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Student attitudes and knowledge change in an introductory college economics course

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Students' attitudes towards economics as well as their knowledge of economics before and after taking a college introductory economics class is examined using standardized multiple choice economics knowledge and attitude questions. Prior knowledge of economics, having a bank account, and other biographical information are used to hold constant many factors influencing pre/post performance in an economics class. Students who gained in economics knowledge appear to have a more negative attitude towards the subject compared to students who exhibited no knowledge gained. Prior experience in or outside of high school appear to have little impact on knowledge gain or attitude though the beginning of the semester knowledge of economics is important. Results are mixed but show a clear need to improve attitudinal change of students and the pedagogical knowledge of prospective teachers.

The teaching of economics is often analyzed using student evaluations or tests to examine how much economic knowledge a student has gained during a semester with most students studying some economics in high school (Mead & Sandene, 2007; Walstad, Rebeck, & MacDonald, 2009). Often a student's attitude towards economics is neglected when examining the knowledge gained with a few exceptions (Phipps & Clark, 1993; Benedict & Hoag, 2002). As part of an ongoing effort to expand economics knowledge in the state of Georgia plus measuring attitudes of students before and after they take an economics course, a detailed quantitative analysis of my students was done in 2009. This study will serve to stimulate more research on knowledge and attitude change in economics courses to help instructors and students. Very recent work shows that high school peers matter as well in terms of knowledge gained (Clark et al., 2011) ,but how attitude is incorporated in to this mix is left for further research beyond this study. Knowledge gained and attitudes towards economics must be measured more frequently as introductory college economics classes are likely taught by professors with only modest training in economics pedagogy during graduate school (Colander & McGoldrick, 2010) and/or by the adjunct/temporary instructors that increasingly constitute most of the instructors at the introductory level. The initial college economics course takes on additional importance given that high school economics teachers usually have had only one course in economics (Walstad, 2001). Many studies also do not attempt to hold constant several important factors such as the instructor, the book used in the course and content delivered. This study limits the sample to one instructor using Mankiw's third custom edition of Brief Principles of Economics (Mankiw, 2009) over the calendar year 2009 in an attempt to look at a statistically large sample holding these factors constant.

Another influence on a student's performance in an introductory class may be their prior non-academic personal finance/savings experience as a child or young adult. With the current severe recession potentially leading to a "savings revolution" (Kristof, 2009) worldwide, prior ability to save may contribute to improved economics performance. To control for this, students in the sample were asked about their first bank account including if they were currently unbanked. A recent Federal Deposit Insurance Corporation survey (FDIC, 2009) found that 17 million adults

reside in households where no one has a checking or savings account (i.e. unbanked). Another 21 million use non-bank services such as check cashing services despite having a bank account (i.e. underbanked). Adults not using or using banks only in a limited way varies greatly by racial group – for example, the FDIC estimated 22% of African-American households are unbanked. Students were also asked to estimate the gross income of the household where they grew up as poor households are more likely to be unbanked as well leading to cash being spent on consumption that needs to be saved (Kristof, 2009). Finally, SAT scores were elicited as they are known to be strongly linked to family wealth. All factors were considered using descriptive statistics and an Ordinary Least Squares (OLS) regression commonly found in the literature. In section two we describe the method and data. In section three we discuss the results and in section four we draw some conclusions.

Survey Instrument and Method

The survey (see appendix) was given to the author's introductory economics classes during the calendar year 2009. Part one of the survey consisted of 11 biographical and prior history questions asked only at the beginning of the semester as there was no need to ask them again at the end. Part two contained 11 attitudinal questions and 17 knowledge questions drawn from the literature.   The author's introductory economics classes are a few of the many sections of introductory economics taught given that all 19,000 students at GSU were required to take the class regardless of major. The population in my classes is therefore quite diverse relative to many universities where economics is not in the required core. Most students at GSU are Georgia residents (94%) almost equally split between men (51%) and women (49%). Twenty four percent of students are African-American/Black and 66% are White with the average age being 21 (www.collegeportraits.org/GA/GSOU/characteristics). Students took the survey online at the beginning and end of the semester with the reward of a few extra credit points if they completed both the pre and post survey. Students could choose to not take the survey and get extra credit in a different way or not get any extra credit at all. The majority of students (155/284=55%) chose to complete the pre and post survey. Seven different sections of students were included in the population with 4 night classes, two summer intensive (meeting everyday) classes and one afternoon class. The enrollment in the 4 night sections was 52, 52, 44, 54 students respectively with the latter two being taught in the fall semester and the others in the spring. The afternoon section was taught in fall 2009 with 57 students. The two summer sections had 39 and 37 students respectively.

