Establishing State Specific Benchmarks in Economic Education

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Abstract

National learning benchmarks provide a useful tool for assessing the state and progress of economic education. They do not, however, provide actionable information at the state level. In this study we build on national efforts by constructing state level benchmarks using the Test of Economic Learning and Test of Understanding College Economics to measure student and teacher knowledge in economics throughout the state of Nebraska. We also collect classroom and individual level data on characteristics such as gender, race, class format, teacher attitudes, etc. Using these data we show that Nebraska's students perform similarly to national student cohorts in both micro and macro economics. Consistent with established literature, we show that teacher knowledge is an important determinant of student success. In addition to providing a snapshot of economic understanding, results from this study may be subsequently used to guide educational research, policy debates, instructional programming and school reform at the state and local level.

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Introduction

According to the 2007 *Survey of the States*, economics is included in the educational standards in all states in some form. Of these, 41 states require the standards to be implemented and 17 states require students to take a course in economics prior to graduation. While it is impressive that so many states have a mandatory standards component, only 22 require some form of test in economics (NCEE, 2007).

Nebraska school districts operate under a local control doctrine which enables each school district to choose curriculum content and graduation requirements. As a result, although Nebraska requires the implementation of economic standards with local reporting on a select subset of the standards to the Nebraska Department of Education it does not require that all students take a uniform statewide exam in economics, nor is there a mandatory graduation requirement to take an economics course. Research conducted by the Nebraska Council on Economic Education and the State Department of Education indicates that 54 percent of the 178 high schools responding to the survey require Personal Finance, Consumer Economics, or Economics for graduation (Nebraska State Board of Education, 2006; Nebraska State Department of Education, 2007).

Consequently, in states like Nebraska with no mandatory graduation requirement or formal statewide examination in economics important questions such as: What and how much do students know?, How do we measure improvement in students' knowledge of economics over time?, and What is the level of economic understanding of Nebraska teachers? remain unanswered.

With no state level data on economic literacy for high school students it is impossible to ascertain the impact and value added associated with implementing standards in economic

education. Furthermore, policy makers, school districts and interested parties are unable to determine whether or not implemented programming is achieving its stated objective, whether or not student outcomes are improving or if additional emphasis should be placed on economic literacy. By creating a baseline measure of economic understanding this study provides a useful tool for the Nebraska Council on Economic Education, the State of Nebraska, as well as the students and teachers within the public and private school systems. By ascertaining the knowledge level of our students, we will be able to better target and implement student and teacher programs to improve economic and financial literacy in addition to directing and informing public opinion and debate on educational priorities.

Methodology

We base our research on a wealth of literature and previous work done in the area of measurement, assessment and evaluation of economic understanding. Furthermore, our assessment comes at an important time as the state of Nebraska is scheduled to begin standards testing begins in 2008–2009. Having established a benchmark that pre-dates state mandated testing we will be able to use this study to provide feedback regarding the efficacy of the new educational standards. Results from this study will also create an opportunity to establish a statewide baseline that can be used to track changes in student knowledge and understanding proficiency in subsequent years; thus helping to ascertain the impact of state level testing.

This study also addresses the important role of the teacher by measuring the level of economic knowledge and attitudes towards economic issues. The characteristics of a typical classroom are gathered and analyzed. Particularly, this study investigates the impact of factors

such as class size, gender, teacher support, proficiency, etc., on student performance. This study can also serve as a model for evaluation in other states.

Standards based testing provides educators with direction for shaping economic education on a national level and likewise provides a template for investigation at the state level. We begin by following Baumol (1990) with the simple acknowledgement that we would like to learn more about the status of economic education in Nebraska. Bosshardt and Watts (1990) provide an empirical framework for analysis of student outcomes and further identify important variables in student success. These variables include teacher characteristics, school and district size, and baseline knowledge, race, gender, etc. Unlike Bosshardt and Watts, for us the identification of the components of student learning is secondary to assessing the state of economic understanding among Nebraska's student population. In analyzing the production of economic knowledge in students we rely on the framework employed by Bosshardt and Watts but are limited in its implementation due to sample size and data considerations that make it difficult to replicate their work.

The impact of establishing state-wide standards and testing is documented in Rebeck and Walstad (2000). They show that the implementation of state standards causes the number of economics course offered to rise, illustrating a change in the status of economic education. Allgood and Walstad (1999) employ longitudinal analysis of student/teacher performance. As we seek to establish an initial baseline norm for Nebraska students, this study provides important direction on research design for ongoing investigation of the impact of new state standards and testing as well as traditional inputs into student learning. This research together with research conducted with the Nebraska State Department of Education (2007) will enable us to measure

the impact of the forthcoming standards testing on student achievement and the availability of economic literacy classes.

