He believes that teaching micro first is better intellectually. However, he thinks that the current arguments reflect somewhat scanty evidence. He also raises a secondary issue. Suppose teaching micro first is more sound, but macro increases attendance. Requiring micro first would mean that fewer students would be getting a slightly better education. In summary Blinder definitely believes that better and more replicative efforts should be focused on fewer issues in order to convince the greater economic world of their validity rather than a scattered offering of one or two studies per year on thirty different dimensions.

(Blinder, 1991)
Student Backgrounds

Anderson, in his large 1994 study of nearly 7,000 Canadian high school students, hypothesized and later established the significance of several key student background factors as independent variables in his final conclusions. Running F-tests on such variables as algebra, calculus, and economics as part of high school student’s backgrounds prior to entering college, Anderson found that they all were statistically significant factors in his estimation results. Those significant scores led to Anderson labeling those pre-college background experience factors as clearly important in describing the determinants of success in college introductory economics principles courses. (Anderson and Benjamin, 1994)

Bonello et al. (1994), conducting an empirical analysis of freshman versus sophomores taking economics principles courses, found distinctive and significant differences favoring sophomores. Whether the students were taking micro or macro first, was not the distinctive issue. The true issue was the fact that the extra year of experience at the college level by the sophomores proved empirically to be worth significantly increased scores when taking examinations in either micro or macro. There was a correlation effect with both classes’ prior economics and mathematics backgrounds; however, the extra year of college life with its acclimatization values proved to be the strongest of the independent variables affecting learning outcomes. (Bonello, Swartz, and Davisson, 1994)
Attendance

Durden et al., (1995), addressed the learning dimension issue of students’ attendance affecting performance in college introductory economics courses. Citing several earlier studies, Durden set out to determine empirically at what point attendance starts to affect student performance. Durden cites Romer (1993) who found that attendance did contribute significantly to academic performance, even controlling for student motivation, which Romer argued is the true factor in determining performance. This argument was echoed by Park who found that attendance was a determinant in student performance, but not as important as the students’ GPA and the percentile rank on college entrance exams. (Park and Kerr, 1990) Durden set up his own empirical analysis. (Durden and Ellis, 1995) Contrasting Durden et al’s decision to run their own empirical study, was evidence from two other studies that showed results arguing attendance had nothing to do with student performance. Browne et al. (1991) showed that students who did not attend a typically structured class with lectures did just as well on the Test of Understanding in College Economics (TUCE) as those students who attended a standard microeconomic principles course. Browne also reported, however, that those students who attended the lectures performed better on essay questions than those who did not. (Browne et al., 1991) A further study by McConnell et al., (1990) found no significant difference in the performance of students with low classroom attendance vis-à-vis those attending class. (McConnell and Lamphear, 1969)

Durden’s analysis of his data suggests what many professors have thought all along: the typical student is not adversely affected by a few absences, but excessive absenteeism (in his empirical example, five or more misses) is associated strongly with
poor academic performance. Indeed, in their conclusions, Durden et al. suggest that the effect is non-linear, becoming important only after a student has missed four classes during the semester. What seems to matter most is excessive absenteeism. This study did not address any class organizational setup other than the traditional two or three class meetings per week format. (Durden, and Ellis, 1995)

Grade Point Averages As Predictors

Grade Point Averages (GPAs) are mentioned by nearly all of the more than fifty authors included in the bibliography. Most authors make some reference to high school GPAs as at least initial predictors of success for college introductory principles courses. There is indeed a wide consensus among economists and educators that GPAs are important predictors for students entering principles courses. Cardell et al., uses GPA reports in a somewhat different analysis format than has been done traditionally. In a survey conducted at Washington State University in 1993, he hypothesized that the conventional lecture-discussion format may be the least effective way to teach economics; rather, the most effective teaching method may be as a laboratory science. Cardell conducted a pure experiment using students from both macro and micro economics principles courses. His unique model (utilizing Ordinary Least Squares (OLS)) delivered some interesting results.

- Students having taken trigonometry or the second semester in a calculus sequence raised their net Test for Understanding of College Economics (TUCE) score by about one point.
• A one-point increase in the most recent high school or Freshman GPA corresponds to about a 1.5 point increase in the net TUCE score.

• A ten percent increase in class attendance resulted in a net score gain increase of about .25 point.

Almost all of Cardell’s statistical tests indicated that the chosen measures of student performance and achievement were appropriate to the estimated models. In particular, the measures of previous academic performance, ability, and mathematics background consistently are statistically significant. (Cardell, Fort, et al., 1996) Results of Cardell’s studies are interesting, but as Blinder stated, replication is the all important validation for new ideas measuring student achievement in economic education.

Laband and Piette, (1995), had yet another interesting analysis on the impact of GPAs on student performance in economics courses. They were investigating whether students in community colleges performed as well as students at four-year universities performed in upper-division economics courses after having taken their principles courses at their respective locations. Laband used the student’s GPAs as a control for tracking the performance of students as they went forward in their economic matriculation. Laband accepted as a given, that throughout the United States, most state colleges and universities are required to admit transfer students from community colleges in their state without requiring that they take the Scholastic Aptitude Test (SAT), which is a normal requirement of non-transferring applicants.

In their paper, Laband and Piette demonstrate that the academic performance of students in post-principles economics classes is lower among students who took their micro and macroeconomics principles courses at a community college than among
non-transfer students. In their survey of slightly over 2,000 students, Laband and Piette found that although GPAs in the principles classes virtually were identical for transfer and non-transfer four-year university students, the transferees had a considerably lower mean GPA in their upper-level economics courses than did the non-transfer four-year university students. (Laband, and Piette, 1995) This is an interesting study but much replication should be undertaken prior to placing much reliance on the results. Not all economists and/or educators place all learning outcomes success on GPAs alone.

Mathematics Background

Anderson and Benjamin, (1994) in researching the determinants of success, make a very strong case regarding the importance of a proper mathematics background for students approaching both economics principles courses and advanced courses. They conducted a large survey of several thousand high school students in Toronto, Ontario, Canada who went on to college introductory principles economics courses. The students had taken algebra and calculus, both considered statistically significant variables in predicting students’ achievement. In this article, where Anderson analyzed the factors that determine a student’s predicted success in introductory economics, the single most important factor was taking a course in calculus as a high school senior. Background knowledge of calculus and economics were the most important determinants in the probability of dropping the course in the first semester of a two semester term, whereas the average mathematics grade as a high school senior was the most important determinant of the decision to continue through the second semester. (Anderson and Benjamin, 1994)
Becker and Watts (1996) in a large survey of styles and methods by instructors, found that instructors view students' abilities to make numerical calculations as important in all courses, but especially in statistics. However, the only mathematics skills for which the median response in their survey was "zero = not at all important," was calculus in principles courses. For intermediate theory courses, calculus was judged "1 = somewhat important," and in statistics and econometrics, the median response was "2 = important." Correspondingly, algebra was rated in this survey "somewhat important" for principles classes. (Becker, and Watts, 1996) In their survey of over 3,000 college teachers of economics, Becker and Watts were certainly not downplaying the importance of mathematics to successful achievement in principles courses. They just found, however, that algebra was more important for principles courses while calculus was positive and significant for upper division economics courses.

As mentioned above, Cohn and Cohn (1994) in their study on the importance of graphs and learning skills of students taking principles of economics courses, definitely emphasized the importance of mathematical concepts for students in their understanding of what the graphs were intending to depict.

**Age, Race, and Demographics**

Phipps and Clark (1993), writing on the subject of attitudes and opinions about economics by students, administered three different surveys for their article. They used the Test of Economic Literacy (TEL), the Attitude Toward Economics (ATE), and the Economic Attitude Sophistication (EAS) as a series of overlapping measures in their attempting to determine by factor analysis what students thought about the subject of
economics. Two data sets were used for this analysis. The primary data used were extracted from the national norming sample of the Test of Economic Literacy (TEL). These data were collected in winter and spring 1986. These were the same data used by Walstad and Soper (1989) when they generated a matched pre- and post-test sample of 1,630 cases for their analysis. The secondary data set was the Capstone data (Clark and Highsmith, 1991), a matched pre- and post-test sample of 995 students who took high school economics during the 1990-91 academic year. Phipps and Clark, directors of economic education at the University of Kansas and Wichita State University respectively, did not use any live student samples in their analysis. All data was historical. Some interesting facts were derived from this attitudes survey. The most interesting finding in the EAS factor regressions was the relationship between race and employment issues. Black students in the sample were much more likely than white students to agree with economists that unemployment is not just a result of laziness. Given the historical differences in unemployment rates between blacks and whites in the United States, this result may reflect a greater personal familiarity with unemployment, and its causes on the part of black students than white students.

In one of the models in Phipps’ survey, I.Q. was not found to influence any of the EAS factors. In still another aspect of their study, Phipps and Clark found that students who had specific prior economics instruction viewed the subject as easier, an intuitively appealing finding. (Phipps and Clark, 1993)

In their earlier study mentioned above, Laband and Piette (1995), while making claims regarding the differences between community college and four-year university students’ performance after principles courses, found that older students regardless of
their origin academically, did much better in their studies than younger students. The older students outperformed the younger consistently on the margin.

In a paper by Stratton et al. (1994), the authors were interested in relationships between student grade achievement and instructor evaluations. The variables they used reflected several demographic categories in their attempt to determine whether grades were part of any functional relationship between the instructor and the student in terms of end-of-course evaluations. These authors made some interesting findings. However, research of the literature has not yielded any replications. For instance, they found that students repeating the course received grades that were 0.4 points or about 18% higher; non-whites scored about 3% lower than whites; night students scored about 4% lower than day students; and as in most studies women scored about 13% lower than men. (Stratton, Myers, and King, 1994)

The Gender Dimension

In the last fifteen years, the development of validated multiple-choice tests such as the Test of Understanding in College Economics (TUCE) has been instrumental in encouraging a proliferation of studies on variables affecting students understanding of economics, particularly in beginning courses. As noted by Blinder, there have been a number of studies generated every year concerning the many dimensions of student learning and outcomes in principles of economics courses. Most of those scholarly articles have been generated since the establishment of the TUCE exam. Two factors led to the acceptance of these tests as reliable measures of economics comprehension. First, would be the high standing within the profession of the economists involved in the
construction of the TUCE exam. Second, is the large numbers of students that were tested to generate norming data.

A statistically significant finding consistently has emerged over the last twenty years from the research on these multiple-choice tests: Female students perform less well than male students in beginning economics courses. (Siegfried, 1979) This finding has spawned a series of inductive papers to explain female students' inferiority in economics comprehension. A more sophisticated approach distinguishes between the stock and the flow of knowledge (Siegfried, 1979) with the general conclusion that male superiority appears in the stock of knowledge prior to college but that learning rates in college are similar for males and females. When and why male superiority appears in the stock of knowledge remains a mystery.

The psychological literature argues that people who mature earlier have higher verbal learning rates. Because females, on average, mature earlier than males, they should have higher verbal skills, leaving males with a competitive advantage only in spatial and quantitative skills. (Siegfried, 1977, p. 8)

According to this hypothesis, female students should perform better than male students on essay questions (which require verbal skills) and no worse on multiple-choice questions. Unfortunately, none of the large-scale studies carried out over the last twenty years is supplemented by analyses using essay examination questions.

Lumsden and Scott, (1987), conducted a large scale survey using multiple choice examination questions. Lumsden found that these results cannot be generalized to essay questions. The evidence supports, according to Lumsden, the conclusions drawn that the impact of the gender variable depends on the form of the examination. In this large study
Lumsden arrived at three conclusions, 1) male student superiority was confined to multiple-choice tests, 2) female students performed better than male students on essay questions, and 3) female learning rates were lower than male learning rates in principles of economics courses. (Lumsden and Scott, 1987)

Phipps (1993) found empirical evidence that males seemed to enjoy the subject of economics relatively more than females but males were not significantly different from females regarding perceived difficulty or attitude toward usefulness. This finding was derived from a factor analysis study of attitudes and opinions by students in economics principles courses.

Phipps considered that if a goal of economic education is to teach students to apply economic concepts, then instructional strategies might include specific drill on the concepts covered by the Test of Economic Literacy (TEL), economics instruction beginning at an early age, and reconsideration of the high school consumer economics courses as the vehicle for economics instruction. Phipps further recommends that if economic goals are to increase the students' enjoyment of economics, then strategies must include specific attention to female students, who appear to enjoy the subject less than male students do. (Phipps and Clark, 1993)

Robb and Robb (1999), in observing the mounting evidence that female students, on average, do worse than male students in university introductory economics courses, suggest that this may explain why economics is male-dominated. Female students may get "turned off" by economics at the introductory level. The reasons for gender-based performance differentials are not clearly understood, although several hypotheses have been advanced in the literature. These hypotheses include differences by gender in
mathematics ability, and/or preparedness, possible subject-matter bias (economics does not "speak" to women), possible gender bias in testing methods (women do less well on multiple-choice exams), and the absence of female role-models.

Robb and Robb, (1999), focused on the possible influence of the absence (or presence) of female role-models in economics. They hypothesized that a female instructor might influence the performance and the decision-making of female students in two ways. First, female instructors may teach introductory economics in a way that does not "disadvantage" female students and/or provide a classroom climate that women find more conducive to learning. (Ferber, 1995) Second, female instructors might provide the traditional role-model effect because their presence signals that women can and do succeed in economics. (Robb, R. and Robb, A. L., 1999)

Interestingly, Laband et al. in the study involving community college instructors referred to above, found that regardless of students' lower division principles courses location, if students either majored in economics or enrolled in upper division economics courses, female students performed better at that higher level. Laband's finding, although probably not generalizable, follows the accepted belief that female students perform better as they progress not only in all their college courses but specifically in economics. (Laband and Piette, 1995)

Anderson and Benjamin (1994) in examining the gender issue problem, went back and looked at characteristics of early preparedness in attempting to understand the learning differentials between males and females. Their results probably are not surprising. In their 4,000 student sample population, men took more algebra, and calculus – in other words more mathematics. Men perform better in calculus and
functions, whereas women do better in English. Normed tests suggest that this is
generalizably true, at least at the high school level. Although according to Anderson,
there does not appear to be a gender effect in high school economics (where it is more
consumer than mathematically oriented), the analytic nature of economics becomes much
more evident at the college and university level. (Anderson and Benjamin, 1994)

In a study looking at classroom interaction, Fassinger (1995), tested further and
expanded on a frequently cited report (Hall and Sandler, 1982) regarding the “chilly”
classroom climate for female students in college economics and other university courses.
In this report, Hall and Sandler believe women are disadvantaged in college because of
professors’ differential treatment of students by gender. Fassinger was focused on
learning objectives perceived by male and female students. As a dummy variable in her
calculations, she also inserted the gender of the instructor into her regression equation.
Fassinger’s findings indicated that the professor’s gender had minimal impact on male
performance, with the exception that the male students were more likely to comprehend
class material in female professors’ classes than in male professors’ classes. The picture
was quite different for the female students. Fassinger found that having female
professors positively affected women students: Females were significantly more
confident, comprehended more, were more interested in the subject matter, and
participated more in classes when their professors were a female. (Fassinger, 1995)

Concluding this section on the gender dimension, Whaples (1995) turns to the
subject of attitudes and opinions among college economics students. Specifically,
Whaples analyzes student’s attitudes regarding the fairness of the marketplace. In his
research he presents evidence that students’ opinions change upon taking introductory
economics, so that a greater percentage come to regard the functioning of the overall market as fair. Whaples asked approximately 300 students the following attitude questions regarding market fairness (in a pre-and post-test environment):

- Is it fair to raise rents?
- Is it fair to raise flower prices on a holiday?
- Should government limit the increase in flower prices?
- Is it fair that middlemen make a large profit?
- Would you be annoyed when someone sells/buys a place in a line of people waiting to purchase flowers?

Whaple's most important finding was that on almost all of the fairness questions, those students who had completed the economics class had significantly different notions of fairness than their counterparts had on the first day of class. For example, examining his data, the proportion of students who believed it is unfair to increase the price of flowers on a holiday fell almost in half. The proportion that favored government control over flower prices rather than market determination fell by over sixty percent. Learning economics did seem to change many students' minds about what is fair, convincing them the market outcomes were equitable.

Differences in the question responses appear when the responses are reported by gender. Responses by females show that initially they were considerably less likely than males to regard the market outcomes as fair. At the end of the semester, when the same questions were asked in a post test environment, female students were still less likely to consider the market outcome fair, but the gap had narrowed considerably. (Whaples, 1995)
In this section, issues that appear to be affected by or have an effect upon the gender status of students taking introductory college economics principles courses have been examined. The gender issue persists in the teaching and learning of economics principles. Referring again to Blinder, it is likely to remain a problem/issue until there is greater replication by scholars in the field of economics regarding approaches and solutions. In addition to cross-sectional issues affecting female students taking introductory economics, there are other issues which should be investigated, especially in the light of the under-representation of females both as students and faculty.

**Attitudes, Opinions And Economic Sophistication**

As students grow and learn, economic attitudes and opinions take shape and influence thoughts and actions over a lifetime. Consequently, economic educators need to know the nature of the relationship between cognitive and affective domains in economic learning. Accordingly, economic education research in the past decade has been characterized by the development of increasingly sophisticated models of economics learning, with students' attitudes towards economics a key variable in many of these models. (Soper and Walstad, 1983; Becker, 1983; Walstad, 1987; Walstad and Becker, 1984)

Although the theoretical relationship between attitude and economics learning varies across models, student attitudes typically have been measured using the Survey on Economic Attitudes (SEA). (Soper and Walstad, 1983) The SEA consists of 28 statements to which students are asked to respond on a 5 point Likert-type scale indicating strong agreement to strong disagreement. The SEA comprises two separate
sub instruments of 14 items each. The first section is entitled Attitude Toward Economics (ATE), and is designed to assess students’ attitudes toward economics as a discipline. The second sub instrument is called the Economic Attitude Sophistication (EAS) and assesses students’ agreement or disagreement with the consensus position of economics professionals. National norming of the overall SEA has shown the instrument to be reliable with a relatively high internal consistency.