In part one, students were asked their current college rank (e.g. junior), age, race, year of high school graduation, high school GPA, SAT/ACT score, estimate of household income of student's family, subject of highest level math class taken in high school (e.g. Algebra II), state location of their high school, grade in their high school economics class, how interested their high school economics teacher was in the subject (5 point scale), and the year they first had a bank account in their own name. I added in their class grade and when they took the class. The year of their first bank account was thought to measure how well they knew personal finance at the start of the class with the understanding that many workshops on campus reveal that our incoming students do not have good personal finance knowledge.

As most students went to high school in Georgia most of the sample had taken a mandatory high school economics class. While the state mandates a curriculum for this class that is quite similar to the GSU survey of economics course, this "double dose" of economics is often not the actual experience of a student for two reasons. First, the high school economics course is sometimes dumped on a new teacher or one not interested in economics because of staffing issues and unpopularity. While a teacher's educational background, teaching experience and the class size have been shown in over a hundred studies to have little impact on student achievement (Hanushek, 1989), an inexperienced teacher can hurt student achievement (Hoxby, 2006)

especially when they do not want to teach the class at all. While my anecdotal evidence working with high school teachers suggests that some developed a bad attitude toward economics during the sole economics course they took in college, the college economics course and the grade received can be seen as a teacher input that may have little impact on whether a teacher is successful with student achievement (Buddin, 2010). Therefore we asked the students to give us their self-reported view of their high school economics instructor. Second, until recently in Georgia a teacher only needed "broad field" social studies certification to be qualified to teach the economics course. Most of these teachers focus on and want to teach history (in particular U.S. history). Very recently Georgia has changed certification with teachers now being required to be certified specifically in economics, but most current teachers are grandfathered in under the old "broad field" system. Georgia has also recently tried to strengthen personal finance/economics content with a mandatory high school End-of-Course-Test (EOCT) in economics that must count as 15% of the grade in the high school class (for details, see Swinton et al., 2007). The high school EOCT is also supported by new grade by grade economics Georgia Performance Standards (GPS) down to kindergarten. If actually implemented, the GPS would insure that students would receive some basic economics training even in elementary school, but it is too soon to measure the full impact of the new standards. It is also unclear if the new economics specific credentialing and standards will again be "teacher inputs" (Hanushek, 1989) that don't impact student achievement very much. However, as there is a substantial gap between the Georgia state mandated EOCT-economics test score and the grade received in the high school economics class that is supposed to be incorporating high school economics GPS standards (Clark, 2009), most of the sample is likely to be taking the college class after having received an inflated high school economics grade. In an environment where top college economics departments exhibit grade inflation (Bar et al., 2009) and top law schools are openly *and even retroactively* inflating their grades to "show success" to employers (Rampell, 2010), the meaningfulness of a high school GPA may be slipping, but it is nevertheless cited as a good indicator of future college success (Geiser & Santelices, 2007). We could find no study that shows causality between the high school grade and college grade, but believe it is an important factor in measuring the pre-course knowledge and attitude of the student.

Part two of the survey was administered both at the beginning and end of the semester. The attitudinal questions were developed decades ago (Soper & Walstad, 1983) to elicit how a student feels about economics regardless of their knowledge of the subject. We know that many students despite the current economic crisis perhaps sparking greater interest do not like economics for several possible reasons. First, well studied math anxiety leading to poor performance in math class (Marsh, 1990) could also impact the economics class (Benedict & Hoag, 2002). Second, a bad experience in the high school economics class could lead to a perception by the student that the required GSU economics class is their "second" economics class which is perceived as difficult because the first one was (Dynan & Rouse, 1997). Even if the student did not have a bad first course experience, if their peer group did it does impact their knowledge (Clark et al., 2011) which could also shape their attitude though this link remains to be researched. The pre-course attitude is known to be influenced by the high school economics experience and grade (Charkins et al., 1985; Wetzel et al., 1982). Georgia trained high school economics teachers tend to follow the national experience (Walstad, 2001) of taking only the mandatory high school and single GSU survey of economics classes. Given Georgia Performance Standards in economics K-12, the mandatory End-Of-Course-Test (EOCT) in economics, and K-12 teacher training workshops widely available statewide (www.gcee.org) for decades, one might assume the student would have quite a bit of basic economics knowledge before taking their college economics course. Importantly, both sets of questions used here are standardized and vetted in prior national studies to insure they measure what they are supposed to. Once a student completes both the pre and post part two of the survey, any knowledge gained and attitudinal change during the semester can be measured by subtracting the early 5 point Likert scale score from the later one. This before/after measure

constitutes the dependent variable in the regression analysis where the regressors are the biographical/prior history variables from part one of the survey.