We measure student understanding by using the *Test of Economic Literacy* (TEL), a nationally normed test in economics designed for students in grades 10–12. It was most recently normed in 2001 (Walstad and Rebeck, 2001). Likewise, the *Test for Understanding in College Economics* (TUCE), a nationally normed test designed for college principles of economics courses is used as an instrument to measure teacher understanding. The TUCE was renormed in 2007 (Walstad and Rebeck, 2007).

Instruments such as the TEL and TUCE have been shown to be valid and useful tools in measuring levels of economic knowledge. Walstad and Soper (1988) show that nationally normed testing creates reliable measures of the stock of student learning in economics. Using regression analysis of TEL scores they further identify recommendations for changes in the nature of economic education. These include: required courses in economics separate from other related topics, a de-emphasis on relying on infusion of economics as a primary learning strategy, an emphasis on macro and international economics and increased teacher education. Using pre- and posttest scoring, they are further able to identify important variables in student learning over time such as: teacher quality, class size, etc.

Becker, Greene, and Rosen (1990) show that the manner in which money is spent on educational programs may be more important than the amount spent, and provide motivation for assessing the success of different program types and the importance of classroom and school characteristics in student achievement.

Collection of attitudinal information from teachers follows Becker, Walstad and Watts (1994) who compared the views of economists, economic educators, economics teachers,

business and social science teachers, and journalists on various economic topics. They show that economics teachers' views aligned more with economists and economic educators. General social science teachers' views were closer to journalists, while business teachers' views more closely resembled those of economics teachers and economic educators. Our findings are consistent with their results.

Data/Sample Description

During the fall of 2006, 942 students in grades 9–12 throughout the state of Nebraska were recruited to participate in this study. The majority of the students were in grades 11 and 12 (720) with an additional 222 students in grades 9 and 10. Twenty-three teachers, currently teaching economics, business, social science or math courses were selected by geographical location, course type, etc., to reflect the diversity of the state of Nebraska. Data was collected in three areas: classroom questionnaire, student knowledge, and teacher knowledge and attitudes on various economic issues. Participating teachers were paid an honorarium for their time. Although smaller in size than national norming samples (94 teachers, 3000 students for the TEL) the Nebraska sample is representative of the state in both geographic and demographic terms.

Student proficiency in economic understanding is demonstrated by direct examination using the *Test of Economic Literacy*. Developed by the National Council on Economic Education, the TEL as mentioned above is a nationally normed and standardized test used to measure the achievement of high school students in economics, grades 10–12. Testing occurred in a traditional pencil-and-paper format, given under strict protocols to ensure the data collected was consistent and comparable across all participating teachers and classrooms.

In addition to student testing data, a detailed classroom profile questionnaire was completed by participating teachers. The classroom data questionnaire was comprehensive and included items regarding classroom type, composition and characteristics. Teachers were asked to indicate their level of education, specific certifications, quantity and type of post-graduate education, tenure, experience in teaching economics, and other relevant questions. The classroom data questionnaire replicated other standard classroom instruments used nationally in economic education research. Data on free and reduced lunch participation were obtained from a State Department of Education database.

In addition to the classroom questionnaire, participating teachers also completed a two-part instrument to ascertain their level of economic understanding and attitudes on various economic topics. Economic knowledge was measured using the *Test for Understanding College Economics* (TUCE). The attitudinal survey was drawn from a previous work by Becker, Walstad and Watts (1994).

Both the TEL and the TUCE have been proven to be valid and reliable measures of economic knowledge. (Allgood and Walstad, 1999) The two instruments are also in line with the Nebraska Standards in Social Science/History, in which economics is included. See Appendix 2 for a detailed alignment of the standards with the items on the tests.

Analysis

The results of the classroom survey showed that all participating classrooms and their teachers are representative of the public schools in the state of Nebraska. The number of males and females were approximately equal as was the sample of urban and suburban public schools to the number of rural schools, showing a diverse number of large, medium and small schools.

The sample also covers a broad socioeconomic range in the state with on average 33% (state average = 34.66%) of the student population on free or reduced price lunch. The highest was 70% and the lowest 4%. In grades 11 and 12, 720 students participated in this study. This represents approximately 2% of the total number of students in the state in grades 11 and 12 (42,576). The overall sample of students in grades 9–12 is approximately 1% of the state's student population in those grades (90,961) (Nebraska Department of Education, 2006). Given the size of the state and the sample sizes used for national norming projects, the sample is large enough to ensure a robust benchmark.