In this thesis, survey questions for students in micro economics principles courses were drawn from the SEA. Not all 28 questions were used. As will be explained in greater detail in the following chapter, ten questions were drawn from the combined list of attitude and economic sophistication instruments. The ten selected questions were adjudged by economists on this candidate’s supervising committee as cross-sectionally representative of students’ attitudes and sophistication in the local community. The ten questions included in the survey for this thesis were pre-submitted (by the candidate) to the supervising committee for their approval.

To provide instruments of general utility to researchers and evaluators in the field, more data regarding the SEA was needed, particularly regarding instrumental reliability. Therefore, the two-part SEA was originally normed in May 1979, using students from 167 high school systems representing all geographic regions of the country. Additionally, reliability validation was attained by college-level administrators several times since the original 1979 construction of the SEA. The SEA has been re-normed several times in its totality since its inception. A reliability control was established for the attitude sophistication portion of this thesis survey, and will be detailed in the following chapter.
The results of national reliability and validity studies indicate the ability of the SEA to detect either "attitudes towards economics as a subject" or "economic attitude sophistication" among various student populations with some degree of certainty. (Soper and Walstad, 1983) Summarizing, exposure to formal economic instruction at the high school or beginning college level may have an impact on economic knowledge, attitudes towards the discipline, and opinions on economic issues. If these are all outputs from the learning process, then both cognitive and affective dimensions are worth assessing in an objective and scientific way. The SEA provides an effective measurement tool with good reliability and validity and with known characteristics. (Soper and Walstad, 1983)

Economic attitudes and opinions should be a topic of interest to teachers of economics, whether they teach it separately or integrate it into the existing curriculum of a principles course. On the one hand, it is often thought that affect may be more important than cognition in determining human economic behavior. Even if students understand the consequences of economic actions and policies, they may still act "irrationally" from an economic perspective, perhaps because their economic attitudes and opinions run counter to their economic understanding. In addition, willingness to learn economics may depend on positive attitudes towards the subject.

On the other hand, economic understanding may be the most vital factor in shaping economic attitudes and opinions. Therefore, if a teacher is concerned with developing more positive attitudes towards the subject of economics, economic institutions, or issues, one effective strategy would be to increase students' economic knowledge. Should this be true, parents, school districts, states, and/or university departments of economics that want to shape economic attitudes and opinions must
consider recommending or requiring early economics instruction for students as a means of achieving that (economic knowledge) objective.

Class Size

The influence of class size on academic achievement has substantive policy implications, but despite many empirical studies, is not a settled issue. Existing evidence related to class size in economic education is sparse and somewhat equivocal; there is a need for more empirical results of cost-benefit analyses of class size learning determinants. The influence of class size on student achievement and attitude has been a research issue in education for many years. According to McKeachnie (1986), it is probably the first problem of university teaching to which research was directed. McKeachnie summarizes the theory linking learning to class size, as well as the relevant empirical evidence. (McKeachnie, 1986 pp. 69-71) Several points should be noted, according to McKeachnie:

- If we are concerned only with communication of knowledge, a large class may motivate an instructor to prepare better and thus produce better teaching and greater student achievement.

- There is more to learning than communication of knowledge – critical thinking, application, knowledge retention, and attitude change, for example, are important goals. An instructor usually tries to adopt a combination of teaching methods within his or her repertoire of skills, to achieve an optimal balance among these. A large class creates logistical problems that reduce an instructor’s ability to affect this optimal balance, thereby hindering learning.
• The larger the group the smaller the proportion that can participate orally, and the less likely that an individual will feel free to contribute. Because active learning is so important to learning and retention of learning, achievement may be less in larger classes.

Research universities appear to finance their relatively low teaching loads (averaging two courses per semester) through larger class sizes. Instructors at research universities teach larger classes across the introductory principles courses, with mean class size in introductory courses of one hundred sixty-two students (Becker, 1997 p. 1358), compared with average class size of forty-five – sixty-five in masters and liberal arts institutions, and thirty at associate degree-granting institutions. (Siegfried et al., 1996, p. 189), on the other hand, reports “average class size across both macro and micro is about thirty in two-year colleges, thirty-five in liberal arts colleges, forty-five in comprehensive (master’s) universities, and around sixty in research and doctoral institutions.” These are two studies were conducted a year apart by established researchers in economic education yet generated significantly different survey results.

Class size is important because it affords instructors opportunities to try different teaching methods. As Wilbert McKeachie (1990, p. 190) stated in a later review of the class size literature:

“It seems plausible that the effect of class size on learning depends on what the teacher does. . . In larger classes, faculty members typically require less written work and spend more time lecturing and less in discussion. . . Lecture tends to be at least equal to, and often more effective than, discussion for immediate recall of textual knowledge on a course examination, but discussion tends to be superior for long-term retention.”

It seems clear that the influence of class size on achievement depends or should depend on the measure of achievement. As McKeachie concluded, “that when measures
of knowledge are used, the large-class lecture method is as effective as small-class methods, but when we use measures of transfers of knowledge to new situations, retention of information, problem solving, critical thinking, attitude change, or motivation, small-class discussion methods are favored."

In their previously noted study on course sequencing, Lopus and Maxwell (1995) also reported a significantly positive relationship between achievements and lower class size. In another study on class size, Kennedy and Siegfried (1997) used a methodology which differed from Lopus and Maxwell in several ways. Lopus employed observations on individual students, whereas Kennedy used class-average observations. Lopus used the number of students writing the post-test as their measure of class size – a measure Kennedy found deficient. Lopus used GPAs as their control for student ability, a measure Kennedy found insufficiently comparable across institutions to be employed reliably. Nevertheless, both studies found learning achievement improved in smaller class sizes.

Class size also is thought to affect attitudes negatively, thereby affecting achievement negatively. In survey articles by Siegfried and Fels (1979) and Siegfried and Walstad (1990), both studies show that students do not like large classes. However, a close look at these papers reveals that the studies do not offer strong evidence that students are actually happier in smaller classes as Siegfried and Fels (1979 p. 938) maintain.

The literature on the influence of class size on achievement by students and the rating of teachers, as originally surveyed by Feldman (1984) and many others (Kennedy and Siegfried, 1997; Robb and Robb, 1999; Siegfried and Kennedy, 1995; Siegfried and
Saunders, 1996; Becker, W., 1997; and Becker, W. and Watts, M., 1995), is instructive. The influence of class size on teacher ratings by students is non-linear, weakly negative at first, but then becoming positive after a class size of about fifty. For purposes of standardization, this thesis defines a “large” class as more than fifty students. Several reasons have been offered by the above authors stating why this positive relationship might emerge, all of which have implications for interpreting any empirical results linking class size with achievement. These include:

- Better teachers may be assigned to larger classes, particularly very large classes.
- Teachers may be more motivated when teaching a large class, particularly a very large class.
- Students may be drawn to a good instructor and thereby increase class size; therefore, class size may be endogenous.
- At some point an instructor may change his/her teaching techniques to one more suitable for a large class; there may be an intermediate stage during which a more appropriate teaching technique is employed, inhibiting learning.

Kennedy and Siegfried (1997) measured student achievement results in sixty-nine economics classes at fifty-three universities around the United States. Class sizes in the survey institutions ranged from 14 to 109. Students were given the TUCE multiple-choice pre- and post-test as a measurement device of their course achievement. Kennedy and Siegfried arrived at the conclusion that larger class size does not reduce learning in principles of economics. They detailed a number of reasons that support their conclusion. First, unlike many previous studies, this was not a one-institution study;
several institutions (53) of different types were represented in the data. Class size was fairly evenly distributed across a wide range, from 14 to 109 students in a class. Compared to most previous research in economic education based on cross-sectional data, their $R^2$s were quite high. $R^2$ is a statistical measure indicating a "goodness of fit" whereby error terms are minimized. Finally their conclusion was remarkably robust to a variety of different specifications. As convinced of their results as Kennedy and Siegfried were, a caveat is important. There are many factors over which instructors or department chairs have control yet do not influence achievement on a test like the multiple-choice TUCE. Notwithstanding large classes, instructors cannot influence learning through lecturing less, assigning more homework, administering more quizzes, placing more importance on multiple-choice questions, or inspiring students to study more hours. Further, department chairs cannot on their own improve learning by assigning better-rated, more-experienced, or tenured/tenure track instructors by reducing the class size or by imposing calculus or prior economics prerequisites. Kennedy and Siegfried (1997), although confident of these survey results, also conclude that testing student achievement with a nationally normed multiple-choice examination probably does not prove the point one way or the other.

Instructor-Related Learning Dimensions

Teacher Education

During the 1990s, there has been some renewed interest in and criticism of the quality of undergraduate economics instruction. Many colleges and universities have responded by placing more emphasis on teaching, and faculty are under increasing
pressure to improve their teaching performance. Economics departments are particularly concerned about enrollment trends and recognize that effective teaching stimulates student interest and willingness to major in a subject. (Siegfried, 1996)

To economists and others, it should not be surprising that there is room for improvement in college teaching. Graduate programs emphasize development of advanced knowledge and research skills. Few programs provide much if any teacher education for instructors. However, because teaching is a basic responsibility of most economics faculty in higher education, the Committee on Economic Education (CEE) of the American Economic Association and the National Council on Economic Education (NCEE) created the Teacher Training Program (TTP) for college and university economics faculty. According to the literature, there is only one national program designed specifically to help economists move from employing the lecture mode (exclusively) to incorporating alternative teaching methods. However the TTP, offered by the AEA is sponsored only periodically. The program which was created in 1991 evolved into six workshops conducted between 1992 and 1994. According to William Becker (1997), with only a few hundred economists participating in those occasional program offerings, “it’s going to take a long time to acquaint a noticeable fraction of the AEA members with alternative teaching methods via this program. “

In a study by White (1997) seventy-five university departments of economics responded to a survey request asking about their departments' efforts to assess the teaching effectiveness of their faculty. Of the 75 respondents, 20 departments mentioned that their senior faculty conducted classroom visits and observations of junior faculty. In some instances, the visits were a regular part of junior faculty annual reviews; in others,
the visits might be conducted solely by a department chair on an "as needed" basis. In all instances, the classroom visits appeared to occur on the basis of prior notice and scheduling. Among departments that did classroom visits, the general tone of their response was one of reluctance in conducting visits. Across the spectrum of this survey, members of larger departments felt that more formal evaluation procedures were necessary, whereas smaller departments felt more comfortable with the informal arrangements. Similarly, state universities, according to their responses were more insistent on formal procedures, whereas private universities were somewhat less likely to engage in informal classroom visits. Further, inasmuch that the academic rankings of economics departments are based exclusively on research reputations, the higher ranked departments do not place much emphasis on teaching evaluation.

A majority of respondents mentioned that their faculty felt much more comfortable sitting in and commenting on the classroom performance of graduate assistants. These departments clearly saw this as part of their Ph.D. program efforts to train future members of the profession (with some incidental benefits for the graduate instructors' current students). These efforts did not generate the discomfort level that comes from "judging a colleague's teaching efforts." (White, 1995, p. 83)

Again, referencing Becker (1997) who cited White's 1995 study, speaking apparently facetiously, Becker is astounded that even for individual graduate departments running their own programs as offshoots of the AEA, the attitude appears to be that there are only "some incidental benefits for the graduate instructors' current (undergraduate) students." How the graduate student teacher's current students could be viewed as getting only "incidental benefits" sounds peculiar, it may simply be more evidence that
(instructor) undergraduate education in economics is unsatisfactory because of the poor training with the wrong signals given to graduate students and junior faculty. (Becker, 1997)

This literature review could find no credible test score or other empirical evidence in the economic education literature on the optimal way to teach graduate students and faculty members to be teachers. There is likely no better way to document future teaching potential than to provide evidence of current teaching practices and student outcomes. Given the lack of credible evidence regarding optimal teaching methods and techniques, the reader is referred again to Blinder, Becker and a few others in their insistence upon large-scale replicated surveys and analyses of both teaching methods and student learning outcomes. Multiple replication of such a core issue of how students learn vis-a-vis methods by which they are taught, perhaps at the expense of tangential research, can eventually solve this multi-faceted dilemma. That is the essence of this thesis.

The Teacher Training Program (TTP), when it sporadically occurs, consists of twenty-two hours of instruction, and has usually been held over a three-day period. Workshop sessions in the TTP have covered learning strategies, teaching methods, testing, evaluation of teaching skills, and conducting teacher seminars at home institutions. (Salemi, Saunders, and Walstad, 1996)

- Learning Strategies – this section presented an overview of what educational psychology has to say about how students learn and encouraged participants to think about specific learning outcomes as they plan teaching activities.
• Teaching Methods – four sessions in the TTP are devoted to teaching methods. A session on discussion showed participants how to write interpretive questions and use them to engage students in higher-level thinking. The TTP session on lecturing explains the advantages and disadvantages of lectures and demonstrated techniques to improve lectures. A group-work or collaborative session illustrated how group activities can be used in principles classes to produce desired learning outcomes. The writing session demonstrated how writing exercises can be used to give feedback to the instructor, the student, or to peers without requiring extra class or grading time.

• Testing – the testing sessions cover both multiple-choice and essay testing. Participants are given an overview of the relative merits of various testing strategies. In the multiple-choice session they learn how to write valid multiple-choice questions and how to analyze statistical data from multiple-choice tests. In the essay session they learn how to use essay tests to assess higher-order cognitive skills and to strengthen the ability of students to craft arguments.

• Faculty Evaluation – TTP sessions on evaluation of teaching review the major research findings on student and peer evaluation. Participants learn how to interpret data from evaluations and to identify the most important characteristics of a good teacher.

• Teaching Seminar – participants in the TTP workshops agree to present a teaching seminar for their colleagues within one year following their
participation. TTP workshop applications require the participant to provide a written commitment and further require the participants' chair to pledge support for the seminar.

Although these teaching and learning strategies appear to be worthwhile and valuable aids to furthering the teaching skills of economics instructors, the fact that they have been offered sporadically and attended poorly speaks volumes about the motivation of future, junior, and even senior economics instructors toward improving their teaching skills.

Taking a slightly different approach to the issue of teacher education, Allgood and Walstad in a recent 1999 article, focus on the education and preparation of teachers of high school economics. They found that for most teachers, the amount of coursework in economics is limited. Studies of teacher education programs at colleges and universities show that most prospective social studies teachers (the ones most likely to teach economics in high schools) take on average, about four college credit hours of coursework in economics. Only eleven states have specific requirements for coursework in economics for teacher certification. (Walstad, 1992)

Allgood and Walstad, professors at the University of Nebraska, developed a special part-time masters program for public school social studies teachers in an attempt to improve the knowledge and capability of those instructors to transfer the same to their future students. Thirty-two teachers completed the masters program at the University of Nebraska in 1996. Although all thirty-two students reported having taken some economics in college, the background data self-reported by the students suggests that most of them would benefit from more intensive instruction in economics to deepen their
understanding of the subject (because most of their credit hours in economics were taken several years earlier) and research indicates that the economic knowledge of teachers depreciates over a time. (Allgood and Walstad, 1999)

Finally, most economics departments, as uncovered in the literature, genuinely are concerned about teaching effectiveness and about ways of measuring teaching effectiveness. It appears from the literature, that departments are devoting increased time and resources to this issue – effectiveness – despite their discomfort with the assessment process and their uncertainties about the validity of the assessments. Again, as reported above, many instructors and departments feel uncomfortable with the evaluation process and especially uncomfortable with classroom visits and observations, even by senior faculty.

Instructor Methods and Styles

One goal of the typical introductory course in principles of economics is to give students an appreciation for how economists go about their trade and to expose the students to the various areas within the field. Introductory economics instructors tend to lecture, entertain a few questions from students, and give multiple-choice or short answer tests. Students who are tactile learners, who need to make connections, and who need to communicate ideas to understand them will find the content and pedagogy of economics foreign to their ways of knowing.

The content of the introductory economics course is spelled out in the syllabus and the table of contents of the introductory economics textbook. Introductory economics course syllabi look remarkably similar. Under the course title and number,
objectives, if explicit, are outlined. One objective typically included is "learning to think like an economist." Rarely are student outcomes from taking and completing a course in introductory economics mentioned in course syllabi. A list of required texts follows, along with the schedule of meeting dates and chapters to be covered on these dates. Rarely do introductory course syllabi paint an inclusive and exciting picture of what students will learn and how they will go about learning it.

A quick review of the table of contents of an introductory economics textbook reveals that microeconomics is about the determinants of supply and demand, cost curves, market structures, and the determinants of output, employment, and prices in a market economy. A cursory examination of an introductory economics textbook reveals that economists use many numbers and graphs. Students interested in historical or contextual debates or discussions find only tangential references to them.

Feiner and Morgan (1987) found that the number of times race and gender issues are mentioned are few, and when they are mentioned, they are often found in separate chapters on "women's issues" or "minority concerns." (Feiner and Morgan, 1987) Marianne Ferber (1995) found that several major trends affecting female students were ignored or minimized in current textbooks. For example, Ferber noted that fewer than half of leading introductory economics textbooks mentioned the dramatic increase in the labor force participation of women since World War II.