Results

Sample Description

Taken in calendar year 2009 with a required core introductory economics class, it was not surprising that half (78) of the total sample of 155 students responding are freshman and another quarter (38) are sophomores. Similar to overall GSU student enrollment percentages, 21% of the sample self-identified as African-American and 72% (112) identify as White/Caucasian. Seventy nine percent (122) are students of ages 18, 19 or 20 years with almost all remaining students being older than 20. Corresponding to the ages, 77% (120) of the students are very recent high school graduates (2007-2009) with almost all (140=90%) matriculating from a Georgia high school. Unfortunately, there is no access to a student's state mandated economics end-of-course-test (EOCT) score. While a third of the sample (51) did not recall their grade in the high school class, of the remaining students who did most self-reported either an "A" (51=33%), "B" (40=26%) or "C" (11=7%) grade.

This distribution is quite different from their grade in the college class where only 20 (13%) got an "A", 55 (36%) a "B" and 62 (40%) a "C" grade. While only 18 (12%) students got a "D" or "F", students not responding to the survey often got low grades, so the sample is biased upwards in terms of the grade received in college. A comparison of the high school and college course grade when both are reported revealed that only 29 (19%) of the students got the same grade in high school, six (4%) got a higher grade in the college course, and the remainder all got a lower grade including a substantial number (30=19%) who dropped 2 grades or more. While there are a number of factors outside the economics course per se that could lead to the grade disparity, the skewness towards a lower grade is substantial. When asked how interested their high school economics teacher was in the subject matter, most students (86=56%) listed at least mildly interested on a 5 point scale with few students (24=16%) responding that their teacher was mildly uninterested or more. So we know the students believed their high school instructors were interested in teaching the course though we don't know the actual content of the course which was supposed to follow state guidelines like the GPS. The timing of the college course varied considerably with some students in a summer intensive four weeks day class (42=27%), some in a once a week evening class (85=55%) and much fewer in a more traditional class meeting twice a week during a regular semester (28=18%). Timing of the class has little impact on knowledge or attitudinal change.

All but 39 (25%) of the students reported having had a final math class that is beyond any math used in the introductory course. While 25 (16%) students did not identify their household income range, only 49 (32%) identified coming from households with annual income less than $60,000 a year. Most students appeared to have opened a bank account in their name only in high school with 85 (55%) respondents reporting the years 2006-2009 as the first year with a bank account. Using this response and their age, an additional descriptor variable of the first age a respondent had their bank account was also computed.

Attitudes – Descriptive Results

Attitudes are measured by both individual questions and an overall attitude index that uses all the answers to the ten attitudinal questions (Table 1). The initial attitude at the start of the semester indicated that 152 (98%) of students do not see the study of economics as a waste of time or are at least neutral about the subject. By the end of the semester, 93 (60%) students

remained with the same opinion while exactly 25 (16%) viewed studying economics as slightly more or slightly less a waste of time than at the start of the semester. There were almost no extreme changes along the scale for this question. Though almost all students have had a high school economics class, one-third were neutral on whether they used economics to analyze situations. Forty nine percent (76) did use economics, but a substantial number (25=16%) did not including two students who strongly disagreed that they use economic concepts to analyze situations. By the end of the semester, fifty one percent (79) had the same opinion, but 37 (24%) had moved away from using economics while only 28 (18%) had increased their opinion of using it. As in the first question, there were almost no extreme changes.

        Only 12% (18) thought economics had too much math in it and 34% (52) had a neutral opinion. Thirty nine percent (61) had no change in this view during the semester while virtually the same number of students slightly increased (40=26%) or decreased (39=25%) their opinion. Fourteen students exhibited an extreme change in attitude but the numbers were about equal (6 vs 8) either way. Thirty two percent (49) of the students believe that people are innately bad at math regardless of how many math classes they have with another 30 (19%) students being neutral. At the end of the semester 43 (28%) students had at least slightly increased this perception about math while 39 (25%) had lessened this perception. Only 70 (45%) students were unchanged.