The classrooms sampled in this study included eight economics classes, ten business classes, four social science classes, and one math class representing the range of economics instruction from a concentrated course to infusion in other subjects. The teachers surveyed have, on average, 17.65 years of teaching experience and 10 years teaching economics within their subject. Seventy-eight percent of the teachers in the sample have a master's degree. This can be compared to the overall state average of 16 years of experience and is slightly higher than the state average of 40% with master's degrees. (See Table 1).

Overall, there was a wide range of economic education instruction on the part of the teachers. While three of the participating teachers majored in economics as undergraduates, the majority of the teachers experienced coursework and staff development in economics at the graduate level with two courses in economics and three days of in-service training in economics. Fourteen teachers reported taking 0–2 graduate courses in economics while three teachers reported taking more than eight graduate courses in economics. The mean was 3 courses in economics.

The participating teachers in the study, on average, have a solid understanding of economics. The average score of the Nebraska teachers using a 40-item subset of questions from the TUCE was 22.9 (minimum of 12, maximum of 36), or 57% correct on the 40-item macro and micro test combined. The original TUCE exam contains 60 items. The 40 items on the test cover a broad range of principles of economics concepts in macroeconomics, microeconomics and fundamental concepts in international trade. According to the *TUCE Examiners Manual*, a typical score on the national posttest sample for a similar 40-item test would be 44% correct. On an item-by-item basis, Nebraska teachers scored above the national averages on both the micro and macro questions by over 12 percentage points. Detailed item analysis of the TUCE score comparisons to the national data can be found in Tables 2 and 3.

The overall scores of participating students are comparable to the national norms on the *Test for Economic Literacy* (Table 4). The mean score for all Nebraska students in grades 10 through 12 is 18.84 putting them in the 70th percentile of the national norming sample, compared to the overall national mean of 19.05. The mean scores of Nebraska students in grades 11 and 12 was 18.29 and 20.48, respectively; which is directly comparable to the national norms in grades 11 and 12, without economics, of 20.29 and 19.30. As expected, the overall mean scores drop when including the Nebraska 9th grade students; the original TEL was normed using only 10th–12th grade students. The Nebraska 9th grade student data are reported for baseline purposes only.

Our study also looks at students in a variety of subjects. According to Table 5, the mean score for Nebraska students in an economics course was 19.0, slightly above the national average. Students in business and social science courses scored means of 17.61 and 18.74, respectively. These results are comparable to the national data, between the national means for economics and social science courses.

Table 6 shows the TEL score comparisons on an item-by-item basis. Overall, Nebraska students in grades 10–12 correctly answered the same number of questions as the national sample of students without economics. The overall results for Nebraska students in grades 9–12 are reported here; however, they cannot be compared to the national data as the nationally normed TEL did not include 9th grader students in its sample; the 9-12 results are for baseline purposes only.

Table 7 reports the results for students according to gender, location, and teacher knowledge. The mean score, in terms of males and females (including 9th grade) is comparable to the national norms of 18.07 and 20.27. The sample sizes for urban and rural settings reflect the diverse population in Nebraska.

The results of this study clearly show the importance of teacher knowledge of economics and its impact on student scores. As seen in Table 7, the two variables called TEL TopTeach and TEL BttmTeach are the mean scores of students taught by teachers that scored better (or worse) than one standard deviation above (or below) the mean teacher TUCE score. The 129 students in the TEL TopTeach sample had a TEL mean score of 20.25 compared to the 156 students in the BttmTeach sample with a mean score of 17.31. Clearly, teachers who demonstrated more economic knowledge had a greater impact on their students' level of economic understanding. Regression analysis of the data further supports this claim although via post-graduate education hours instead of TUCE performance.

Identification of Inputs to Student Learning

Although identification of the inputs to student learning is a secondary objective of this study it contributes to the ultimate objective of evaluating the status of economic education in Nebraska and identifying areas where energy and resources can best be applied to improve

economic education. To identify the inputs into education production we follow Boasshardt and Watts (1990) and estimate the following linear production function:

$$TelScore = F(Student\ Characteristics, School\ Characteristics, Teacher\ Characteristics)$$

In performing the estimation we initially specified three separate models using different measures of teacher understanding (i.e. PostGradHours, Tenure and TuceScore). For a complete description of the dependent and independent variables, please see Table 8. The three models estimated are:

Model #1

$$TelScore_i = \alpha + \beta_1 Gender_i + \beta_2 Race_i + \beta_3 Urban_i + \beta_4 PercentLunch_i + \beta_5 SchoolSize_i + \beta_7 EconTenure_i + \beta_6 InService_i + \beta_6 EconClass_i + \beta_6 PostGradHours_i + \varepsilon_i$$