The classroom dynamics can also be uninviting to some students. The interactions between students and the instructor are often limited. Introductory economics appears to be taught in similar ways at both large research institutions and at small liberal-arts colleges. Hall and Sandler (1982), referenced above, observe that
instructors allow male students to talk more than female students and allow male students to interrupt female students. Female students’ questions are taken less seriously or ignored. Male students are coached more and asked to develop their answers. Instructors make less eye contact with female students than with male students. Students of color face similar obstacles. Fassinger (1995), mentioned above, also reviews statistical studies that confirm many of Hall and Sandlers’ observations. (Bartlett, 1995)

The manner in which economics has been and continues to be taught to undergraduates is documented in national surveys. (Becker and Watts, 1996; Siegfried et al., 1996; Benzing and Christ, 1997) The 625 respondents to the Becker and Watts survey are typical, showing the representative U.S. undergraduate economics teacher to be a male (83%) Caucasian (89%) with a Ph.D. degree (86%). At research universities, the teaching load averages two courses per semester, whereas it is three courses per semester at doctoral, master’s, and liberal arts institutions, and five courses per semester at associate degree-granting institutions. (Becker, 1997)

Cooperative learning techniques in which students work together in the classroom noticeably are absent in all economics courses at research universities where the largest classes tend to be located. Not much is written on the use of computers in the teaching of economics. Computer labs are used notably only in the teaching of statistics and econometrics. Whether this lack of newer instructional methods is primarily due to low instructor demand or inadequate facility support by the institutions is unknown. Regardless of the reason, it is consistent with a passive learning environment that does not engage students. In contrast, class discussion and other forms of active learning
without extensive lecturing, are now the most prominent forms of instruction used across the rest of university higher education. (Sax et al., 1996)

The National Council on Economic Education (NCEE), together with the American Economic Association’s (AEA) Committee on Economic Education, has been sponsoring programs in the 1990s to improve the teaching of economics and to promote innovative teaching methods. Becker and Watts (1995) describe many of these improvements and explain reasons for economists to use alternative teaching methods in different undergraduate courses. Although targeted at theory and field courses above the introductory level, Becker and Watts (1995) state that there is great instructional value utilizing innovative and alternative approaches to teaching economics. While the scope of this thesis is not focused on upper division approaches to teaching, the following categorical list by Becker and Watts, certainly is worth further investigation by economics instructors. Instructors would benefit from the use of:

- Classroom games, simulations, and laboratory.
- Experimental economics.
- Writing assignments in economics lower division courses.
- Economics integrated with literature and drama.
- Popular and business press.
- Case studies in undergraduate economics classes.
- Cooperative learning techniques.

Although Becker and Watts described the above categories in great detail in 1995, in the following year (1996), they conducted a national survey on what instructors of economics actually were doing in the classroom. Becker and Watts sent 3,047 surveys
and received responses from 625 or 20.5 percent of the professors listed in the AEA. Unfortunately, there is no way to establish whether respondents were representative of all U.S. undergraduate economics teachers, therefore the results are likely not generalizable. Becker and Watts believed that those instructors with greater interest in teaching were more likely to complete the questionnaire and return it in the prepaid envelope provided. Likely selection bias reinforced their basic conclusion that, as a group, college economics instructors rarely use innovative teaching techniques.

The Becker and Watts survey consisted of three parts. In Part I of the survey, respondents provided information on (1) classroom presentation styles (lecturing and using the chalkboard, overhead projectors, computers, VCRs, television programs, slides and audio cassettes, team-teaching, or guest lectures); (2) assignments involving other classroom activities or teaching examples (computer labs, classroom experiments, games and simulations, small group projects, studies of the lives or work of prominent economists, and references to sports or to literature, drama and music); (3) assignments involving print materials (textbooks, workbooks, instructor-developed class notes and problem sets, press readings, or readings from academic articles or books); (4) assignments to conduct data-based searched (through library holdings, internet searches, CD-ROMs, or computer disks); and (5) assignments to conduct literature searches of published books and articles or working papers. (Becker and Watts, 1996)

In Part II Becker and Watts asked about testing and grading methods; and then they determined what percentages of course grades were assigned on the basis of multiple-choice questions, short-answer questions, essay questions, writing assignments (disaggregated into categories for term papers, shorter papers, homework/problem sets,
and other written assignments), oral presentations, performance in classroom simulations or experiments, and other assignments. Finally, they asked how important different levels of mathematics were in each type of course. (Becker and Watts, 1996)

In Part III of the Becker and Watts survey, they asked for background information on individual respondents, their schools, and their departments. This included questions on an individuals' gender, education, academic rank, years of teaching experience, allocation of effort between teaching and other activities, and recent publication experience. (Becker and Watts, 1996)

Results of the Survey

Some of the Becker and Watts results indicate that the median amount of time spent lecturing in all the courses at all of the institutions was 83%. Ironically, 83% is also the median amount of time respondents in all types of institutions used the chalkboard for writing text and graphs. The use of overhead projectors has been increasing during the decade of the 1990s. This is true especially in principles classes. Part of this usage is due undoubtedly to the preparation and supply of transparencies provided by introductory textbook publishers. Publishers have been providing more and better quality transparencies for principles courses than for upper-division theory and field courses. Another area of surprisingly limited use is that of higher technology (computers, television, VCR's, tapes, slides etc.). On the Becker and Watts national survey of usage in principles courses, the mean response for usage of such technological learning aids was only 6.2 percent. Another teaching practice to note about methods used in introductory principles courses is that, despite recent attention given to cooperative
teaching and learning methods, whatever use is made of those techniques in the introductory principles courses; the median use of cooperative teaching and teaming (in Becker and Watts national survey), is zero for both. Another area to note in the national survey, involves the use of workbooks, study guides, and instructor-developed problem sets.

Instructors view students’ ability to make numerical calculations as important in all courses. While algebra was rated as “extremely important” by statistics and econometrics instructors, it was only “somewhat important” in principles courses.

1997 Follow-up Instructor Survey

In 1997, Benzing and Christ conducted a national survey similar to the 1996 study by Becker and Watts. Many of their results were quite similar. Dozens of instructors in the Benzing survey responded that lecture and chalkboard use were the predominant method in principles courses. Few responders, indicated a frequent use of overhead transparencies, videos, workbooks, slides or computer simulations.

Eight percent indicated that student learning styles varied; indeed, many respondents in this group said they used different methods to accommodate different learning styles. This is an indication that a small number of instructors actually are aware of current educational theory. (Benzing, and Christ, 1997)
### Table 1
Teaching Methods (Percentage of Respondents in Each Category)

<table>
<thead>
<tr>
<th>Method</th>
<th>All the time</th>
<th>Very often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>45</td>
<td>41</td>
<td>9</td>
<td>5</td>
<td>0</td>
<td>201</td>
</tr>
<tr>
<td>Class discussion</td>
<td>14</td>
<td>24</td>
<td>24</td>
<td>13</td>
<td>5</td>
<td>194</td>
</tr>
<tr>
<td>Small group activities</td>
<td>1</td>
<td>6</td>
<td>13</td>
<td>29</td>
<td>51</td>
<td>174</td>
</tr>
<tr>
<td>Blackboard</td>
<td>55</td>
<td>25</td>
<td>9</td>
<td>7</td>
<td>3</td>
<td>193</td>
</tr>
<tr>
<td>Overhead projector</td>
<td>14</td>
<td>12</td>
<td>8</td>
<td>26</td>
<td>40</td>
<td>186</td>
</tr>
<tr>
<td>Video</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>27</td>
<td>68</td>
<td>178</td>
</tr>
<tr>
<td>Textbook</td>
<td>57</td>
<td>19</td>
<td>8</td>
<td>13</td>
<td>4</td>
<td>198</td>
</tr>
<tr>
<td>Programmed instruction</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>11</td>
<td>83</td>
<td>175</td>
</tr>
<tr>
<td>Workbook with text</td>
<td>9</td>
<td>4</td>
<td>6</td>
<td>24</td>
<td>57</td>
<td>183</td>
</tr>
<tr>
<td>Self-designed handouts</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>20</td>
<td>6</td>
<td>194</td>
</tr>
<tr>
<td>Current periodicals</td>
<td>11</td>
<td>2</td>
<td>25</td>
<td>31</td>
<td>13</td>
<td>192</td>
</tr>
<tr>
<td>Guest speakers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>33</td>
<td>62</td>
<td>182</td>
</tr>
<tr>
<td>Pictures/slides</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>8</td>
<td>91</td>
<td>181</td>
</tr>
<tr>
<td>Computer simulation</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>16</td>
<td>73</td>
<td>180</td>
</tr>
</tbody>
</table>


Apathetic students, illiterate graduates, incompetent teaching, impersonal campuses are all criticisms of higher education. After years of studies and reports, state boards of education and regents/trustees of state university systems are beginning to understand the concerns. Chickering and Damson offer seven principles for good practice and teaching principles of economics and/or other social sciences.

**Good practice:**

- encourages contacts between students and faculty.
- develops reciprocity and cooperation among students.
- uses active learning techniques.
- gives prompt feedback.
• emphasizes time on task.

• communicates high expectations.

• respects diverse talents and ways of learning.

Each of the good practice principles can be elaborated upon extensively. There will be more commentary on many of these principles of good teaching practice in following chapters.

Other Instructional Surveys and Evaluations

Economics majors have declined and enrollments in economics courses have stabilized in the 1990s only by the affiliation and requirements of college business schools. Some faculty and departments of economics affiliated with business schools have felt increasing pressure to please their students by making their courses more "student-friendly." Some teaching experts claim that faculty can achieve this goal of replacing traditional lecture methods with actual teaching techniques such as group assignments and discussions. Advocates of active teaching claim that it improves both the performance and the satisfaction of students. (Salemi, Saunders, and Walstad, 1996; Saunders and Walstad, 1990)

Michael Leeds et al. (1998), in studying these assumptions regarding active teaching found that the use of more active strategies may be misguided and that students prefer, and learn more in, classes conducted in the standard lecture format. Leeds' conclusion is that departments of economics should not expect to improve the performance and satisfaction of their students simply by incorporating active teaching techniques. (Leeds, Stull and Westbrook, 1998)
Leeds began his contrarian study by assuming that students receive utility from a course as an "investment good," that can help increase their future earnings, or as a "consumption good," that provides student pleasure. In both cases, the utility that students gain from a course will be directly related to how much they feel they have learned from it. Leeds felt that even though students may want to increase their future earnings, and perhaps even enjoy the courses they take, they specifically do not want to sacrifice their leisure time. Given the amount of consumption or investment value they receive, some students seem to get less utility, and thus give lower SETs – Student Evaluation of Teachers – for courses that require more time. Instructors can affect what students learn and how much they enjoy the course by their choice of teaching techniques. Nevertheless, there are factors that even the instructors cannot directly manage. For example, students may have difficulty relating to minority, female, or foreign-born instructors and give lower SETs as a result.

Leeds et al. found that teaching strategies had very little impact on SETs. Instead SETs apparently were based on unchangeable characteristics of the instructor in the class. The major exception to this rule is the extremely strong impact of perceived learning. Leeds et al. found in their results that, all else being equal, students preferred male, native-born instructors. Instructors' SETs scores fell with age until instructors reached fifty-four at which point the SETs began to turn upward. Part-time instructors consistently had lower SETs.

Perceived learning had the greatest and most statistically significant impact of any variable. Students clearly rewarded instructors when they felt they learned a great deal in the introductory principles class. As students wanted to learn, the negative coefficient on
time spent on the course, in the Leeds regression model, confirms that they still valued their leisure time. The only teaching techniques that had discernible impact on SETs were the traditional lecture format and stopping the lecture frequently to be sure that students were following it.

Saunders and Powers (1995), investigating methods of increasing student learning, utilized a pre- and post-test scenario and used the microeconomics TUCE exam as the instrument. The TUCE micro exam contains five broad content categories. These categories are:

1. The Basic Economic Problem (scarcity, opportunity cost, economic efficiency); four questions.
2. Markets and the Price Mechanism (basic supply and demand analysis including price elasticity, marginal utility), seven questions.
3. Cost, Revenue, Profits Maximization, and Market Structure (marginal analysis, fixed cost, monopoly and competition), six questions.
5. Income Distribution and Government Redistribution Policies (factor markets and effects of taxes, transfers, subsidies), six questions.

Saunders and Powers' results suggest that while many students come into introductory micro courses with little prior knowledge of content, many of them increase their understanding significantly, but even more students do not. Results of Saunders' studies indicated that many students performed well on the third category (cost, revenue,
profit maximization, and market structure). Saunders and Powers’ results indicate and suggest that students learning in introductory microeconomics, as measured by the micro TUCE, may be increased by switching some instructional efforts from the fifth category (income distribution and government redistribution policies) to the third category mentioned above (cost, revenue, profit maximization, and market structures). This was a "positive" finding not a "normative" recommendation. In their summary, they indicate that their findings should be considered as exploratory.

As stated at the beginning of this chapter, economists and educators are producing a relatively large quantity of scholarly articles each year on economic education. Since they were judged worthy of publication, most of these journal articles did have something to say about one aspect or another of economic education. However, as Blinder, William Becker, and several others have pointed out repeatedly, there is not yet enough replication of major important topics in the literature. Furthermore, in the beginning and observed throughout this literature review, although there are literally dozens of issues that touch upon instruction in economics principles courses, they are, in their attempt to be unique publications, rarely hitting on the basic concepts that are important to achieving increased learning outcomes. Because of the absence of reputable, replicative, scholarly studies regarding learning and how to increase it, the bulk of the economics establishment is being exposed to only theoretical, experimental and innovative new ideas. In and of itself, that is not unworthy, however, for significant change to take place in methods that would assist students to increase their knowledge about economics, more researchers need to update earlier large scale surveys. More researchers should expend the human capital needed to expand and deepen the stock of
knowledge regarding increasing student outcomes. Whereas, it is clear that future grade K-12 teachers need more basic economics instruction in order to pass knowledge on to their students, it also is true that instructors of introductory economics courses need at least basic training in learning methodologies.

In Chapter Three, which follows, there is a description of the protocols, survey instruments, survey administration procedures, sample selection/assignment procedures, and the data collection methods. Additionally, in Chapter Three is a description of the methodology to be used for analyzing the data and generating results. The actual analysis of the results generated by pre- and post-test instruments will be discussed and explained in Chapter Four.
CHAPTER THREE

METHODOLOGY

This chapter describes the methods that were employed in setting up the design, research, and data collection for assessing the learning outcomes of students in introductory economics courses. A number of input factors had to be considered and addressed in both the conceptual and application stages of the research problem. Those factors will be discussed in greater detail later in this chapter. Initially, the idea for the project germinated after nearly four years of teaching principles courses first as an adjunct at the Community College of Southern Nevada (CCSN), and later as a graduate assistant in the Barbara Schick Center for Economic Education in the College of Business at UNLV. At UNLV, occasional teaching assignments reinforced the conceptual idea and sets of questions regarding how economics knowledge is conveyed to students in principles courses. Further, as personal experiences and observations of other faculty members increased, how economics knowledge was passed on to succeeding generations (classes) of students by various college faculty, helped to crystallize the problem statement. Paraphrasing the problem statement, "how do students actually learn economic concepts" in a principles course eventually became the research question. That question directly led to the undertaking of this thesis.
Prospectus and Project Design

A prospectus normally is required prior to commencing work on a thesis or dissertation at the graduate level. That is certainly the case in the College of Business at UNLV. Therefore a proposed research project was outlined in a prospectus and submitted to the thesis chairperson, the Department of Economics chairperson, and the various administrative personnel in the College of Business and the Graduate College. The prospectus was prepared and approved by all of the appropriate supervising individuals, which allowed the commencement of the research task. A copy of the prospectus is included in Appendix A on page 113.

The prospectus describes research that will "design, conduct, and analyze pre- and post-test data of economic content knowledge and student economic sophistication with the goal of assessing the factors that contribute to how students in introductory economics courses learn the concepts of economics." (Prospectus, Appendix A) The prospectus originally proposed that five classes of students in introductory Microeconomics from both UNLV and CCSN be given pre- and post-tests of economic content, economic sophistication, and attitudes about the economy, which would assist the researcher in evaluating and drawing conclusions about the nature and content of successful learning outcomes. The prospectus also calls for student demographic information to be collected. Student demographic profile information was gleaned from a confidential (unnamed/unsigned) background questionnaire. Information regarding the students included self-reporting responses such as age, mathematics background, college experience level (freshman/sophomore etc.), college major, work experience, and several other demographic characteristics.
When human subjects are proposed to be used in academic research experiments or projects, certain Federal regulations apply whereby approvals must be sought and granted prior to the commencement of any such research involving those human subjects. Obviously students volunteering to participate as part of the sample to be studied, qualify as human subjects under these Federal regulations. At UNLV, such research proposals fall under the purview of the Office of Sponsored Programs (OSP). A Protocol for Research was prepared and submitted to the Office of Sponsored Programs in early August 1999. Approval for this research project was granted by the OSP on August 18, 1999. The research protocol and the approval are also included in Appendix A on pages 116 and 118.

The Protocol for Research includes the essential elements of the prospectus, as well as several other necessary requirements. The Protocol describes risks that could be perceived by the students participating in this research project. The Protocol stated that there were no known risks for students participating in the project. The Protocol also described benefits attainable by the students participating in the project. The Protocol described that benefits were intangible for all participating students. The Protocol described costs required of any participant. The Protocol stated that the only cost to any student participating in the project would be the approximate forty minutes required to take both the pre- and post-tests of economic sophistication and content. There were no monetary costs associated with this project. The Protocol also required that a form be devised informing the student of the nature of the project and requiring their informed consent. A project information statement and an informed consent statement are attached with the Protocol for Research and they are also in Appendix A on pages 119 and 120.
The informed consent statement describes the project, the risks, benefits, and costs, associated with the project and requires the researcher and the student to sign the form. The informed consent form itself, bears an ascending four-digit numerical code which the students used when participating in the pre- and post-tests. Their identification only appears on the informed consent form. Only the researcher knows the student's personal identification. These have been and will be kept confidential. The only identification of the student on both the pre- and post-tests is the aforementioned four-digit ID number.