        The fifth question looked at the enjoyment of reading articles about economics – a key feature of most economics textbooks including the one used. At the start of the semester, a perfect "inverse U" appears with 62 (40%) students neutral on reading articles about economics. Forty eight percent of the students (75) did not change their opinion over the semester, but 7 more expressed at least slightly more enjoyment than those who expressed at least slightly less enjoyment with few extreme changes. The sixth attitudinal question was quite blunt as it asked simply do you hate economics. Only 16 (10%) students expressed some agreement with 32 (20%) neutral. Forty eight percent (75) of responses were unchanged at the end of the semester, 48 (31%) students had moved toward greater hate and 32 (21%) toward less hate.

        Given that 90% (140) of the sample attended high school in Georgia and most (120=77%) very recently graduated, the seventh question about economics being easy to understand at the start of the semester was influenced by their recent high school experience. Some (44=28%) thought economics was not easy and another 36% (55) were neutral. Forty six percent (71) did not change this opinion over the semester, 39 (25%) students responded that economics was not as easy as at the start of the semester and 44 (28%) responding it was easier at the end of the course. Fifty two percent (80) believe economics was not dull with another 30% (46) being neutral. Forty four percent (68) did not change their opinion over the semester, while 34% (52) found economics more dull and 21% (32) less dull. Forty nine percent (76) would have been willing to attend a special lecture by a leading economist at the start of the semester with another 27% (41) neutral. Forty six percent (71) held this opinion at the end of the semester and another 32% (50) responded they would be more likely to attend that at the start of the semester. Finally, at the start of the semester, only 38 (25%) students responded that economics was a very difficult subject for them. Sixty eight (44%) of students did not change their opinion on this question, but 51 (33%) students moved towards economics being very difficult during the semester and only 37 (24%) moved the other direction. This last question is not surprising as many students likely had an economics course in high school that was easier and even had different subject matter than the author's class.

        How much a student changed their attitude overall toward economics was measured by the degree they moved up or down the Likert scale on all the attitude questions with a score of 1 if they moved from "strongly agree" to "agree" etc. Two overall indices were created. First, an index was created to measure if their attitudes had changed at all (good or bad) which is indicated by having a score different from zero. The result was a mean of near zero with a standard deviation of 3.5 indicating no attitude change. Second, an index was created to measure whether they had moved towards a more favorable view of economics by measuring an absolute value of change on the

Likert scale towards a more positive attitude (e.g. hating economics less than at the start of the semester). Initially this index had a mean of -1 which indicated a slight, but not statistically significant worsening of their attitude toward economics. However, 12 (8%) students had a very high and negative score on this index for unknown reasons that could not be examined given the small number. When these 12 negative outliers were omitted the smaller sample mean was zero indicating the course had not improved students' attitudes towards economics even though their knowledge of economics had increased substantially.