Model #2

$$TelScore_i = \alpha + \beta_1 Gender_i + \beta_2 Race_i + \beta_3 Urban_i + \beta_4 PercentLunch_i + \beta_5 SchoolSize_i + \beta_7 EconTenure_i + \beta_6 InService_i + \beta_6 EconClass_i + \beta_6 Tenure_i + \varepsilon_i$$

Model #3

$$TelScore_i = \alpha + \beta_1 Gender_i + \beta_2 Race_i + \beta_3 Urban_i + \beta_4 PercentLunch_i + \beta_5 SchoolSize_i + \beta_7 EconTenure_i + \beta_6 InService_i + \beta_6 EconClass_i + \beta_6 TuceScore_i + \varepsilon_i$$

Estimation is performed using OLS with White's heteroskedasticity consistent standard errors. The results of all three models are largely consistent with established findings within the literature. Gender contributes positively to performance on the TEL as does race, being in an urban school, school size, the amount of time a teacher has been teaching economics, and whether or not the class is a dedicated economics class as opposed to a class that infuses economic content. For the students tested, however, Gender is not statistically significant. Also consistent with the literature schools with higher levels of student participation in free or reduced lunch programs exhibit lower levels of economic understanding. Race is statistically significant

at the 1% level for all three models as is EconTenure and Urban as is EconClass. (Please see Table 9 for complete results.)

Schoolsize is positive but only significant in the regression using PostGradHours as the measure of teacher understanding. This may be due to a selection bias resulting from large school districts recruiting the best teachers available (see Becker, Greene, and Rosen (1990)). The variable TuceScore is positive but insignificant.

Curiously, the sign on the InService variable is both negative and significant in every specification. Previous research has shown that in-service education for teachers has a positive impact on student understanding and achievement. We hypothesize that the in-service hours recorded by teachers are not dedicated economics focused in-service trainings and are instead general in-service hours offered through local schools and school districts. As such, they may be serving as a substitute for post-graduate training in economics which have a large and significant impact on student learning. To investigate this theory we first inspected the data and found that teachers with large numbers of in-service hours listed had low levels of post graduate training. To further estimate the impact of in-service training we estimated an additional two models by defining two new variables, InServiceHigh and InServiceLow representing teachers that had more or less than the median number of in-service hours. The subsequent two regressions are estimated as Models 4 and 5 and are specified as follows:

Model #4

$$TelScore_i = \alpha + \beta_1 Gender_i + \beta_2 Race_i + \beta_3 Urban_i + \beta_4 PercentLunch_i + \beta_5 SchoolSize_i + \beta_7 EconTenure_i + \beta_5 EconClass_i + \beta_6 InServiceLow_i + \varepsilon_i$$

Model #5

$$TelScore_i = \alpha + \beta_1 Gender_i + \beta_2 Race_i + \beta_3 Urban_i + \beta_4 PercentLunch_i + \beta_5 SchoolSize_i + \beta_7 EconTenure_i + \beta_5 EconClass_i + \beta_6 InServiceHigh_i + \varepsilon_i$$

The InService variable is highly significant in each regression but for teachers with low levels of in-service training the coefficient is positive and for teachers with high levels of in-service training the coefficient is negative. Since the two new variables are mirror images of one another the size and significance are identical except for sign. Possible explanations for this effect may include a selection bias among teachers with the highest skilled and motivated teachers seeking out additional rigorous training while less skilled teachers rely on in-service training to maintain certifications. This result lends support to the claim that additional post-graduate education is essential for improving economic education and that general in-service training is a poor substitute.

Teacher Attitudes

Using the attitudinal survey developed by Becker, Walstad and Watts (1994) we surveyed teachers' attitudes toward economic issues. In general Nebraska teachers attitudes mirror those of the Economics teachers originally surveyed (Please see Table 10). Notable exception include items 1 regarding tariffs, 5, regarding the transition of the former Soviet Union, 11, regarding wages and prices, 14, regarding government spending, 20, regarding inflation and unemployment, 21, regarding the natural rate of unemployment, 24, regarding trade deficits, and 26 regarding trade deficits. All these may largely be attributed to the major changes in trade and monetary policy as well as the transformation of the USSR that have occurred since the survey was originally administered.

Further research will address how teacher attitudes impact student learning by subject matter.

Conclusion

The primary purpose of this investigation was to ascertain the current status of economic education within the state of Nebraska. Using testing and survey data from a representative group of students and teachers we have shown that Nebraska's students are performing at the performance levels of comparable students across the nation. We have identified key areas requiring additional focus and improvement (particularly topics in microeconomics) and have also identified areas in which educators are excelling (institutions and macroeconomics).