The Pre- and Post-Test Instrument

The test instruments for this research project include a pre-test and a post-test survey questionnaire. The pre-test instrument has three sections. The first section is a thirteen-question element that requests the student to indicate various demographic characteristics. Most of the characteristics have been described earlier in Chapter Two as well as in the Prospectus and Protocol sections above. The second section of the pre-test instrument is a ten-question segment requiring responses from the student, which will indicate their level of economic sophistication attitude towards economics. As described in some detail in the literature review, the questions in this part of the survey instrument were taken from the twenty-eight question nationally normed Survey on Economic Attitudes (SEA). The SEA was originally normed in May 1979 using students from one hundred and sixty-seven high school systems representing all geographic regions of the country. The SEA has been re-normed several times in its totality since its inception. As discussed in the literature review, the SEA nationally normed reliability and validity
studies indicate the ability of the SEA to detect either “attitudes towards economics as a subject” or “economic attitude sophistication” among various student populations with a high degree of certainty. (Soper and Walstad, 1983). The national SEA is divided into two sections. It includes a fourteen question “Attitude” section and a fourteen question “Sophistication” element. Given the nature of this research project, the researcher made an arbitrary decision to limit the number of questions in the proxy SEA given to students at UNLV and CCSN. The rationale for the arbitrary decision to limit the number of questions to ten, was a function of the uniqueness of this thesis project. As stated earlier, this project involves combining attitude sophistication elements with microeconomic content questions. Further, as mentioned above, there is also the thirteen-question demographic profile element. There are also thirty-five microeconomics content questions. There are a total of fifty-eight questions in the overall pre-test instrument. Given the realities of college class time parameters, combined with a short introduction and other test administration requirements, the researcher felt that ten questions relating to attitude and sophistication would be sufficient. The researcher selected ten questions and submitted them to economists on the candidate’s supervising committee. The committee judged the submitted questions as cross-sectionally representative of student attitudes and sophistication in the Southern Nevada community. The supervising committee granted their approval for the selection of the ten questions included in the survey instrument. The post-test instrument includes exactly the same ten attitude and sophistication questions as the pre-test instrument. The post-test instrument does not include the demographic profile characteristics questions.
Both the pre- and post-test survey instruments include a thirty-five question section covering a number of topics normally discussed within the span of a one semester introductory microeconomics course. The microeconomics content section includes eight questions of a generally introductory nature normally discussed at the beginning of a semester. There are four questions relating to demand and supply and elasticity. There are three questions relating to marginal utility. There are six questions relating to the costs of production. There are three questions related to perfect competition. There are three questions related to monopolies. There are four questions relating to monopolistic competition and oligopolies. There are two questions related to wages, and there are two questions related to labor and unions. All of the microeconomic content questions were selected from a test bank provided for and associated with Economics by McConnell. (McConnell and Brue, 1999) The thirty-five questions in the microeconomic content section of the test instrument had the following difficulty breakdown: easy – 10 questions, moderate – 18 questions, difficult – 7 questions. Therefore, eighty percent of the questions were of the easy to moderate variety. The pre- and post-test instrument is included in Appendix B, starting on page 121. Also included in Appendix B and following the test instrument are copies of the two scannable scoring sheets used for the pre- and post-test administration. The score sheets can be found starting on pages 132 and 133.

Sample Selection

As stated in the Prospectus and the Protocol for Research, originally five classes in microeconomics principles were to be selected for pre- and post-test administration. By the beginning of the fall 1999 semester, some problems developed with the proposed
sample selection process. At this point, it should be stated that it was never the intent of the research for this survey to be administered by random assignment. The finite number of microeconomic principles classes offered at both UNLV and CCSN precluded random assignment, given the desire to maximize the sample size. Two problems arose at the beginning of the fall 1999 semester with three ramifications. At UNLV one professor teaching two sections of microeconomics principles elected not to participate, thus reducing the number of available classes from six to four. At CCSN, the same problem arose when one professor teaching one section of microeconomics principles elected not to participate.

A second problem of a different nature arose at CCSN when a professor teaching one of the six microeconomics principles classes scheduled for the fall 1999 semester declined to participate due to a conflict of interest. The conflict involved that professor's service on the research candidate's Supervising Committee. Another problem developed at the time of the administration of pre-test during the first week of the fall 1999 semester. One instructor at CCSN decided during the verbal introduction of the purpose of the survey to disallow administering the test during class time. This instructor would allow the test to be completed only as a take home instrument. After two weeks only five students had returned the pre-test instrument. The researcher made an arbitrary decision that those results would be invalid and eliminated that class from the survey.

Table 2, which follows on the next page, shows the number of students originally taking both the pre- and post-tests by class section at both UNLV and CCSN. It also depicts the number of matched pre- and post instruments that survived following attrition and data cleanup activities that were necessary due to missing response values and/or
missing student ID codes. The reader will note that there is an entry on Table 2 for a control class. Discussion relating to the control class will follow in the succeeding section. Inspection of Table 2 does not show the true effect of attrition. On this survey attrition worked both ways. Approximately ten percent of the total post-test takers (176 students) had not taken the pre-test. Additionally, over thirty percent of the pre-test takers did not take/complete the post-test. Matching pre- and post-test takers and data cleanup issues yielded a final total of 108 accurate and complete responses to this survey.

Table 2
Pre- and Post-test Results

<table>
<thead>
<tr>
<th></th>
<th>UNLV</th>
<th>CCSN</th>
<th>Control</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nominal</td>
<td>Optimal</td>
<td>Nominal</td>
<td>Optimal</td>
</tr>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Matched / Clean Data</td>
<td>Pre</td>
</tr>
<tr>
<td>Sect. 001</td>
<td>39</td>
<td>32</td>
<td>21</td>
<td>5**</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>32</td>
<td>26</td>
<td>13</td>
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<td>3</td>
<td>49</td>
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<td>22</td>
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<tr>
<td>6</td>
<td>32</td>
<td>23</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Sub Tot.</td>
<td>165</td>
<td>131</td>
<td>86</td>
<td></td>
</tr>
</tbody>
</table>

Nominal = original test takers
Optimal = matched Pre- and Post Student Ids after attrition and data Clean-up

** Note: CCSN instructor elected not to allow test administration in-class. Test was allowed only as take-home – thus causing invalidation.

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Measurement Validity and Reliability

Once the specific concepts (variables) were established, i.e., the sophistication and microeconomic concepts that are desired to be analyzed and measured, measurement procedures must be developed. The goal is to devise operations that actually measure or indicate the concepts intended to be measured – in other words, to achieve measurement validity. In this thesis, operation(s) will indicate a procedure for identifying or indicating the value of cases on a variable. Cases represent the students as coded by their ID numbers. Variables include the cross sectional terms (with labels) upon which the cases are operating. This survey, given the preliminary estimate of the number of students in microeconomics principles classes, contains only fixed-choice questions. In this type of survey, fixed-choice questions are superior because respondents are offered explicit responses from which to choose. With fixed-choice questions, respondents have been deemed more likely to answer the questions that the researcher actually wants them to answer, thus avoiding ambiguity. Importantly, response choices should be mutually exclusive and exhaustive, so that every respondent can find one and only one choice that is correct (unless the question offers the “check all that apply” format).

To ensure that response choices were exhaustive, no questions of the above type were presented, thus eliminating ambiguity. However, ambiguity cannot be completely eliminated with certainty. That is because some questions are prone to problems due to idiosyncratic variation, which occurs when individuals’ responses vary because of their reactions to particular words or ideas in the question. Differences in respondents’ backgrounds, knowledge, and beliefs almost guarantee that some will understand the same question differently. If some respondents do not know some of the words in a
question, they will not know what the answers mean. In this survey, a serious attempt was made to reduce ambiguity in the meaning of terms and words used in the question sets. However, since the pre- and post-test instruments are testing the students' knowledge about economic concepts, it is understood that some students will have unfamiliarity with the meaning of the questions.

Indexes or scales also have been proven to be reliable over a broad range of social science surveys. Such a scale is included in the attitude sophistication section of the pre- and post-test. In this case, the objective was not to mark a student's response incorrect if they did not answer the question correctly. Rather the intent of the index/scale is to weigh the students' answers in such a way that their score on a particular question reflects a level of attitude sophistication in terms of economic concepts. On the ten-question SEA, students' scores were ranked - both pre- and post-test – on a weighted scale from 1.0 to 5.0. A score of 5.0 indicated the greatest amount of sophistication. Student responses and the means of all of the sample group will be discussed in greater detail in Chapter Four.

The issue of measurement is very important. Do the operations developed to measure the curriculum concepts actually do so – are they valid? If the researcher has weighed measurement options, carefully constructed the questions and observational procedures, the preliminary assumption could be made that the analyses should be on the right track. But there cannot be much confidence in a measure until it has been evaluated empirically for its validity.

The extent to which measures indicate what they are intended to measure can be assessed by an approach called criterion validity. Criterion validity is established when
the scores obtained on one measure (in this case the pre- and post-test instruments), can be compared accurately to those obtained with an already validated measure of the same phenomenon (the criteria). *Criterion validity* exists for the measures used in this survey, e.g. the content question sets and the attitude sophistication index, because they were drawn from previously validated and nationally normed test instruments. Existence of *criterion validity* serves to increase the confidence that the test instrument is measuring what it is intended to measure.

Reliability means that a measurement procedure yields consistent scores when the phenomenon being measured is not changing. If a measure is reliable, it is affected less by random error or chance variation, than if it is unreliable. Reliability is a prerequisite for measurement validity. We cannot really measure the results of the test instruments if the measure we are using gives inconsistent results. When researchers measure phenomenon that does not change between two points separated by an interval of time, the degree to which the two measurements yield identical values is the *test-retest reliability* of the measure. This is the exact type of reliability measurement that was used in this survey. A control group was selected to participate in the survey along with the microeconomics principles classes from UNLV and CCSN. The control group was the single section of Finance 115, an entry-level undergraduate course in Finance offered in the fall semester 1999 at UNLV. The control group students generally were of the same age and demographic characteristics as the experimental groups. Referring back to Table 2 indicates the number of students taking the pre- and post-test from the control group class. Unfortunately, as shown in Table 2, there was a low rate of successful matching of students taking both the pre- and post-test. Nevertheless, the results of the control group
students will be analyzed and reported in Chapter Four. Of interest will be not only the results of the attempt to measure the reliability, but also whether those results are statistically significant.

Notwithstanding the sample size issue in this survey, it is important to assess the reliability of the test instrument to establish its validity. In fact, because it is usually easier to assess reliability than validity, readers will see more evaluations of measurement reliability in research reports than evaluations of measurement validity. It is important to remember that a reliable measure is not necessarily a valid measure. This discrepancy is a common flaw of self-reporting test instrument measures. As an example consider the issue of a test instrument attempting to measure instances of substance abuse. The multiple questions and self-reporting indexes and/or question sets will usually be answered by most respondents in a consistent way, making the indexes reliable. However, a number of respondents will not admit to drinking or other substance abuse, even though they drink large amounts. Their answers to the questions are consistent and reliable but they are consistently misleading. As a result, some instruments based on self-reporting are reliable but invalid.

One of the most frequent causes of instrument reliability and validity failure occurs when the population study or the measurement context differs from that in previous research. Neither of those primary failure causations occurred in this project's instrument context or within the student respondents who remained a homogenous sample. Since the students were somewhat captive, and both pre-test and post-test instruments remained exactly the same, the consistency threshold for reliability has been attained in this survey. According to Russell Schutt, the test-retest reliability issue has
proved to be far better for use with standardized measures. (Schutt, 1999) It appears that the survey instruments in this project have met the criteria for reliability. Internal consistency is the empirical method used in this research project for assessing the reliability of the test instruments. Cronbach’s alpha (or coefficient alpha) is the most popular of the coefficients. It is calculated as follows:

\[
\alpha = \frac{K}{K-1} \left(1 - \frac{\sum_{i=1}^{K} s_{ii}}{\sum_{i=1}^{K} \sum_{j=1}^{K} s_{ij}}\right)
\]

where \(K\) is the number of items (questions) and \(s_{ij}\) is the estimated covariance between items \(i\) and \(j\). Note the \(s_{ii}\) is the variance (not standard deviation) of item \(i\).

If the data are standardized by subtracting the item means and dividing by the item standard deviations before the above formula is used; the result is the standardized version of Cronbach’s alpha. Algebra will show that this is equivalent to the following calculations based directly on the correlation matrix of the items:

\[
\alpha = \frac{Kr}{1 + r(K - 1)}
\]

where \(K\) is the number of items (variables) and \(r\) is the average of all the correlations among the \(K\) items.

Cronbach’s alpha has several interpretations. It is equal to the average value of alpha coefficients obtained for all possible combinations of dividing \(2K\) items into two groups of \(K\) items each and calculating the two-half tests. Also, alpha estimates the
expected correlation of one instrument with an alternative form containing the same number of items. Furthermore, alpha estimates the expected correlation between an actual test and a hypothetical test which may never be written.

Since Cronbach's alpha is a correlation, it can range between -1 and 1. In most cases it is positive, although negative values arise occasionally. What value of alpha should be achieved? As a rule, a value of at least 0.8 should be achieved for widely used instruments. An instrument's alpha value may be improved by either adding more items or by increasing the average correlation among the items.

The empirical (econometric) analysis of Cronbach's alpha test for reliability will be discussed in Chapter Four.

Sampling Issues

Neither the time nor resources were available to study the entire national population of students taking economics principles courses, this survey studied a sample, a subset of the student population. One key issue with selecting or evaluating sample components is understanding exactly what population they represent. In this case, it was deemed, possibly arbitrarily, that the students in the seven economics principles courses selected for the study were representative of typical college freshmen and sophomores taking this kind of course. The most important question to be asked at this point, when considering methods, is can the findings from this sample of the population be generalizable to the population from which the sample was selected? As has been stated, this project did not use random sampling methods in the selection of students or classes.
for participation in the survey. Therefore, it is by definition a non-probability sampling method.

There are a number of non-probability methods frequently used in social science research. The four most frequently used methods are availability sampling, quota sampling, purposive sampling, and snowball sampling. Because these methods do not use a random selection procedure, we cannot normally expect a sample selected with any of these methods to yield a representative sample. However, there are exceptions, and these methods may be used when random sampling is not possible or feasible. The nature of this survey precluded random sampling, in that the objective was to attempt to elicit responses from as many students as possible taking microeconomics principles courses during a given semester.

The four methods of non-probability mentioned above have the following characteristics:

- **Availability Sampling** – elements are selected for availability sampling because they are available or otherwise easy to find. Thus this sampling method is also known as a haphazard, accidental, or convenience sample.

- **Quota Sampling** – is intended to overcome the most obvious flaw of availability sampling – that the sample will just consist of whomever or whatever is available without any concern or its similarity to the population of interest. The distinguishing feature of a quota sample is that quotas are set to ensure that the sample represents certain characteristics in proportion to their prevalence in the population.
• Purposive Sampling – each sample element is selected for a purpose, usually because of the unique position of the sample elements. Purposive sampling may involve studying the entire population of some limited group.

• Snowball Sampling – one member of the population is identified and that person identifies others in the population who identify others, and so on. The sample thus “snowballs” in size. This technique is useful for hard-to-reach or hard-to-identify yet interconnected populations (at least some members of the population know each other).

This survey appears to represent a purposive sampling as representative of a non-probability sampling method. In purposive sampling, two key elements are important. The first element is completeness – the responses from the sample group provide an overall sense of the meaning of a concept, within the confines of the sample population. The second test is one of saturation – one gains confidence as over the span of the time from period one (pre-test) to period two (post-test), that no new learning outcomes have been generated. Adhering to these guidelines helps to ensure that a purposive sample adequately represents the issues studied.

Purposive sampling does not produce a sample that represents the entire population, but it can be exactly what is needed in a case study of a clearly defined and relatively limited group. The set of students taking microeconomics principles course classes in the fall of 1999 at UNLV and CCSN clearly do represent a limited group, such that purposive sampling can be generalized as being representative of the population of students taking principles courses.
Causation

This research seeks to identify causes by figuring out why things happen. This research attempted to determine empirically if students are improving their economic attitude sophistication and/or increasing their knowledge about economic content.

Finding causation is the goal of most social science research. Most social scientists consider a cause as an explanation for some characteristics, attitudes, or behaviors of groups or types of individuals or other entities (such as families, organizations, cities or for events). (Schutt, 1999, p. 148) A causal explanation involving a relationship between an independent variable and a dependent variable (between gender, mathematics background, or prior economic courses taken and the gain score difference between a pre- and post-test of microeconomics principles, for example) is termed a nomothetic causal explanation. Such an explanation identifies common influences on a number of cases or events.

In this survey the cases are the students, and the influences are the cross-sectional variables identified in the demographic profile, the gain score on the microeconomic content, and the Likert scale ranking on the attitude or sophistication segment of the pre- and post-test survey instrument. Nomothetic causal explanations exemplify “logico-scientific reasoning,” abstracting from concrete events to find general patterns. (Richardson, 1995) It also can be termed a variable-oriented explanation because it involves relationships between variables. The variation in the independent variable (previous economics coursework, age, etc.) cause variation in the dependent variable (the likelihood of improving the microeconomic content gain score).
Several criteria need to be considered prior to deciding whether a causal connection exists when developing internally valid statements about causal relationships. The following three criteria – empirical association, appropriate time order, and nonspuriousness – are widely accepted as the bases for identifying a nomothetic causal effect:

- **Association** – an empirical association between the independent and dependent variables is the first criterion researchers use for identifying a causal effect. Association is a necessary criterion for establishing a causal effect, but it is not sufficient.

- **Time Order** – suppose research finds in a survey that most people who have committed violent crimes have also watched a violent movie and that most people who have not committed violent crimes have not watched that same violent movie. An association exists from watching the movie and committing violent crimes. But further suppose that research reveals that the movie was released after the crimes were committed. Watching the movie could not possibly have led to the crimes. Indeed, perhaps the criminals watched the movie because their commission of violent crimes made them interested in violent movies.

This discussion points up the importance of the criterion of *time order*. To conclude that causation was involved, research must demonstrate that the cases were exposed to variation in the independent variable before variation in the dependent variable. In this thesis, the students took a pre-test as a baseline, were exposed to several independent variables related to the teaching
of economics principles, and then at the end of the semester took a post-test. These two criteria, working together, meet the threshold of both association and time order.