Table 1. Attitudinal Responses

1. Studying economics is a waste of time

	SD	D	N	A	SA
Start	56	75	21	1	2
End	57	70	21	3	4
Diff	1	-5	0	2	2

2. I use economics concepts to analyze situations

	SD	D	N	A	SA
Start	2	23	53	61	16
End	2	21	50	73	8
Diff	0	-2	-3	12	-8

3. Economics has too much math in it.
I prefer to take a less quantitative subject.

	SD	D	N	A	SA
Start	27	58	52	15	3
End	29	58	43	15	10
Diff	2	0	-9	0	7

4. Most people are just not good at math no matter
how many math classes they have.

	SD	D	N	A	SA
Start	28	48	30	38	11
End	20	53	35	33	14
Diff	-8	5	5	-5	3

5. I enjoy reading articles about economics topics.

	SD	D	N	A	SA
Start	10	38	62	37	8
End	13	39	47	52	4
Diff	3	1	-15	#	-4

6. I hate economics

	SD	D	N	A	SA
Start	27	80	32	12	4
End	24	69	38	17	7
Diff	-3	-11	6	5	3

7. Economics is easy to understand

	SD	D	N	A	SA
Start	11	33	55	47	9
End	19	32	44	49	11
Diff	8	-1	-11	2	2

8. Economics is dull

	SD	D	N	A	SA

Start	15	65	46	25	4
End	10	52	46	37	10
Diff	-5	-13	0	#	6

9. I would be willing to attend a special lecture by a leading economist

	SD	D	N	A	SA
Start	6	32	41	63	13
End	6	38	51	50	10
Diff	0	6	10	#	-3

10. Economics is a very difficult subject for me

	SD	D	N	A	SA
Start	13	53	51	27	11
End	13	51	38	35	18
Diff	0	-2	-13	8	7

Knowledge – Descriptive Results

Respondents answered the same eighteen TUCE (Walstad et al., 2007) economics knowledge questions at the beginning and end of the semester. Most of the sample (107=69%) improved their economics knowledge or at least remained constant (11=7%). Twenty four percent (37) registered a decrease in economic knowledge though 11 of these respondents changed by only one additional wrong answer. However, these 37 students certainly warrant additional study as to why they did not improve in the class. Across the knowledge questions, we sought to understand what the students knew at the start and whether the class changed what they knew for the 18 important economic concepts embodied in the TUCE questions. Based on the responses to each question, there was a clear divide between some questions that the students scored well on (100=65% or more students answering correctly) and other questions that the students did less well (81=52% or fewer answering correctly). Questions on prices as market signals, international trade, shifting of the demand curve, labor productivity, and GDP were concepts that fell in the latter group. At the end of the semester, all of these responses improved to near 100 or more answering correctly except the international trade question which stubbornly remained at only 75 (48%) responding correctly, just 3 students more than at the start of the semester.

The other concepts of minimum wage, opportunity cost, definition of microeconomics, definition of the FED, economic systems, definition of a factor of production, opportunity cost again, definition of money, substitute good, supply curve shift, monopoly, real vs nominal income, and comparative advantage were all correctly answered by about 100 (65%) students or more at the start of the semester. It was hoped that with these better understood concepts the course could register double digit increases in correct responses over the semester to dramatically decrease the approximately one-third of the sample that did not understand them at the start. The course successfully did this except for the concepts of minimum wage, second opportunity cost question, substitute good, monopoly, and real vs nominal income. Perhaps most surprisingly, the supply shift question actually lost correct responses by 4 students. All other concepts had at least 10 or more students answering correctly at the end of the semester. These are clearly target concepts for future teaching that need more creative exposition and time as the students are not improving. Overall, however, the number of students getting 4 or fewer of the knowledge questions incorrect

increased from 36 (23%) to 70 (45%) during the semester. Of the students who did exceptionally poorly at the start by missing half or more of the questions (44=28%), eleven (7%) dropped out of this category at the end of the semester with 33 (21%) still missing half the questions. The average student got 7 questions incorrect at the start and 5.6 incorrect at the end which given a large standard deviation of 3 is not statistically significant. As there was concern that this result may be sensitive to outliers, particularly 10 students who seemed to score much worse at the end of the semester, the t-test was rerun with students who got 5 or more incorrect responses at the end of the semester relative to the start removed from the sample (n=145). The smaller sample still had a large enough standard deviation to make the mean difference of 2 questions statistically insignificant, but now we can say the course impacted student knowledge by an additional 2 questions answered correctly for an 11% knowledge gain.

Simple Correlations and Regressions

A simple correlation table was created looking at cross-correlations between all variables. Some correlations were obvious, but other suggested a need to run regressions as variables we thought would be important were not showing any high correlations at all. Obvious correlations such as older students graduating in an earlier year from high school were observed, but we looked at any correlation above 15% to see if the sample revealed anything from these before running regressions. For example, the year the student first had a bank account in their name is not highly correlated with anything except their SAT score (0.24) suggesting this measure of financial immaturity may not be important. Another surprise was the self described measure of household income, the highest math taken in high school, the venue for taking the college class (day, night, summer intensive), and what year the student currently is in college all appear to be only weakly correlated with all measures of knowledge and attitudes overall and by individual question. However, how interested the high school economics teacher was in teaching economics and the self reported high school economics grade are positively correlated with the grade received in the college course (but not the overall high school GPA or SAT score which was unexpected). High positive correlations suggest older students appear to improve their overall attitude toward economics over the semester and specifically hate and see economics as a difficult subject less after the college course. Self-reported race is not highly correlated with any other variable at all.

While correlations are revealing, regressions allow multiple variables to be examined simultaneously. Rather than use ad hoc regressions, we ran regressions similar to those found in Walstad et al. (2009). The dependent variable is either the measure of economic knowledge at the end of the course, the gain in economic knowledge comparing the pre and post-test scores on the knowledge question of the survey, or an "improved attitude" measure that aggregated the attitudinal question responses by measuring favorable changes in a respondent's attitude along a 5 point Likert scale. For example, if a respondent answered "strongly agree" at the start of the semester to "Economics is dull" but answered "neutral" at the end of the semester, 2 points were added to their improved attitude score. If vice versa happened, 2 points were subtracted from their score. Most respondents fell in the ranged +7 to -9 with 13 negative outliers with a score of -10 or greater. Regressions were run using both the entire sample (n=155) and without the outliers (n=142) to test for sensitivity of the results (Table 2). Independent variables included age, race, year in college, household income range, self reported high school economics course grade, self reported interest of the high school teacher in economics, college economics grade, start of semester economic knowledge, the last math class taken in high school, the first year the respondent had a bank account in their name, the age the respondent first had a bank account in their own name, and two dummy variables for the summer and night classes. Initial results (not shown) indicated that most variables were not having a significant impact on any of the three

dependent variables, so smaller regressions were run with only variables that had some significance at 10%.