- **Nonspuriousness** – even when research establishes that two variables are associated and that variation in the independent variable preceded variation in the dependent variable, we cannot be sure we have identified a causal relationship between the two variables. Researchers must remind themselves of the old saying in statistics “correlation does not prove causation.” It is meant to remind researchers that an association between two variables might be caused by something else.

  Before concluding that variation in an independent variable caused variation in a dependent variable, there must be a reason to believe that the relationship is nonspurious. **Nonspuriousness** is a relationship between two variables that is not due to variation in a third variable. When this third variable, termed an extraneous variable causes the variation, it is said to have created a spurious relationship between the independent and dependent variables. The solution to this dilemma is to design the research showing what happens to the dependent variable when only the independent variable varies. Even within the confines of the college classroom, spuriousness cannot be eliminated completely as an extraneous condition. While the instructor is delivering the knowledge and content of the coursework, students (who are not in a vacuum) have easy access to other sources of information about that same content. We live in an age where information is available 24
hours a day from myriad sources. The assessment of learning outcomes in a microeconomics principles course cannot and should not ignore the value of outside information available to the student sample population.

A major concern with this type of non-experimental research such as this thesis is meeting the criterion of nonspuriousness. The problem lies with the non-random assignment of the students and the information that they receive from their instructors. It is hard to determine whether variation in the dependent variable is due to variation in one or more of the independent variables or to some other input.

To reduce the risk of spuriousness, this non-experimental research used the technique of statistical control. Statistical control is a technique used in non-experimental research to reduce the risk of spuriousness. One variable is held constant so the relationship between two or more other variables can be assessed without the influence of variation in the control variable. This technique will be used in Chapter Four in the data analysis section relating to spuriousness and the ability to determine whether there is a causal explanation for the gain in scores for students taking the pre- and post-tests over the course of one semester.

Methods of Analysis

The analysis of the data and the interpretation of the results will be reported in Chapter Four. Various statistical techniques will be used in the interpretation of the data gathered in the pre- and post-test surveys of the students in the sample. The following is a description of the statistical approaches to be used in Chapter Four.
Frequency Distributions

Frequency distributions will be prepared for the responses to the thirteen demographic profile questions to which students responded in the pre-test instrument.

Those profile questions are as follows:

1. **Age**
   a. 18 – 21
   b. 22 – 25
   c. 26 – 35
   d. 36 – 45
   e. 46 or older

2. **Gender**
   a. Male
   b. Female

3. **Number of economics courses taken in high school**
   a. None
   b. One
   c. Two
   d. Three or more

4. **Approximate GPA in high school**
   a. 2.0 - 2.3
   b. 2.4 - 2.7
   c. 2.8 - 3.3
   d. 3.4 - 4.0

5. **Number of economics courses taken in college**
   a. None
   b. One
   c. Two
   d. Three or more

6. **Approximate GPA in college**
   a. 2.0 - 2.3
   b. 2.4 - 2.7
   c. 2.8 - 3.3
   d. 3.4 - 4.0
7. College experience level
   a. Freshman
   b. Sophomore
   c. Upper division (Jr./Sr.)
   d. Graduate

8. Math background
   a. High school algebra
   b. Intermediate algebra
   c. College algebra
   d. Calculus
   e. No math background

9. Planned college major
   a. Accounting / Finance
   b. Economics
   c. Management / Marketing
   d. MIS
   e. Non-business

10. Housing
    a. Live at home with parents
    b. Dormitory
    c. Rent
    d. Own home

11. Household income
    a. Under $10,000
    b. $10,500 - 15,000
    c. $15,500 - 20,000
    d. $20,500 - 25,000
    e. Over $25,000

12. Ethnic origin
    a. Asian / Pacific Islander
    b. Black
    c. Hispanic
    d. White
    e. Other

13. Work experience
    a. None
    b. 1 - 3 Years
    c. 4 - 7 Years
    d. 8 - 11 Years
    e. 12 Years or Greater
Frequency distributions will be run on all components of the demographic characteristics of the students taking the pre- and post-test. A discussion of the various components of the frequency distributions will be included in the first analysis section of Chapter Four.

Analysis of Gain Scores

The next section of analytical interpretation will be a discussion regarding the scores on the two pre- and post-test instruments of attitude sophistication and microeconomics content. Tables will be used to display the sub-categorical breakdown of groups including the various demographic characteristics (gender, age, etc.), by layering performance scores against the range of student responses.

This actual method of analysis in Chapter Four will utilize pivot tables, wherein combinations of variables will be displayed in order to show in a descriptive way exactly how the frequency distributions combine with the results of the analysis of the gain scores. This will be the location of the Cronbach’s alpha test for reliability and correlation. While correlation does not prove causation, it will be important to see and discuss the results of these types of statistical interpretation.

Regression Models

In order to further test the significance of the knowledge gained by the students in the surveys, sets of regression equations will be run as part of the analyses. First to be considered are the two gain score dimensions -- pre- and post-test scores of the mean Likert-scale results for attitude sophistication. Next are the net gain scores from the pre-
and post-test scores in microeconomic content, as principal dependent variables, (although, either one could also be an independent variable as a predictor of the other).

The analysis will use selected responses from the demographic questionnaire as the independent variables. As a preliminary step in building and estimating the model, some *a priori* assumptions about the relative significance of some of the variables suggest the arbitrary exclusion of selected variables. Variables and their renamed labels for the regression modeling are:

1. Age - **AGE**
2. Gender - **MALE** and **FEM**
3. Prior economics courses in high school - **HSECO**
4. High school GPA - **HSGPA**
5. Prior economics courses in college - **UECO**
6. College GPA - **UGPA**
7. College experience level - **UYEAR**
8. Prior math background - **MATH**
9. Planned major - **UMAJ**
10. Housing - **HOME**
11. Household income - **INC**
12. Ethnic origin - **ETH**
13. Work experience - **WORK**
14. Pre-/post-test microeconomics gain score - **MGAIN**
15. Sophistication and Attitudes pre-/post-test gain - **SEAGAIN**
After the preliminary regressions, wherein the assumed most important variables will be tried once, the analysis will, in a second phase, settle on presumed major factors. The researcher believes that AGE, MALE/FEM, MATH, HSECO, HSGPA, UECO, and UGPA will be the more significant independent variables along with the two gain score variables of MGAIN and SEAGAIN.

The analysis will be reported in Chapter Four, which follows. The survey data have been collected, matched, cleaned-up, and readied for examination, manipulation, and interpretation. Chapter Four will describe the results of the survey by the methods described above in a multi-step process. Chapter Four will yield an assessment of whether this sample of introductory economics principles students (in two schools) actually gained some increment of knowledge, whether their attitudes changed over the course of a semester, and if there was a positive learning outcome. Chapter Five will summarize the findings and present conclusions and recommendations.
CHAPTER FOUR

DATA ANALYSIS AND RESULTS

The intent of Chapter Four is to quantitatively analyze the data collected in the pre- and post-test surveys of students in introductory microeconomics principles courses taken during the fall semester 1999. Those students were in classes at UNLV and CCSN. The numbers of students and the classes and institutions to which they belonged were described in Table 2 in Chapter Three. The research project involved the assessment of how well students learned economics concepts in introductory principles courses.

Chapter Three described how a sample population of students was exposed to pre- and post test instruments in the attempt to measure the gain in knowledge from taking a one-semester course in microeconomics. The two test instruments were culled from a nationally normed set of ten questions relating to economic attitude sophistication, as well as a representative set of test-bank questions assessing student's knowledge regarding formal economic concepts. The students in the sample took the pre-test instruments at the end of the first week of the fall semester 1999. Students in the same classrooms took the post-test instrument (with exactly the same questions), near the end of regular classroom instruction in December 1999. This chapter will discuss, analyze, and demonstrate whether the students experienced positive learning outcomes in their respective microeconomics principles classes during the fall 1999 semester. Following is
an analysis of the empirical results of all of the 108 students who successfully completed both the pre-and post-test instruments.

Frequency Distributions

In this section the thirteen demographic profile dimensions will be briefly discussed in the context of a table that will break down the components of the dimension. For example, students were asked to self-report discrete categories of personal information within the broader scope of the demographic dimension. A copy of the demographic characteristics is included in Appendix B, starting on page 141.

Table 3, which follows, shows distribution of the age characteristics of the students who participated in the pre- and post-test surveys. Given the status of principles of microeconomics as an entry-level lower division course, most of the student participants are in the 18 – 21 age bracket. Indeed, nearly two-thirds of the students are within that age bracket. Further, 84 percent of the student participants were under twenty-five. This seems intuitive, as the older survey participants were likely (college) re-entry adults returning to school after some years of employment.

Table 3

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid 18-21</td>
<td>71</td>
<td>65.7</td>
<td>65.7</td>
<td>65.7</td>
</tr>
<tr>
<td>22-25</td>
<td>20</td>
<td>18.5</td>
<td>18.5</td>
<td>84.3</td>
</tr>
<tr>
<td>26-35</td>
<td>14</td>
<td>13.0</td>
<td>13.0</td>
<td>97.2</td>
</tr>
<tr>
<td>36-45</td>
<td>3</td>
<td>2.8</td>
<td>2.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
The next demographic characteristic is the gender category that is described in Table 4 below. As shown, males comprised nearly 56 percent of the sample participants, while females represent the balance at 44.4 percent. These percentages compare consistently with other surveys described in the economic education literature relating to gender and as found in Chapter Two.

Table 4.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>60</td>
<td>55.6</td>
<td>55.6</td>
<td>55.6</td>
</tr>
<tr>
<td>Female</td>
<td>48</td>
<td>44.4</td>
<td>44.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 5 is the first of two demographic characteristics relating to prior economic coursework. Table 5 shows the student participant’s self-reported answers on the number of courses taken in high school. It is not surprising that nearly sixty-four percent of the students in the sample reported that they had never taken an economics course in high school. This response correlates with a high number of CCSN and UNLV students claiming Nevada residence. That being the case, given that economics is offered as an elective in only a few schools, there is no a priori expectation of high school economics coursework. What is surprising, however, is that thirty percent of the student respondents reported having taken one class in high school. This response requires a comment regarding the offerings of high school economics coursework in Nevada high schools. The above responses illuminate at least three significant issues. First, as mentioned
above, there are very few economics courses offered in Nevada high schools. There are only a few teachers who are certified/endorsed to teach economics in Nevada high schools. Therefore, this finding suggests that the thirty percent of the student respondents reporting having taken at least one class in high school, likely completed their high school years outside the state of Nevada.

Second, Nevada high school standards are changing. In the near future, in order to graduate, high school students in the State of Nevada will be required to pass a proficiency exam which will include a section on economics. While this is encouraging, the shortage of qualified teachers points to a relatively long implementation schedule.

Third, the students' responses point to a shortcoming in the analysis at least as far as this demographic characteristic/dimension is concerned. It is apparent that another question should have been asked regarding the state and/or regional location of the respondent's high school. As the statewide implementation of economics coursework in high schools progresses during the next few years, this appears likely to be an interesting area for future research. Correlating the long-term/longitudinal improvement in scores of future generations of economics students within higher institutions in the State of Nevada.
Table 5

<table>
<thead>
<tr>
<th>Number of economics courses taken in high school</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>69</td>
<td>63.9</td>
<td>63.9</td>
<td>63.9</td>
</tr>
<tr>
<td>One</td>
<td>33</td>
<td>30.6</td>
<td>30.6</td>
<td>94.4</td>
</tr>
<tr>
<td>Two</td>
<td>3</td>
<td>2.8</td>
<td>2.8</td>
<td>97.2</td>
</tr>
<tr>
<td>Three or more</td>
<td>3</td>
<td>2.8</td>
<td>2.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 6 shows the approximate GPA in high school as self-reported by the student participants. There was no crosscheck with CCSN or UNLV registrars for validation of these self-reported grade point averages. Slightly over 80 percent of the student respondents reported scores of at least a B- grade point average in high school.

Table 6

<table>
<thead>
<tr>
<th>Approximate GPA in High School</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0-2.3</td>
<td>3</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>2.4-2.7</td>
<td>17</td>
<td>15.7</td>
<td>15.9</td>
<td>18.7</td>
</tr>
<tr>
<td>2.8-3.3</td>
<td>39</td>
<td>36.1</td>
<td>36.4</td>
<td>55.1</td>
</tr>
<tr>
<td>3.4-4.0</td>
<td>48</td>
<td>44.4</td>
<td>44.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>99.1</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7 shows the number of self-reported economics courses previously taken in college by students in the survey. Approximately one-half of the respondents indicated...
that they had never taken a course prior to the one in which they were enrolled in fall 1999, while nearly half reported that they had taken at least one economics course prior to the current semester. Statistically, nearly another quarter of the student respondents indicated that they had taken at least two courses prior to their current class.

Table 7

<table>
<thead>
<tr>
<th>Number of economics courses in college</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>None</td>
<td>26</td>
<td>24.1</td>
<td>24.1</td>
</tr>
<tr>
<td></td>
<td>One</td>
<td>52</td>
<td>48.1</td>
<td>72.2</td>
</tr>
<tr>
<td></td>
<td>Two</td>
<td>26</td>
<td>24.1</td>
<td>96.3</td>
</tr>
<tr>
<td></td>
<td>Three or more</td>
<td>4</td>
<td>3.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 8 shows the approximate GPA in college as self-reported by the student respondents. As shown in Table 8, nearly one fourth of the respondents reported a C+ to B- range in their college GPA to date. Almost one-half of the student respondents indicated that they had a college or university GPA within the B- to B+ range. Further, slightly better than 20 percent indicated a better than B+ average in their college GPA to date.
Table 8

<table>
<thead>
<tr>
<th>Approximate GPA in college</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>2.0-2.3</td>
<td>9</td>
<td>8.3</td>
<td>8.4</td>
</tr>
<tr>
<td></td>
<td>2.4-2.7</td>
<td>25</td>
<td>23.1</td>
<td>23.4</td>
</tr>
<tr>
<td></td>
<td>2.8-3.3</td>
<td>50</td>
<td>46.3</td>
<td>46.7</td>
</tr>
<tr>
<td></td>
<td>3.4-4.0</td>
<td>23</td>
<td>21.3</td>
<td>21.5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>107</td>
<td>99.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td>1</td>
<td>.9</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>108</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 9 shows a frequency distribution of the year in college of the student respondents. Corresponding to Table 3 age characteristics above, where nearly two-thirds of the respondents were under twenty-one, Table 9 shows that ninety-eight percent of the students were upper division or lower. That further corresponds to 106 of the 108 participants.

Table 9

<table>
<thead>
<tr>
<th>College Year</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Freshman</td>
<td>10</td>
<td>9.3</td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>Sophomore</td>
<td>50</td>
<td>46.3</td>
<td>55.6</td>
</tr>
<tr>
<td></td>
<td>Upper division (Jr. / Sr.)</td>
<td>45</td>
<td>41.7</td>
<td>97.2</td>
</tr>
<tr>
<td></td>
<td>Graduate</td>
<td>3</td>
<td>2.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>108</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

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It was assumed *a priori* that Table 10, showing math background, would represent a significant factor in the assessment of learning outcomes for students in introductory principles of economics courses. Of the 108 students responding to both pre- and post-test instruments, only ten had taken high school algebra or less (no math background), level of experience. That means that approximately ninety percent of the respondents had intermediate algebra, college algebra, or calculus prior to taking economics principles. It is assumed that math background is an important determinant for success in perceptual understanding and the attainment of positive learning outcomes in economics. Later in this chapter, more analysis will be carried out with math background as a primary factor.

Table 10

<table>
<thead>
<tr>
<th>Math Background</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid High School algebra</td>
<td>8</td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
</tr>
<tr>
<td>Intermediate algebra</td>
<td>18</td>
<td>16.7</td>
<td>16.7</td>
<td>24.1</td>
</tr>
<tr>
<td>College algebra</td>
<td>50</td>
<td>46.3</td>
<td>46.3</td>
<td>70.4</td>
</tr>
<tr>
<td>Calculus</td>
<td>30</td>
<td>27.8</td>
<td>27.8</td>
<td>98.1</td>
</tr>
<tr>
<td>No math background</td>
<td>2</td>
<td>1.9</td>
<td>1.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 11 is not an empirical analysis, rather it is an indication of a planned major by a student survey respondent. Nevertheless, it is interesting to note that student respondents reported at a level of only 2.8 percent that they were planning on becoming an economics major. This fits almost congruently with the historic record of the last twenty years described in the literature review in Chapter Two. Actually, the planned
economics major response is slightly higher than the recent nationwide surveys indicate. Much more significant percentages for other majors within the college of business are represented in Table 11. Of necessity, they are enrolled in principles of microeconomics due to its inclusion as a core requirement for the college of business at UNLV. Thus, as typical in many colleges and universities, economics is largely a service department for the college of business.

Table 11

<table>
<thead>
<tr>
<th>Planned College Major</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid Accounting / Finance</td>
<td>27</td>
<td>25.0</td>
<td>25.2</td>
<td>25.2</td>
</tr>
<tr>
<td>Economics</td>
<td>3</td>
<td>2.8</td>
<td>2.8</td>
<td>28.0</td>
</tr>
<tr>
<td>Management / Marketing</td>
<td>40</td>
<td>37.0</td>
<td>37.4</td>
<td>65.4</td>
</tr>
<tr>
<td>MIS</td>
<td>20</td>
<td>18.5</td>
<td>18.7</td>
<td>84.1</td>
</tr>
<tr>
<td>Non-business</td>
<td>17</td>
<td>15.7</td>
<td>15.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>99.1</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing Missing</td>
<td>1</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A significant thirty-nine percent of the student respondents indicated that they are living at home with parents. This is not an atypical percentage given both CCSN and UNLV are often described as “commuter” colleges. However, it also fits with the age breakdown discussed above in Table 3. Younger students attending a “commuter” college have less of a need to incur the cost of living outside the home. Of course, affordability enters into the equation as well. Notwithstanding, the commuter label, fully fifty-percent of the sample group is either living in dormitory or renting (usually an apartment). About nine percent are living in homes that they either own or are buying —
a frequency that is similar to the age characteristics of adults over twenty-five returning to school. These are groups of students who have already had some employment experience and are more established than younger students with little or no working experience.