While there is clear descriptive evidence of knowledge gained during the semester, few variables were found to have a significant impact on this. This equation suggests that my course is impacting students who are relatively naive with personal finance (first bank year is positive) and starting economic knowledge. As many freshmen in the course have these characteristics, the course is doing what it is designed to do. However, the fact that respondent's attitudes worsened during the semester even with some negative outliers omitted suggests that more must be done for positive attitudinal change. This is a concern not only for the immediate impact, but also because we know some students will later teach economics in the K-12 grades and this course may be their only exposure to the field. So more work by me on promoting a positive attitude toward economics without yielding any of the knowledge gained is a key result. The larger sample also indicates that overall attitude change is unaffected by the course.

The reverse regression has an improved attitude as the dependent variable. Here more senior students and non-white students (meaning African-American as the number of Hispanic or other is quite low) became statistically significant with positive signs. This might be attributed to more mature students getting more from the class and/or specific topics in class where I present my own work on the economics of racism and the cost of being black (Mazzocco et al., 2006). However, the negative relation between knowledge and attitude remains and is strong though the overall fit of the regression is worse. A third regression considering only knowledge at the end of the semester yields similar results as the other two variations.

A. Knowledge Gained
During the Semester

	n=142	**n=155**
Intercept [t-stat. In parentheses]	***-3.645 (-2.91)	-0.349 (-0.358)
Starting Knowledge	***-0.51 (-5.99)	***-0.598 (-6.842)
Course Grade	***1.244 [4.55]	***1.154 [3.67]
Improved Attitude	*-0.115 (-1.89)	***-0.207 (-2.862)
Attitude Change	*-0.163 (-1.77)	-0.029 (-0.274)
First Year w/Bank Accnt	***0.0012 [3.02]	
Adj. R-sq.	0.39	0.39

B. Having an Improved Attitude Toward Economics

	n=142	**n=155**
Intercept [t-stat. In parentheses]	***-2.21 (-2.75)	***-9.1 (-3.85)
Knowledge Gained	***-0.23 (-2.79)	***-0.48 (-2.96)
Race	**0.947 [2.09]	**1.322 [2.47]
First Year w/Bank Accnt		**0.0024 [2.39]
Class year at University	0.441 [1.578]	**0.764 [2.42]
Attitude Change	0.365 [3.95]	***0.441 [3.48]
Adj. R-sq.	0.19	0.28

C. Knowledge at the End of the Semester

	n=142	**n=155**
Intercept [t-stat. In parentheses]	***-3.645 (-2.91)	-0.375 (-0.385)
Starting Knowledge	***0.49 [5.76]	***0.4 [4.64]
Course Grade	***1.24 [4.55]	***1.17 [3.72]
Improved Attitude	**-0.12 (-1.89)	***-0.214 (-3.33)
Attitude Change	**-0.16 (-1.77)	

First Year w/Bank Accnt	***0.0012 [3.02]	
Adj. R-sq.	0.44	0.37

Note: n=142 represents the sample without 13 negative "improved attitude" outliers
***=1%, **=5% significant, ***=10% significant

Conclusions

Responses to the survey offer clear evidence of where teaching can be improved both in terms of knowledge and attitudes. In terms of knowledge, better lesson plans such as "and/or" activities must be found for the concepts of minimum wage, substitute goods, monopoly, and real versus nominal income in particular. The last of these concepts is very important as the misunderstanding of real versus nominal can have profound impact on the student's personal finance decisions and retirement planning. Positive results for students who are relatively financially naive and don't have a lot of economics knowledge at the start of the class support using current methods for other concepts. Shifting versus moving along a line in a graph is a perennial difficult topic for students. More effort by all economics teachers including myself toward finding good pedagogical methods to help students understand this technical concept within a crowded curriculum is needed. Greater use of active learning methods such as implementing cooperative learning lesson plans (e.g. serc.carleton.edu/econ) would help increase the very low number of college economics teachers that are teaching with active learning (Watts & Becker, 2008) as well as improving long term learning by students (McGoldrick et al., 2010). Indeed the growth of online economics courses may further spur instructors to adapt active learning as a way of showing value added in their classroom. Some business schools have implemented supplementary instruction programs to help students overcome math deficiencies and anxiety before taking economics(Benedict & Hoag, 2002). College economics professors can also increase their outreach to K-12 teachers by sharing such free of charge links as www.econedlink.org for lesson plans, www.handsonbanking.org for personal finance video lessons in Spanish/English as well as encouragement to purchase the Virtual Economics 3.0 CD (ve.councilforeconed.org) to directly link lesson plans to Georgia Performance Standards.

Greater attendance at Georgia Council on Economic Education (www.gcee.org) workshops by K-12 teachers may also improve student high school knowledge (Swinton et al., 2007) though others caution against such workshops for college faculty as they do not lead to profound changes in pedagogical practices (Maier & Emerson, 2010 and literature cited there) which are certainly needed if Watts & Becker's (2008) finding of mostly "chalk and talk" is to change. Indeed it is hard to explain how statewide workshops with little follow-up appear to impact K-12 teachers/students but not college professors in the literature. It would help to have the GCEE move even more away from an input reporting mode (# workshops, # teachers served, rank of Georgia amongst states in terms of # workshops, etc.) toward the kind of rigorous output measurement only recently begun by their research committee. The committee itself could open up to more participation by using

meeting software so the current barrier of physical attendance only to participate in meetings could be overcome. Statistical data used to measure output performance could be made available to all on the web without user barriers similar to many economic databases to promote research using the new free modules for economics education created by the American Economic Association (www.aeaweb.org/home/committees/AEACEE/Econometrics_Handbook).

The inverse relationship between knowledge gained and a more negative attitude towards economics was not expected thought it is weak if the smaller sample is used. Though some students don't now it yet, they are future K-12 teachers and the class may be their only economics experience in college. While the class already features a few activities that are used to grasp a difficult concept (e.g. using play dough figures to illustrate GDP, showing the economics in Dr. Seuss' children's literature, etc.), more activities are needed to perhaps make economics more fun and improve attitudes towards the subject. Possibly moving the class towards a greater emphasis on personal finance would hopefully improve the attitudes as well.

Overall, the results unexpectedly suggest many background variables that were believed to have an impact on the survey class knowledge and attitudes were not that important. The high school experience not impacting the knowledge and attitudes directly was not expected though the starting economic knowledge may embed the high school economics experience. Clearly the high school economics class is not serving as a supplementary instruction course that would lower anxiety towards economics for entering freshmen who face a mandatory economics survey class at our university. Future research might focus more on attitudes and whether particular attitude questions can be addressed with improvements in pedagogy.

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Survey Appendix

Part I. (only completed at the beginning of the semester)

1. what is your age?
2. What year did you graduate from high school?
3. In what state did you graduate from high school? (if outside the U.S., please put "international")
4. If you took a high school economics/personal finance class, what grade did you receive in that class? (put "zero" if you had no such class or don't remember).
5. On a 5 point scale with 1=very uninterested, 2=mildly uninterested, 3=neutral, 4=mildly interested, 5=very interested, rate your high school economics/personal finance teacher relative to how interested they were in the subject. (put "zero" if you had no such class).
6. what was your high school GPA? ((put "zero" if you don't remember).
7. What was your SAT score? (if you took the ACT instead of the SAT, put that; if you took neither or don't remember, put "zero").
8.   What was the math subject/content of the last math class you took in high school (ex. If you took Algebra II in 11th grade and no math in 12th grade, you would answer "2"). 1. calculus 2. algebra II 3. geometry 4. pre-calculus (trigonometry and analytic geometry) 5. algebra I 6. other
9. What is the approximate household income of the household you grew up in?
a. 0-$30,000, b. $30,000-$60,000 c. $60,000-$100,000 d. more than $100,000
a. don't know
10. What was the FIRST year that YOU had a bank account <u>in your name</u>? (if you are not sure, but do have one, try to best estimate when that account was opened; if you don't currently have one and never have had a bank account, put "zero").
11. What is your ethnicity? 1=Black/African American, 2=White/Caucasian, 3=Native American, 4=Hispanic, 5=Other

Part II. (completed both at the beginning and the end of the semester)