Table 12

<table>
<thead>
<tr>
<th>Housing</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live at home with parents</td>
<td>43</td>
<td>39.8</td>
<td>39.8</td>
<td>39.8</td>
</tr>
<tr>
<td>Dormitory</td>
<td>9</td>
<td>8.3</td>
<td>8.3</td>
<td>48.1</td>
</tr>
<tr>
<td>Rent</td>
<td>46</td>
<td>42.6</td>
<td>42.6</td>
<td>90.7</td>
</tr>
<tr>
<td>Own home</td>
<td>10</td>
<td>9.3</td>
<td>9.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 13 shows household income as self-reported by the survey respondents. This table shows some interesting frequencies in that fully one-half of the respondents report a household income of over $25,000, the highest bracket on the survey. These data appear to point towards a large number of full-time workers and part-time students, but this variable was not discretely researched in this analysis. However, a second possibility might exist wherein the college student is supported (via household income) by not only full-time work, but perhaps a spouse or other person. One could have an *a priori* expectation that full-time students might be responding in the lower income brackets. Nearly one quarter of the respondents indicated a household income under $10,000. There are scattered responses up to the over $25,000 category where, as mentioned above, over half of the students indicated their level of income.
Table 13

<table>
<thead>
<tr>
<th>Household Income</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid Under $10,000</td>
<td>25</td>
<td>23.1</td>
<td>23.4</td>
<td>23.4</td>
</tr>
<tr>
<td>$10,000-15,000</td>
<td>7</td>
<td>6.5</td>
<td>6.5</td>
<td>29.9</td>
</tr>
<tr>
<td>$15,500-20,000</td>
<td>10</td>
<td>9.3</td>
<td>9.3</td>
<td>39.3</td>
</tr>
<tr>
<td>$20,500-25,000</td>
<td>11</td>
<td>10.2</td>
<td>10.3</td>
<td>49.5</td>
</tr>
<tr>
<td>Over $25,000</td>
<td>54</td>
<td>50.0</td>
<td>50.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>99.1</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 14 shows the ethnic origin as reported by the student respondents. Sixty-two percent of the respondents indicated that they were White. The next highest ethnic origin category was Asian/Pacific Islander, a category reported by fifteen percent of the student respondents. Blacks and Hispanics were ordered in at the 6.5 and 9.3 percent categories respectively.

Table 14

<table>
<thead>
<tr>
<th>Ethnic Origin</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid Asian / Pacific Islander</td>
<td>16</td>
<td>14.8</td>
<td>15.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Black</td>
<td>7</td>
<td>6.5</td>
<td>6.5</td>
<td>21.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>10</td>
<td>9.3</td>
<td>9.3</td>
<td>30.8</td>
</tr>
<tr>
<td>White</td>
<td>67</td>
<td>62.0</td>
<td>62.6</td>
<td>93.5</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>6.5</td>
<td>6.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>99.1</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 15 reports the number of years of work experience for the student respondents. In this descriptive report, over twenty percent indicated that they had more than eight years of experience. This level of work experience relates to both housing and household income at the upper levels (owning one's own home and income over $25,000). Intuitively, nearly thirty percent of the respondents had one to three years of experience, which probably is representative of college students either working full or part-time during their college years.

Table 15

<table>
<thead>
<tr>
<th>Work Experience</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid None</td>
<td>8</td>
<td>7.4</td>
<td>7.4</td>
<td>7.4</td>
</tr>
<tr>
<td>1-3 years</td>
<td>32</td>
<td>29.6</td>
<td>29.6</td>
<td>37.0</td>
</tr>
<tr>
<td>4-7 years</td>
<td>44</td>
<td>40.7</td>
<td>40.7</td>
<td>77.8</td>
</tr>
<tr>
<td>8-11 years</td>
<td>15</td>
<td>13.9</td>
<td>13.9</td>
<td>91.7</td>
</tr>
<tr>
<td>12 years or greater</td>
<td>9</td>
<td>8.3</td>
<td>8.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The frequency tables shown and discussed above, report much information related to the demographic characteristics of the students taking the pre- and post-test instruments. In the section that follows many of the individual responses will be stripped away and used for further analysis in both a statistical context and a gain score context.

Empirical Analysis

In this section, a quantitative analysis of student learning outcomes will be described. Those outcomes are as a result of measuring the students' performance.
pre- and post-test instruments over the course of a one semester course in microeconomic principles. As described in Chapter Three, there is interest not only in the empirical results of the students' performances, but also in the reliability of those results. Table 16, reports the score on the Cronbach's alpha test for reliability. A reliability analysis is an important measure for determining whether or not the test instrument measures what it is designed to measure. The alpha test of reliability has a range of -1.0 to +1.0. Further, as reported in Chapter Three, an optimal score would approximate +.8 on the scale mentioned above. The alpha scores for reliability on the microeconomic content survey instrument are described in Table 16.

Table 16

Cronbach's alpha Reliability Tests

<table>
<thead>
<tr>
<th>Pre-test Microeconomics Content</th>
<th>Post-test Microeconomics Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability Coefficients</td>
<td>Reliability Coefficients</td>
</tr>
<tr>
<td>N of Cases = 108.0</td>
<td>N of Cases = 108.0</td>
</tr>
<tr>
<td>N of Items = 35</td>
<td>N of Items = 35</td>
</tr>
<tr>
<td>Alpha = .6741</td>
<td>Alpha = .7582</td>
</tr>
</tbody>
</table>

Table 17, in Appendix C, presents an overview of the results of the pre- and post-test instruments administered in this survey. Both the pre- and post-test measurements are shown, as are the gain scores for both instruments. First, examining the attitude
sophistication portion of Table 17, attention is drawn to the fact that on a percentage basis
students' attitudes regarding economics improved 7.8 percent over the course of the fall
semester. That result is shown in column 3, row 3. The attitude sophistication questions
were scored, as described earlier, in the form of a Likert scale. That range of
sophistication was established from 1.0 – 5.0. As reported earlier, the ten questions used
in this portion of the survey, were drawn from nationally normed measurement
instruments of economic attitude sophistication. The minimum score of -.31 (column 3,
row 7), indicated that some students actually experienced a decrease in economics
sophistication, or possibly they miss-marked their responses.

The second part of Table 17 shows the microeconomics content scores,
improvement in the economic knowledge attained by the students. The overall result in
column 6, row 3 (.5748) does not appear to represent a correct percentage difference
between the results exhibited in the preceding columns reporting the pre- and post-test
scores respectively. However, results shown at the bottom of column 6 documenting the
minimum and maximum scores, demonstrate that outliers dramatically affected the mean
percentage gain. The percentages were calculated from the raw scores in the original
data. A more appropriate and accurate measurement of the learning outcome gain
experienced by respondents in this survey, can be seen by observing column 6, row 4,
where the median percentage gain score is reported.

In the introduction to this thesis, the problem statement asked what are the factors
that contribute to learning economic concepts and how do they work to facilitate positive
learning outcomes? The research, data collection, and analysis regarding student pre- and
post-test scores on two separate instruments, have shown that there were differences in
the students' performance outcomes. Those differences represent learning outcomes. The percentage score differences are reported on Table 17. The null hypothesis of this thesis is that there would be no differences between the student respondents taking part in this survey and nationally normed results. The alternative hypothesis is that there would be differences. The method used to determine if there were statistically significant differences is the t-test.

Table 17A in Appendix C shows the t-distribution for the economic attitude sophistication test instrument. The calculated t-score of −4.51 allows the rejection of the null hypothesis and the acceptance of the alternative hypothesis. Therefore, the positive attitude sophistication outcomes/results are statistically significant.

Table 17B in Appendix C shows the t-distribution for the microeconomic content test instrument. The calculated t-score of −5.65 allows the rejection of the null hypothesis and the acceptance of the alternative hypothesis. Therefore the positive economic knowledge outcomes/results are statistically significant.

Table 18 in Appendix C shows the age characteristic distribution in much greater detail. Examination of Table 18 shows how the various age group categories scored on both the pre- and post-test instruments as well as the gain between the two instruments. The 18–21 year old category shows that there was approximately a nine percent increase in the attitude and sophistication scores. Further, there was approximately a sixty-seven percent increase in the learning outcome for students taking both the pre- and post content tests. As discussed above, there is an outlier effect present in the analysis of the content gain scores. Table 18 and the six tables that follow serve to identify where some of those effects are taking place. Recalling that Table 17 shows that the range of gain
score means ran from -.76 to +6.33, the mean scores have the potential for a wide variance and thus deviation. The standard deviation for the entire 18 – 21 age group for MGAIN is 1.28 which is larger than the total for the entire age characteristic in the sample population. Intuitively the younger students, lacking lifetime experience, possess the potential for a wider range of score outcome and consequent learning outcomes.

Table 19 in Appendix C reports the differences in gain scores between males and females. The results of the gender outcomes possess potential for great interest due to the relatively large analysis component in the economic education literature. According to the literature, females are scoring several points (at the mean) lower than their male student colleagues, on nationally normed content instruments. Those gender results empirically show that females have been scoring less than males on economics principles multiple-choice tests for at least twenty years. It does not appear to be the case on this survey. While males scored approximately three percent higher than females on the economics sophistication test instrument, in the aggregate that is not true for the gain score on the microeconomic content test instrument. Indeed, at the mean, females outscored the males eighty-two to thirty-eight percent on the content test instrument. However, again one must look at the possible outlier effect affecting, in this case, especially the female segment. The standard deviation for the female scores is 1.42, whereas it is .72 for the males.

Table 20 in Appendix C reports the statistics on the students' responses as to the number of economics courses taken in high school prior to entering college. As described above in the frequency table section, it is not particularly surprising that approximately sixty-nine percent of the students had taken no economics courses prior to
their college experience. What was somewhat surprising was that thirty percent of the respondents had taken one class prior to beginning college. As discussed in the frequency distribution section, those results would be extremely rare for Nevada high school students. That is because economics courses are rarely taught at the high school level in Nevada. Therefore, respondents indicating having taken one course in high school almost certainly moved here from out of state. As stated earlier, this data presents an interesting possibility for further research given the commencement of Nevada high school economic proficiency exams at the high school level starting in the year 2002. Although the implementation statewide will require a number of years, the prospects for a long-term longitudinal study are ripe for further research.

Along with the possible background of having taken high school economics, the self-reported high school GPA was deemed a possible determinant of success by the researcher. In the literature, there have been a few studies relating overall high school performance to successful learning outcomes in principles courses in economics. That research is rather thin, and deserves greater replication. Table 21 in Appendix C shows the self-reported approximate high school grade point averages given by the test respondents. Allowing for possible "grade inflation," the higher the self-reported grade point average (GPA), the better the performance at the mean.

Table 22 in Appendix C, the number of economics courses previously taken in college, relates to Table 20, the number of courses in high school economics reported by students. Table 22 in Appendix C reports that one-quarter of the students never had taken economics at all. However, half of the students (48.1 percent) had taken at least one course prior to fall 1999. Further, another one-quarter of the respondents (24.1 percent)
self-reported taking at least two courses prior to fall 1999. The one-quarter of the
students reporting taking two previous courses generated a ninety-one percent increase in
pre- and post test scores differences at the mean. However, standard deviation was 1.7.
More consistent gain scores economic content were reported by the seventy-five percent
of the respondents with an increase in content knowledge of approximately forty-three
percent at the mean.

The consideration of college GPAs as a determinant for successful learning
outcomes in economics was deemed an appropriate measure for analysis in this study. In
the historical economic literature, GPAs in both high school and previous college
experience have proven to be significant. As in the earlier measure regarding high school
GPAs, college GPAs were self-reported by the student respondents and not cross-checked
for validity with the respective college registrars. Intuitively, yet conversely, those
students with the lowest reported college GPAs had the highest learning outcomes as
measured by the content gain score. Students reporting previous GPAs in the 2.0 – 2.3
range had an increase in content knowledge of 111. percent at the mean. Students with
higher GPAs reported significant gains as well, although at a lower absolute value than
those with the lowest GPAs entering the study. Table 23 appears in Appendix C.

Table 24 as shown in Appendix C reports gain scores of students with varying
amounts of math background. This variable has been examined in the economic
education literature several times during the preceding twenty years. Visually this has
been a significant variable in the assessment of student learning outcomes. In this survey,
forty-six percent of the students had taken college algebra while nearly thirty percent of
the total had previously taken calculus. Less than ten percent of the total had either no

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background or only high school algebra. The ninety percent of the students with some level of college mathematics, all scored impressive gains on the test instruments, especially on the content test instrument. Again, in examining the score measures, the outlier effect mentioned in several of the other variables also is present in the math background dimension. Nevertheless, it has been demonstrated many times in the literature that increasingly higher levels of mathematics background and experience can accurately predict performance in economics, especially at the upper-division and graduate level.

Regression Analysis

An examination of the group of pivot (data manipulation) tables, which are shown in Appendix C. demonstrates that several characteristics of a student’s background may have had an effect on an individual’s pre- and post-test performance. The frequency distributions, when stripped apart, and arrayed against the sophistication and content results, show which groups and which characteristics are learning and significant as far as outcomes are concerned. Clearly some of the characteristics and backgrounds are significant. In this section, regression equations will further test the significance of the likeliest predictors of learning outcome success.

The first model will be constructed with the following variables:

**Table 25, Regression 1**

**Independent Variables**

Age, Gender, Number of economics courses taken in high school, Approximate GPA in
high school, Number of economics courses taken in college, Approximate GPA in college, and math background.

**Dependant Variable**

SEAGAIN – the gain score on the Likert scale of economic attitude sophistication.

Table 25 shows that none of the presumed independent variables had a significant effect, although HSECON, the number of economics courses taken in high school, was the best. Most of the coefficients are negative, and those that are positive are still not significant. A second regression changes the model only marginally.

**Table 26. Regression 2**

**Independent Variables**

All of the same variables as in Regression 1, however, MGAIN, the content gain score is added in an effort to improve the model.

**Dependant Variable**

SEAGAIN

The model improves slightly, but remains largely not significant. The R-square improves from .044 to .069—hardly indicative of any good fit. The significance issue here is an interesting one. There were definite gains between the pre- and post-tests for attitude sophistication, when considering the raw scores and the percentage differences. Those can be observed by examining the pivot tables (discussed in the previous section). From the raw scores it seems apparent that there were changes in attitude sophistication, however, the positive changes on the whole do not improve to statistical significance.

The second model will be constructed with the following variables:
Table 27. Regression 3

Independent Variables

The independent variables are the same as for Regression 1.

Dependant Variable

MGAIN – the gain score on the microeconomic content instrument.

Again, the \textit{a priori} assumptions of important variables mostly are not validated. However, on this model, there are two significant variables. The effects of gender and the number of high school economics courses taken are significant. Not coincidentally, these are two of the most discussed issues in the economic education literature, and in the literature review in Chapter Two. They also had significant positive raw score differences in the pivot /frequency analysis in the preceding section. Recall that females countered the long-standing male premium in mean score differences in nationally normed test instruments. That result is validated on this regression model.

Further, other authors in the literature have examined high school preparation and experience when assessing college performance. On this measure, the respondents surpassed the historical measurement differences and are statistically significant as well. In other surveys, age and math backgrounds also were significant. In this study, both definitely were important in the mean score differences, but statistically not significant. In an effort to improve the model, the SEAGAIN results were added to the independent variables. All other variables were the same as for Regression 3.

Table 28. Regression 4

Independent Variables

Independent variables are the same as for Regression 1, however, SEAGAIN has been
added to improve the model.

**Dependent Variable**

MGAIN

In this model, gender and both of the prior economics course variables (high school and college) are positive. Math and SEAGAIN also are positive. However, only gender and prior high school experience remain significant. The R-square improves only marginally. All four of the Regression tables appear in order in Appendix C.

In this chapter, the analysis has looked at the results of the pre- and post-tests of sophistication and content in three different approaches. First frequency tables looked at distribution by sub-categories of the participant's demographic characteristics. Second, the frequency distributions were arrayed against the performance scores to establish which groups and sub-groups performed the best on either or both test instruments. Using a t-test for differences, the calculated t-scores allow the rejection of the thesis null hypothesis and the acceptance of the alternative hypothesis. This confirms the significance of the positive gain scores. Third, in a test for fit and significance, the variables were exposed to regression analysis. From the results, four variables - age, gender, prior economic coursework at some level, and previous math background - demonstrated the greatest positive raw and percentage gains in learning outcomes as measured by attitude sophistication and content instruments. And of that list, gender and previous high school economics background were the most statistically significant.

Chapter Five, which follows, will summarize the results of the empirical testing and the literature review and research. Conclusions will be drawn regarding the analysis
and recommendations will be made about the state of economic education at present in Southern Nevada.
CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

The research and analysis for this thesis focused on three principal investigations. The first research task required investigating the state of the literature regarding economic education in the United States. Second, data on the backgrounds and characteristics of typical college students were collected and analyzed. The third investigation of this thesis was on how can learning outcomes be explicitly assessed? Each of those investigations could stand alone as an individual research project. However, the task of researching and analyzing all three generated a synergistic affect on both the process and the ultimate understanding of how concepts and economics are assimilated and learned by students.

The research began with a rigorous examination of the economic education literature. The research span in time was arbitrarily limited to the years between 1980 and 2000. The works of fifty-seven authors were identified, read, and evaluated. Their works covered thirty-five separate dimensions relating to economic education. A few authors focused on basic research, while others explored tangential aspects of economic concepts, student characteristics, student performance, instructor methods, and many other sub-categories. One of the issues sparking much research in economic

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education, relates to concern over the declining numbers of economics majors in colleges and universities. Part of the research rationale for many of the cited authors, has been to gain insight into the learning of economic concepts as a possible explanation for the decline in economics majors, and consequently, economics Baccalaureate degrees. As discovered in the research and as explicitly reported in the analysis sections of this thesis, the low and declining national rates of economics majors almost exactly mirror the environment at UNLV. In this case study, however, UNLV is a few tenths of a percentage point higher than the declining national average of economics majors. Nevertheless, the numbers of economics majors at approximately two percent of all college majors, represents a significant declining trend during the second half of the twentieth century.

One of the problems in performing basic research in economic education relates to sifting through myriad research topics that do not focus on the nexus of answering any of the three basic problems addressed in this thesis. Much of the current research is germane and interesting. However, as Alan Blinder (a former Federal Reserve vice chairman), William Becker, William Walstad and a few others consistently point out, there is too much analysis being conducted that is not focused on basic research. Those economists have consistently called for more basic and replicative research into the kinds of questions asked in this thesis such as what are the optimal student characteristics? How do students learn? How can the learning outcomes be assessed?

Alan Blinder consistently calls for and writes about the need for more basic research in economic education. He and a few others state that in most research universities, as well as other doctorate and masters degree-granting colleges, the teaching
of economics content "is often an afterthought." (Blinder, 1991) Blinder and William Becker separately point a somewhat accusatory finger at the state of economic education. While the breadth of topics in the economic education literature is interesting, the heavy-lifting need is for basic research with large sample populations that replicates, improves, and advances knowledge about how students learn economics concepts. Once that is understood, vast avenues of new research topics will open up with the goal of enhancing learning outcomes. At present, most research in economic education has the tendency to put the cart in front of the horse. As William Becker points out, "if the profession does not start coming to grips with how students learn and how to better assess what they are learning, the students will not be learning and the snowball effect of declining majors in economics will continue." (Becker, 1997) Becker, only somewhat tongue-in-cheek, says that if that trend does continue, eventually departments of economics will be closing.

The many (over thirty-five) dimensions in the economic education literature that discussed learning, the gain of economic content knowledge, and the assessment of learning outcomes, were reported in Chapter Two of this thesis. Following the course of the published literature, major sub-sections of the thesis review followed the trends in academic research. Two of the more closely studied student dimensions are those of gender issues and the benefits/advantages (if any) of prior economics coursework at any level. There has been significant research relating to gender issues. On several nationally normed tests of economic understanding, females scored lower than males at the mean on both pre- and post-test instruments administered to varying populations over the past twenty years. As reported, the reasons for these results are numerous. Part of the female learning outcome shortfall has been attributed to test-taking dynamics when
multiple-choice questions were administered in principles courses or on the nationally normed instruments. In economics, females historically have under-performed males on introductory principles course multiple-choice tests. If they survived the principles courses, and moved on into upper-division or graduate work, where more short answer and essay type questions are more routinely asked, females catch up and surpass males in terms of the mean average gain. The problem for departments of economics, nationwide, is figuring out ways to convey the concepts of economics to more women at the principles level courses. The existing research points to the fact that if and/or when gender appropriate instruction starts to occur, the declining percentages of economics majors likely may be reversed.

It is not simply a question of moving to a different type of test instrument at the classroom level. Typically, young women are not strongly encouraged to take math and science at the high school level. Further, the analytical necessity for understanding concepts in economics requires a certain development in both deductive and inductive reasoning. Historically, females develop these types of skills later than young males. Therefore, part of the issue is cultural and is manifested by under-preparation in the lower grades. Other issues relating to women not performing as well (at the mean) as their male contemporaries, sometimes relate to instructor attitudes and methods. As discussed in the economic education literature, several instructor surveys that have been correlated with student surveys indicate that women often perceive an economics classroom as being a very “chilly” environment in so far as the development of a teacher/student relationship for the purpose of learning economic concepts. That is not a blanket indictment in the literature, however, it is reported with some frequency. Several authors
state that women report the classroom atmosphere as well as the multiple-choice type
testing that is normally administered, are major hurdles for women to overcome,
especially when considering improving learning outcomes.

The first major conclusion of this thesis is that work on the issues of
teacher/female student relationships needs to be undertaken as an ongoing departmental
goal in university departments of economics and high school departments of social
studies. This is not a charge leveled at the department of economics at either of the two
colleges participating in this survey. Rather, it is a valid generalized conclusion based on
an assessment of the literature and the results of the learning outcomes from the student
pre- and post-test experiences.

Another area discussed in some detail in the literature review, relates to research
conducted and the empirical results that have been generated regarding studies of prior
economics coursework by students enrolling in principles courses. It is a likely a priori
assumption that some level of high school or college economics coursework would
represent a benefit to students enrolling in college economics principles courses. As
mentioned in the literature review, there have been large studies of high school students
who, having taken economics in the secondary grades, went on to university and were
subsequently measured for performance and learning outcomes. It is valid to state that
students with prior economics coursework generally find the content of college principles
courses easier to navigate through to successful completion. Indeed, both groups of
students with high school economics or earlier college economics demonstrated positive
raw score gains as the difference between the post and pre-test examination. This is true,
as reported in Chapter Four, on both the attitude sophistication instrument as well as the
microeconomics content instrument. The raw score gains were less in the sophistication category than those in the content category. For those students with prior high school economics coursework, the gains were not only positive in a raw sense but were statistically significant in the regression model estimates. Students with prior economics coursework at the college level, experienced positive raw score gains, but the impact of the difference was not statistically significant in the regression analysis. Notwithstanding statistical significance, it is very important to note that those types of student backgrounds did generate positive results in terms of both economic attitude sophistication and content knowledge.

The second major conclusion of this thesis, therefore, is that to the extent possible prior economic coursework should be taken as early as possible in the student’s matriculation. Aiding and abetting the prior economics coursework dimension, the level of prior mathematics background, and high school/college GPA levels usually are positive indicators of success, if not statistically as significant (in this study) as taking high school economics.

Recommendations

This thesis reported on research literature on several innovative and optimal strategies for the teaching of economics concepts in principles courses. Some of those are now recommended. They include several ideas that would be relatively easy to adopt by instructors. For instance, the literature has pointed out that as technology increases, the opportunities for utilizing technology in the classroom, have increased exponentially. It is recommended that as an alternative to lecture-based instruction that videos, computer
based graphics presentations, classroom simulations, more team projects, and certainly more teacher/student interaction be used in the classroom. While it is a given that there are many quantitative facts that need to be conveyed within the syllabi constraints of economics courses, the methods of instruction need to march with new strategies and technology into the twenty-first century. Teaching strategies such as being aware of students short-term memory capacity (stopping the lecture every fifteen or twenty minutes for a catch-up), short one minute papers at the end of a class session on an important concept learned during that day’s lecture, “pair, share, and report” – a rotational exercise where everyone stops, students pair up with their neighbor to discuss a concept, and the instructor selects a few groups for a short report of that concept. These and many other strategies point to the fact that the days of “chalk and talk” as an exclusive method of presentation of economics course material are likely numbered.

There are two major recommendations that have evolved out of this research project. They follow the two major conclusions made earlier in this chapter regarding gender issues and prior economics coursework.

College and university departments of economics need to start paying more attention to female students. The lack of attention towards female students historically can be seen as one of the contributors towards the decades-long decline in the percentages of economics majors. Population numbers illustrate this issue. There are more women in the population than men as well as increasing numbers of women enrolled in college and university student populations. Women appear to be culturally unattracted to the subject of economics and historically perform less well than men on standardized multiple-choice exams normally given in principles courses. Data
generalized on several nationally conducted surveys show that classroom atmosphere in economics courses is often "chilly" towards women. Instructors pay more attention to their male students. Women find it difficult to receive individualized attention. Yet, if women make it past the lower division introductory courses, they catch up and surpass their male counterparts according to several national surveys and many refereed academic journal articles. This recommendation to regard female students more seriously is not made lightly. The test instruments used in this survey partially have been drawn from nationally normed earlier surveys. The survey meets criterion validity for measurement purposes. The survey has strongly demonstrated a positive reliability correlation on Cronbach's alpha test for reliability. Therefore, the results are generalizable, at least to student populations taking economics courses.

Universities and colleges should attempt to do their utmost to improve the teaching and learning environment for female students. This recommendation might mean that instructors of economics adopt new techniques for instructing, and interacting with female students. One of the first instruction methods to be adopted should be the use of more contemporary, alternative, and innovative teaching techniques. These should include an increased use of new strategies in the classroom. Further, a controlled study should be undertaken to assess the true differences between multiple-choice and alternative testing methods - short answer, essay etc. The point of this recommendation should be evident. The male population is declining and so are economics majors. The female population is in ascension and professors of economics need to attract and retain them. If that goal can be accomplished, as stated above, the declining majors issue will
no longer be a factor. Further research should be undertaken with the objective of
determining what exactly will attract and retain women as students in economics.

The second major recommendation of this thesis also relates to one of the major
conclusions. The conclusion about the importance of prior economics coursework merits
a specific recommendation. As noted in Chapter Four, the frequency distributions
pointed out the fact that thirty percent of the students in the survey had earlier economics
preparation. Since economics is an elective in Nevada high schools, and there are less
than five teachers statewide endorsed for teaching economics, it is likely that the thirty
percent of the respondents self-reporting earlier economics preparation, attended high
school out of state. In hindsight, a question regarding student’s high school location
should have been asked on the survey. Unfortunately it was not. Therefore, the actual
location of the respondents early preparation in economics remains unknown. However,
this positive and significant characteristic, which has been validated nationally and is
validated in this survey, is too important to ignore. Further research needs to be
undertaken in this category as well as for the gender issues. There is a unique
opportunity looming in the near future for research into this area. The Nevada
Legislature has already passed a law requiring economic competency as part of a social
studies proficiency, in order to graduate from high school. The standards for the
economics proficiency curriculum have been written. The interim legislative committee
charged with this responsibility has adopted the standards. Within the next few years,
thousands of Nevada high school students will be required to take economics at that
level. There is a tremendous research opportunity to establish a baseline and perform
longer term longitudinal research into how this early preparation translates into
successful learning outcomes as those students move on into higher education. It is a strong recommendation of this thesis that such a long-term research project be undertaken.

This research has undertaken the task of reviewing relevant economic education literature, with the aim of eventually being able to assess learning outcomes for principles economics courses. The review illuminated the appropriate variables to include in the survey for both descriptive and statistical analysis. The survey possesses validity and reliability. The empirical analysis has generated valid conclusions regarding females as a major segment of the population and important preparation criteria, both of which are significant predictors for successful learning outcomes. The further research that is recommended could elaborate on this thesis and synergistically contribute new methodologies to actually improve learning outcomes.
Assessing Learning Outcomes in
College Introductory Economics Courses

Prospectus

By
John Mundy, MA
Candidate, MA Economics

The analysis of outcomes for students taking college introductory economics courses is a topic that has increasing significance not only to the post-secondary educator community, but also for today's students who will become tomorrow's citizens and consumers. This thesis will be a research project that will design, conduct, and analyze pre- and post-test data of economic content knowledge and sophistication with the goal of assessing the factors that contribute to how students in introductory college economics courses successfully learn the concepts of economics. The thesis will be written in the Turabian style.

Specifically, it is proposed that five classes of students in introductory Microeconomics from both UNLV and CCSN be given pre and post tests of economic literacy, economic sophistication, and attitudes toward the economy to assist in evaluating and drawing conclusions about the nature and content of successful teaching methodologies. Student demographic information will also be collected. At UNLV, introductory classes typically consist of approximately 55 students each. At CCSN, the enrollment is usually smaller, averaging 30-35 students each. It is anticipated that a minimum of 100 students from CCSN will participate. At UNLV, the total will exceed 200 students. A statistical analysis will evaluate the economic literacy test data and correlate it against student demographic profile information gleaned from a confidential (unnamed/unsigned) essentially generic background questionnaire. Information regarding students will include, but not be limited to: 1) age, 2) gender, 3) math background, 4) college experience level (Fr. Soph. Etc.), 5) college major, 6) work experience, 7) whether students have taken macro/micro first. Other methodologies to be assessed will involve self-reported instructional techniques utilized by instructors to achieve their course objectives to successfully impart economic knowledge to their students. To further this project objective, an examination of teaching methods will be assessed and correlated against the student's outcomes. Categories of teaching methods will include, at a minimum, instructor use of: 1) lectures; 2) textbooks; 3) blackboard; 4) activities/classroom demonstrations; 5) classroom discussions; 6) supplemental aids such as
transparencies, PowerPoint, computer projection and video; 7) student guides and workbooks; 8) short papers, research papers, and term papers; 8) categories and types of tests/examinations, and other reported instructional methods. Data regarding teaching styles and methodologies will be gained via structured interviews and questionnaires completed by each participating instructor.

During the past thirty years, there have been a number of analyses performed under the general title of this thesis. The use of varying teaching methodologies correlated against student results has been the usual pro forma analysis task. This thesis, as outlined above, will include additional parameters. First, given what most might agree are differing student backgrounds, the overlay of student profiles is appropriate and could be important to the study. Second, the economic education literature and general societal attitudes appear to suggest that students today are less sophisticated about the state of the economy. The inclusion of these latter two categories correlated with student demographic profiles and the economic content test results represents a new approach to evaluating outcomes. The hypothesis is that the research will show that the results will be similar to earlier studies in the economics literature. The alternative hypothesis is that there will be differences—not so much between the institutions, but as a result of student demographic variables and economic sophistication.
Description of Study – A research project culminating in a thesis that will design, conduct, and analyze pre- and post-tests toward the goal of evaluating how introductory college economics courses are being taught successfully.

1. **Subjects:** It is proposed that five classes of students in introductory Microeconomics from both UNLV and CCSN be given pre and post tests of economic literacy, economics sophistication, and attitudes toward the economy to assist in evaluating and drawing conclusions about the nature and content of successful teaching methodologies. Student demographic information will also be collected. At UNLV, introductory classes typically consist of approximately 55 students each. At CCSN, the enrollment is usually smaller, averaging 30-35 students each. It is anticipated that a minimum of 100 students from CCSN will participate. At UNLV, the total will exceed 200 students. A statistical analysis will evaluate the economic literacy test data and correlate it against student demographic profile information to be gleaned from a non-confidential (unnamed/unsigned)—essentially generic background questionnaire. Information regarding students will include at a minimum: 1) age, 2) gender, 3) math background, 4) college experience level (Fr. Soph. Etc.), 5) college major, 6) work experience, 7) whether students have taken macro / micro first, and perhaps other statistically descriptive information. Other methodologies to be assessed will involve self-reported techniques utilized by instructors to achieve their outcome objectives to successfully impart economic knowledge to their students. To further this project objective, an examination of teaching methods will be assessed and correlated against the student’s outcomes. Categories of teaching methods will include at a minimum, instructor use of 1) lectures, 2) textbooks, 3) blackboard use, 4) activities / classroom demonstrations, 5) classroom discussions, 6) supplemental aids such as audio visual; transparencies; PowerPoint, computer projection and video, 7) student guides and workbooks, 8) short papers, research papers, and term papers, 8) categories and types of tests/examinations, and other reported instruction methods.

Instructor methods evaluations have been analyzed previously in the literature. However, the use of student profiles and an instrument assessing economic sophistication correlated and/or regressed against outcomes as predictors appears to be a new approach to of measuring economic understanding.
2. **Risks:** There are no perceived physical risks for the students. With their consent and participation, they will take a pre-test of economic literacy at the beginning of the Fall 99 semester and a post-test at the conclusion of the same semester. The tests will be relatively short and occupy no more than one class period.

3. **Benefits:** There are few tangible benefits to the participating students other than the knowledge that the results may improve the teaching of future groups of students taking college introductory economics courses.

4. **Costs to subjects:** There will be no financial outlay required of any participant. Each questionnaire will require approximately 40 minutes to complete.

5. **Informed consent:** A consent form has been devised and prepared following all guidelines of UNLV and CCSN. No children will be included in the project. No students from Clark County School District will be included in the project.
DATE: August 18, 1999

TO: John R. Mundy
Department of Economics
Center for Economic Education
M/S 6006

FROM: Dr. William E. Schulze, Director
Office of Sponsored Programs (X1357)

RE: Status of Human Subject Protocol Entitled:
"Assessing Successful Teaching Outcomes in College Introductory Economics Courses"

OSP #202s0899-083e

The protocol for the project referenced above has been reviewed by the Office of Sponsored Programs and it has been determined that it meets the criteria for exemption from full review by the UNLV human subjects Institutional Review Board. This protocol is approved for a period of one year from the date of this notification and work on the project may proceed.

Should the use of human subjects described in this protocol continue beyond a year from the date of this notification, it will be necessary to request an extension.

If you have any questions regarding this information, please contact Marsha Green in the Office of Sponsored Programs at 895-1357.

cc: J. Davis (ECO-6006)
OSP File
You are invited to participate in a study entitled “Assessing Successful Teaching Outcomes in College Introductory Economics Courses.” John Mundy MA, a graduate student in the Department of Economics at the University of Nevada, Las Vegas, will conduct this research study. The purpose of the study is to evaluate and draw conclusions about the nature and content of successful teaching methodologies.

John Mundy will be collecting data through the use of two questionnaires. One will be answered at the beginning of this semester’s course work in Principles of Microeconomics. The second questionnaire will be administered at the end of this semester. Responding to each questionnaire will require approximately 40-45 minutes. All data will be analyzed using a code number instead of your name. All records, results, and written documents related to this research will not reveal your name. Your privacy and confidentiality will be protected.

Although you personally may not receive any direct benefits from this study, you may indirectly benefit by the knowledge that the results may improve the teaching of future groups of students taking college introductory economics courses. You may also benefit by gaining a better understanding of your personal academic progress. This study may recommend possible changes to teaching methodologies in the instruction of introductory economics courses.