A. Attitudes (see Table 1 for these 11 questions)

B. Knowledge

The minimum wage is a type of
a. price floor
b. comparable worth
c. price ceiling
d. marginal price

An individual decides to pay $8 to see a movie instead of buying an $8 meal. What is the opportunity cost of the movie?
a. the satisfaction missed by not eating the meal
b. the $8 paid to see the movie
c. the time spent watching the movie
d. the satisfaction received by going to the movie

Prices act as signals in the market because
a.   prices indicate to sellers the types of goods and services to offer for sale
b.   prices can determine dividends for businesses
c.   high prices for goods and services signal a healthy economy
d.   entrepreneurs become motivated as prices rise

What is the unit of study in microeconomics?
a.   individual businesses and households
b.   inflation and recession
c.   national consumption and expenditures
d.   imports and exports

Which of the following is primarily responsible for the control of the money supply?
a.   the U.S. Treasury
b.   the Federal Reserve System
c.   the Federal Deposit Insurance Corporation
d.   the Comptroller of the Currency

Countries X and Y will NOT trade shoes and wheat if which of the following is true?
a.   Country X can produce more shoes and wheat than country Y
b.   Country Y can produce enough shoes and wheat to satisfy the demand of its public
c.   The opportunity costs of producing shoes and wheat are the same in both countries
d.   The opportunity costs of producing shoes is greater in country X than it is in country Y

Which of the following is an attempt by a firm to increase the demand for its product?
a.   the imposition of a price ceiling on the product
b.   an advertising strategy designed to change consumer tastes and preferences
c.   a marketing strategy to make the good scarce and therefore more expensive
d.   a production strategy to flood the market with the good or service

In every economic system, propel must choose how to:
a.   satisfy all of the wants of society.
b.   make the best use of scarce resources
c.   create an equal distribution of income
d.   save money to reduce the national debt

Which do economists consider to be a productive resource (factor of production)?
a.   common stock in a computer business
b.   corporate bonds of an oil company
c.   machines in an auto plant
d.   money in a bank

The opportunity cost of a new public high school is the:
a.   money cost of hiring teachers for the new school
b.   cost of constructing the new school at a later date
c.   change in the annual tax rate to pay for the new school
d.   other goods and services that must be given up for the new school

Which would most likely increase the productivity of labor?
- a. a decrease in the use of labor-saving technology
- b. a decrease in the pay of corporate executives
- c. an increase in pollution control requirements
- d. an increase in capital investment

What <u>primary</u> function is money serving when it is used to buy a ticket to a movie?
- a. store of value
- b. flow of funds
- c. unit of account
- d. medium of exchange

Which would most likely increase the quantity of gasoline sold in a competitive market?
- a. an increase in the rice of crude oil
- b. an decrease in the price of automobiles
- c. a decrease in the income of consumers
- d. an increase in the taxes on gasoline products

In a competitive market, the price of shoes is likely to be increased by
- a. a decrease in the supply of shoes
- b. a decrease in the demand for shoes
- c. more capital investment in shoe factories
- d. new machines reducing the cost of shoe production

A newspaper reports, *"COFFEE GROWERS' MONOPOLY BROKEN INTO SEVERAL COMPETING FIRMS."*
If this is true, we would expect the coffee-growing industry to
- a. decrease output and decrease prices
- b. increase output and increase prices
- c. decrease output and increase prices
- d. increase output and decrease prices

Gross domestic product (GDP) is a measure of
- a. the price level of goods and services sold
- b. total spending by federal, state, and local governments
- c. the quantity of goods and services produced by private businesses
- d. the market value of the nation's output of final goods and services

If your annual income rises by 50% while prices of the things you buy rise by 100% then your
- a. real income has risen
- b. real income has fallen
- c. money income has fallen
- d. real income is not affected

If Britain has a comparative advantage over France in the production of cars, then
- a. the opportunity cost of producing cars in Britain is lower than in France
- b. the opportunity cost of producing cars in Britain is higher than in France
- c. there are no gains from specialization and trade in cars between Britain and France
- d. only Britain will gain from specialization and trade in cars between Britain and France

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Dr. Gregory Brock is a Professor of Economics in the School of Economic Development at Georgia Southern University. He has taught principles of economics at Georgia Southern, Veracruz, Moscow State, Volgograd State, Vilnius, Kent State and Ohio State universities over the past 25 years. He has a PhD in Economics from The Ohio State University with his research found at coba.georgiasouthern.edu/depts/sed/SEDFaculty/bio_gbrock.html.