If at any time you have questions or comments about this study, you may contact John Mundy at UNLV in Room BEH 209 or by calling 895-3604. You may also contact Dr. James Davis, the faculty supervisor, at 895-3408. If you wish to leave written messages for John Mundy, including comments, questions or other information, you may do so at the Dept of Economics at UNLV in Room BEH 508 or at the Barbara Schick Center for Economic Education in Room BEH 209.

John R. Mundy
Researcher

Department of Economics
4505 Maryland Parkway * Box 448005 * Las Vegas, Nevada 89154-4005
(702) 895-3776 * FAX (702) 895-1554
I am John Mundy, a graduate student in the department of economics at the University of Nevada Las Vegas. I am requesting your participation in a research project that will be the foundation for a thesis entitled: "Assessing Learning Outcomes in College Introductory Economics Courses." The purpose of the study is to evaluate and draw conclusions about the nature and content of successful teaching methodologies.

The expected length of time of your participation is approximately 20-25 minutes, once at the beginning of the semester and again at the end of the semester.

There are no foreseeable risks involved in your participation. Although you personally may not receive any direct benefits from this study, you may indirectly benefit by the knowledge that the results may improve the teaching of future groups of students taking college introductory economics courses. You may also benefit by gaining a better understanding of your personal academic progress.

You will not be receiving any compensation for your time spent in this study. Your participation is completely voluntary. The survey is anonymous. Your answers will be kept completely confidential. All data will be analyzed using a code number instead of your name. Results will be compiled in a statistical report format.

If at any time you have questions or comments about this study, you may contact John Mundy at UNLV in Room BEH 209 or by calling 895-3904. You may also contact Dr. James Davis, the faculty supervisor, at 895-3608. If you wish to leave written messages for John Mundy, including comments, questions or other information, you may do so at the Dept. of Economics at UNLV in Room BEH 506 or at the Barbara Schick Center for Economic Education in Room BEH 209. You may also contact the UNLV Office of Sponsored Programs at 895-1357 in FDH 302.

By signing below, you are acknowledging receipt of this information and agreeing to participate. Thank you very much.

________________________________________  
Signature of Participant

________________________________________  
Signature of Researcher

________________________________________  
Name (Please Print)

________________________________________  
Date

________________________________________  
Date

Department of Economics
4505 Maryland Parkway Box 456006 Las Vegas Nevada 89154-4005
(702) 895-3776 FAX (702) 895-1354

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Assessing Learning Outcomes in
College Introductory Economics Courses

I. Demographic Information

1. Age
   a. 18 – 21
   b. 22 – 25
   c. 26 – 35
   d. 36 – 45
   e. 46 or older

2. Gender
   a. Male
   b. Female

3. Number of Economics Courses Taken in High School
   a. None
   b. One
   c. Two
   d. Three or more

4. Approximate GPA in High School
   a. 2.0 – 2.3
   b. 2.4 – 2.7
   c. 2.8 – 3.3
   d. 3.4 – 4.0

5. Number of Economics Courses Taken in College
   a. None
   b. One
   c. Two
   d. Three or more

6. Approximate GPA in College
   a. 2.0 – 2.3
   b. 2.4 – 2.7
   c. 2.8 – 3.3
   d. 3.4 – 4.0
7. College Experience Level
   a. Freshman
   b. Sophomore
   c. Upper division (Jr. / Sr.)
   d. Graduate
8. Math background
   a. High school algebra
   b. Intermediate algebra
   c. College algebra
   d. Calculus
   e. No math background
9. Planned College Major
   a. Accounting / Finance
   b. Economics
   c. Management / Marketing
   d. MIS
   e. Non-business
10. Housing
    a. Live at home with parents
    b. Dormitory
    c. Rent
    d. Own home
11. Household Income
    a. Under $10,000
    b. $10,500 - 15,000
    c. $15,500 - 20,000
    d. $20,500 - 25,000
    e. Over $25,000
12. Ethnic Origin
    a. Asian / Pacific Islander
    b. Black
    c. Hispanic
    d. White
    e. Other
13. Work Experience
    a. None
    b. 1 - 3 Years
    c. 4 - 7 Years
    d. 8 - 11
    e. 12 Years or Greater
Successful Teaching Outcomes in College Introductory Economics Courses

II. Economic Sophistication

Answer 14 – 23 by using the following criteria
a. Agree strongly
b. Agree
c. No opinion
d. Disagree
e. Disagree strongly

14. Economic choices involve only money.

15. In any economic transaction, someone wins and someone loses.

16. Competition from foreign producers harms the economy.

17. The best means of setting market prices is to let buyers and sellers pursue their own self-interest in a market free from government regulation and control.

18. Making rational choices becomes more difficult as the number of products and ways of merchandising them increase.

19. In any voluntary exchange, wealth is created.

20. Most perfectly competitive firms make more than a normal (fair) profit.

21. The consumer does not have any control in the market place.

22. The condition of scarcity – the circumstance of not-enoughness – is a new problem with which people in the U.S. must learn to contend

23. Economic profit is essentially unearned income for a business.
Successful Teaching Outcomes in
College Introductory Economics Courses

III. Basic Microeconomic Concepts

1. Which statement would best complete a short definition of economics?

   "Economics is the study of:
   A) the production and distribution of capital goods."
   B) how the economy generates incomes for people.
   C) the efficient use of scarce productive resources."
   D) how the stock market creates wealth for investors."

2. Which of the following questions is an example of a microeconomic question?

   A) What should the Federal government do to reduce the trade deficit with Japan?
   B) Will the merger of two airlines likely lead to higher ticket prices?
   C) Will the inflation rate remain relatively stable this year?
   D) What factors are contributing to the rise of unemployment in the economy?

3. Microeconomics focuses on:

   A) the workings of the whole economy or large sectors of it.
   B) The individual units that make up the whole of the economy.
   C) Issues such as unemployment and inflation.
   D) Total output and the general level of prices.

4. In every economic system, choices must be made because resources are:

   A) infinite, but human desires and wants are finite.
   B) Finite, but human desires and wants are insatiable.
   C) Unlimited, but human desires and wants are limited.
   D) Limited, and so are human wants.

5. Opportunity cost is best defined as:

   A) marginal cost minus marginal benefit.
   B) The time spent on an economic activity.
   C) The value of the best foregone alternative.
   D) The money cost of an economic decision.

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6. Other things being equal, the law of demand implies that as:
   A) the demand for CDs increases, the price will decrease.
   B) Income increases, the quantity of CDs demanded will increase.
   C) The price of CDs increases, the quantity of CDs demanded will decrease.
   D) The price of CDs increases, the quantity of CDs demanded will increase.

7. People demand more of product X when the price of product Y decreases. This means X and Y are:
   A) complements.
   B) Substitutes.
   C) Not related.
   D) Both inexpensive.

8. If the price of beef rose and the demand for chicken increased, then beef and chicken are:
   A) complementary goods.
   B) Consumer goods.
   C) Inferior goods.
   D) Substitute goods.

9. If the price elasticity of demand for a product is equal to 0.1, then a 10 percent decrease in price will:
   A) increase quantity demanded by 5 percent.
   B) Increase quantity demanded by 0.5 percent.
   C) Decrease quantity demanded by 5 percent.
   D) Decrease quantity demanded by 0.5 percent.

10. When the demand for a good is price-elastic at a given output level, it is also known that:
    A) total revenue is negative.
    B) total revenue for the good will increase if its price decreases.
    C) an increase in price will lead to an increase in total revenue for firms selling the good.
    D) a large change in price will result in a relatively small change in the quantity demanded.
11. In some markets consumers may buy many different brands of a product. Which of the statements below best represents a situation where demand for a particular brand would be very elastic?
   A) "The different brands are almost identical. I always buy the cheapest."
   B) "I use so little of that product that when I do buy it, I don't pay much attention to the price."
   C) "The brand I buy is so superior to other available brands that I hardly consider the others."
   D) "I pinch pennies in buying other products, but like most people I feel I owe it to myself to get the best brand of this product."

12. The price elasticity of demand for a textbook is estimated to be 1 no matter what the price or quantity demanded. In this case,
   A) a 10 percent increase in price will result in a 10 percent increase in the quantity demanded.
   B) a 10 percent increase in price will result in a 10 percent decrease in the quantity demanded.
   C) an increase in price will decrease the total revenue of sellers.
   D) a decrease in price will increase the total revenue of sellers.

13. Total utility is best defined by which of the following?
   A) the change in marginal utility multiplied by the price of a product
   B) the maximum amount of satisfaction from consuming a product.
   C) the total satisfaction received from consuming a particular amount of a product
   D) the additional satisfaction received from consuming one more unit of a product

14. The law of diminishing marginal utility implies that as a person consumes more and more of a given commodity:
   A) total utility will fall and then rise.
   B) average utility will become negative and then positive.
   C) marginal utility will eventually become negative.
   D) marginal utility will eventually decline.

15. Which statement is correct?
   A) When marginal utility is decreasing, an increase in the quantity consumed will decrease total utility.
   B) When marginal utility is positive, an increase in the quantity consumed will decrease total utility.
   C) When marginal utility is positive, an increase in the quantity consumed will increase total utility.
   D) When marginal utility is increasing, a decrease in the quantity consumed will increase total utility.
16. Accounting profits:
   A) are economic profits.
   B) are similar to pure economic rents.
   C) equal the difference between total revenues and explicit costs.
   D) equal the difference between total revenues and the sum of implicit and explicit costs.

17. An industry is expected to expand if firms in the industry are earning:
   A) normal profits.
   B) economic profits.
   C) accounting profits.
   D) profits that exactly cover all of the firms’ opportunity costs.

18. Economic profit is:
   A) total revenues minus fixed costs.
   B) Total revenues from sales minus the cost of materials.
   C) Total revenues minus the opportunity cost of the inputs.
   D) Gross profit minus selling and operating expenses.

19. According to the law of diminishing marginal returns, eventually:
   A) output must fall and then rise as additional units of input are employed.
   B) additional inputs will no longer generate average output.
   C) the additional output generated by additional units of an input will diminish.
   D) the additional inputs necessary to produce an additional unit of output will diminish.

20. Fixed costs are those costs which are:
   A) subject to diminishing marginal productivity.
   B) Embodied in the calculation of marginal cost.
   C) Independent of the rate of output.
   D) Implicit to a competitive firm.

21. Which would contribute most to a firm experiencing “economies of scale”?
   A) rising long-run average costs
   B) the law of diminishing marginal returns
   C) specialization of production with a firm
   D) deterioration of information and control within a firm
22. Which is a feature of a purely competitive market?
   A) price differences between firms producing the same product
   B) significant barriers to entry into the industry
   C) the industry's demand curve is perfectly elastic
   D) products are standardized or homogeneous

23. Which is a reason why there is no advertising by individual firms under pure competition?
   A) Firms produce a homogeneous product.
   B) The quantity of the product demanded is very large.
   C) The market demand curve cannot be increased.
   D) Firms do not make long-run profits.

24. A purely competitive firm is producing at the point where its marginal cost equals the price of its product. If the firm increases its output, then total revenue will:
   A) increase and profits will increase.
   B) decrease and profits will increase.
   C) increase and profits will decrease.
   D) decrease and profits will decrease.

25. Which is a barrier to entry?
   A) patents
   B) revenue maximization
   C) profit maximization
   D) elastic product demand

26. Which statement is correct?
   A) Monopolist firms tend to be more internally efficient than competitive firms because they have a single goal of profit maximization.
   B) Monopolist firms are sheltered from competitive forces and such an environment makes them subject to X-inefficiency.
   C) Monopolist firms are in industries with low barriers to entry that tend to lower the cost of producing products.
   D) Competitive firms tend to be more efficient than monopolist firms because they maximize per unit profits, not total profits.
27. Electric utilities generally charge higher prices for electricity used for illumination and lower prices for electricity used for heat. These lower prices for electric heat result primarily from:
   A) the existence of good heating substitutes
   B) economies of scale in electric heat generation
   C) prices for electric heat being set at the socially optimal level
   D) strict government regulation of the price charged for electric heat.

28. Monopolistic competition is characterized by firms:
   A) producing differentiated products
   B) making economic profits in the long run
   C) producing at optimal productive efficiency
   D) producing where price equals marginal cost

29. The demand curve faced by a monopolistically competitive firm is:
   A) vertical
   B) horizontal
   C) highly elastic
   D) highly inelastic

30. The characteristic most closely associated with oligopoly is:
   A) easy entry into the industry
   B) a few large producers
   C) product standardization
   D) no control over price

31. In a duopoly, if one firm increases its price, then the other firm can:
   A) keep its price constant and thus increase its market share
   B) keep its price constant and thus decrease its market share
   C) increase its price and thus increase its market share
   D) decrease its price and thus decrease its market share

32. Which is an explanation for the stagnation of real wage growth over the past two decades?
   A) a rising cost of capital accumulation
   B) a contraction of employment in service industries
   C) an increase in the quality of labor
   D) a slowdown in the rate of productivity growth
33. Suppose a powerful labor union negotiates a wage for its members above the equilibrium wage rate in a mostly nonunionized market. A likely result of this is that:
   A) the union will have difficulty recruiting new members
   B) union members will be able to work more overtime than before
   C) this firm will make up for the higher wage rate by expanding output
   D) not everyone who wants to work at the new wage will be able to find jobs.

34. Union workers in the United States now represent about:
   A) 16 percent of the civilian labor force
   B) 21 percent of the civilian labor force
   C) 45 percent of the civilian labor force
   D) 58 percent of the civilian labor force

35. Which type of collective-bargaining agreement requires workers to be union members prior to being considered for employment?
   A) right-to-work
   B) closed shop
   C) union shop
   D) open shop

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## Post-test: Assessing Learning Outcomes in College Introductory Economics Courses

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Table 17

Summary Variables

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a. Multiple modes exist. The smallest value is shown.
### Table 17-A

#### Paired Samples Statistics

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### Table 24

**Math Background**

<table>
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<tr>
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<th>Average of Economic Sophistication Questions: Pre Test</th>
<th>SEAGAIN</th>
<th>Microeconomics Pre Test Content Score</th>
<th>Microeconomics Post Test Content Score</th>
<th>MGAIN</th>
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Table 25

### ANOVA

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a. Predictors: (Constant), Math background, Number of economics courses in college, Age, Gender, Approximate GPA in High School, Number of economics courses taken in high school, Approximate GPA in college

b. Dependent Variable: SEAGAIN

### Model Summary

<table>
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<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
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<tr>
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a. Predictors: (Constant), Math background, Number of economics courses in college, Age, Gender, Approximate GPA in High School, Number of economics courses taken in high school, Approximate GPA in college

### Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
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<td>Std. Error</td>
</tr>
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</tbody>
</table>

a. Dependent Variable: SEAGAIN

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Table 26

**Model Summary**

<table>
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<th>Model</th>
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<th>R Square</th>
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* Predictors: (Constant), MGAIN, Approximate GPA in High School, Math background, Number of economics courses in college, Gender, Age, Approximate GPA in college, Number of economics courses taken in high school

**ANOVA**

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<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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* Predictors: (Constant), MGAIN, Approximate GPA in High School, Math background, Number of economics courses in college, Gender, Age, Approximate GPA in college, Number of economics courses taken in high school

b. Dependent Variable: SEAGAIN

**Coefficients**

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<th>Standardized Coefficients</th>
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<th>Beta</th>
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<th>Sig.</th>
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<td>.025</td>
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* Dependent Variable: SEAGAIN

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Table 27

Model Summary

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a. Predictors: (Constant), Math background, Number of economics courses in college, Gender, Age, Approximate GPA in High School, Number of economics courses taken in high school, Approximate GPA in college

ANOVA

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<th>Model</th>
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<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
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a. Predictors: (Constant), Math background, Number of economics courses in college, Gender, Age, Approximate GPA in High School, Number of economics courses taken in high school, Approximate GPA in college
b. Dependent Variable: MGAIN

Coefficients

<table>
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<th>Standardized Coefficients</th>
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a. Dependent Variable: MGAIN

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Table 28

**Model Summary**

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*a. Predictors: (Constant), SEAGAIN, Approximate GPA in college, Gender, Number of economics courses taken in high school, Math background, Approximate GPA in High School, Age, Number of economics courses in college*

**ANOVA**

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<th>Model</th>
<th>Sum of Squares</th>
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<th>Mean Square</th>
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<th>Sig.</th>
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*a. Predictors: (Constant), SEAGAIN, Approximate GPA in college, Gender, Number of economics courses taken in high school, Math background, Approximate GPA in High School, Age, Number of economics courses in college*

*b. Dependent Variable: MGAIN*

**Coefficients**

<table>
<thead>
<tr>
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*a. Dependent Variable: MGAIN*
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Miller, Delbert C., 1964, Handbook of Research Design and Social Measurement, David McKay Company, New York, NY

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VITA

John Richards Mundy
9927 Masked Duck Ave.
Las Vegas, NV
89117

Degrees:
Bachelor of Arts, Economics
California State University, Long Beach, 1996

Bachelor of Science Business Administration, Economics and Finance
University of Nevada, Las Vegas, 1996

Master of Arts, Ethics and Health Policy Studies
University of Nevada, Las Vegas, 1999

Certificate:
Stanford Executive Program – Innovation Management
Stanford University, 1991

Special Honors and Awards:
Graduate Administrative and Teaching Assistant, Associate Dean, College of
Business; UNLV 1998-2000

Commencement Award—Outstanding Master’s Graduate
UNLV President, Dr. Carol Harter—May 1999

Honors Convocation Prize: Best Master’s Thesis –1999-2000

Research Fellow, Keizai KOHO Center for Economic Affairs
Tokyo, Japan, Summer 1999

Thesis Titles:
The Failure of Altruism: Alternatives to Improve the Donor Rate in Organ
Transplantation

Assessing Learning Outcomes in Introductory College Economics Courses:
A Course Study

Publication:
“Stock Market Simulation Games as an Educational Supplement,” March, 2000,
Indiana University Press, Japan-U.S. Clearinghouse Social Sciences.