The principal product of this research is a Nebraska-specific benchmark of economic proficiency that can subsequently be used to direct future programming, educate the public, inform teachers and administrators, and shape the debate over the importance and efficacy of economic and financial literacy education. These results establish a baseline for the state in terms of economic education for both the students and teachers.

This assessment provides a significant baseline that can be used to track changes in student knowledge and proficiency in subsequent years. This is of particular interest as statewide standards' testing begins in 2008–2009. The Council can now provide feedback as to the efficacy of the new educational standards. The outcomes of this study will provide an improved understanding of the component parts of a successful educational environment, motivate increased public awareness of the importance of continuing economic education for teachers, strengthen the rationale for changes in public education, and improve the standing of the Nebraska Council and the Department of Education.

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Appendix 1: Tables and Results

Table 1 - Classroom and Teacher Characteristics

Type of Schools	Public	Private	Home School	Charter	
	23	0	0	0	
Characteristics	Urban	Metropolitan	Inner City	Suburban	Rural
	0	0	5	4	14
Student Body Size	< 500	< 1000	< 1500	< 2000	> 2000
	14	2	0	4	3
Grades served	12	11, 12	10, 11, 12	9, 10, 11, 12	Other
	0	0	1	13	9
Major in Economics (undergraduate)	Yes	No	Related		
	3	19	1		
Masters Degree	Yes	No	%		
	18	5	78/22		
How many post-graduate hours of economics instruction have you taken?	0–6	7–12	13–18	19–24	> 24
	14	4	2	0	3
How much in-service training have you had?	0–3 days (0–24 clock hours)	4–6 days (25–55 clock hours)	7–9 days (56–80 clock hours)	10 days–2 weeks (81–120 clock hours)	15 days or more (more than 125 clock hours)
	12	7	1	2	1
Grade level of the students participating in this evaluation.	12	11	10	9	Other
	10	9	2	2	0
How long have you been teaching (years)?	Maximum	Minimum	Average	StDev	
	36	2	17.65217	9.874709	
How long have you been teaching economics (years)?	Maximum	Minimum	Average	StDev	
	33	0	10.43478	10.37841	
Type of course in which this evaluation is occurring	Economics	Business	Social Science	Math	
	8	10	4	1	
What percentage of your students received free or reduced lunch?	Maximum	Minimum	Average	StDev	
	70%	4%	33%	0.190372	

Table 2 - Item Analysis: TUCE Score Comparisons (Micro)

TUCE Source	Content Categories	NE Teachers %correct	National Norm %correct*	Difference
Micro #1	B. Markets & Prices	65	50	+15
Micro #3	B. Markets & Prices	65	50	+15
Micro #4	C. Theory of the Firm	17	57	–40
Micro #5	D. Factor Markets	61	46	+15
Micro #6	E. Micro Role of Gov.	35	46	–11
Micro #7	E. Micro Role of Gov.	57	49	+8
Micro #8	A. Basic Problem	44	37	+7
Micro #9	B. Markets & Prices	48	31	+17
Micro #10[1]				
Micro #14	C. Theory of the Firm	13	45	–32
Micro #16	E. Micro Role of Gov.	74	50	+24
Micro #17	C. Theory of the Firm	48	43	+5
Micro #18	B. Markets & Prices	39	41	–2
Micro #19	B. Markets & Prices	65	43	+22
Micro #20	C. Theory of the Firm	22	31	–9
Micro #22	C. Theory of the Firm	74	59	+15
Micro #23	D. Factor Markets	52	31	+21
Micro #26	E. Micro Role of Gov.	35	34	+1
Micro #27	E. Micro Role of Gov.	61	41	+20
Micro #28	F. International (micro)	44	35	+9
Micro #29	F. International (micro)	87	37	+50
Average	Overall Microeconomics	49	42	+7

*percent correct posttest used
[1]Question #10 was misprinted on the test forms and is not included in the analysis.

Table 3 - Item Analysis: TUCE Score Comparisons (Macro)

TUCE Source	Content Categories	NE Teachers % correct	National Norm % correct*	Difference
Macro #1	A. Measuring Aggr. Performance	83	53	+30
Macro #4	B. Agg. Supply & Demand	83	46	+37
Macro #7	D. Monetary & Fiscal Policies	74	60	+14
Macro #8	D. Monetary & Fiscal Policies	70	50	+20
Macro #10	E. Policy Debates & Applications	48	41	+7
Macro #11	A. Measuring Aggr. Performance	83	59	+24
Macro #13	B. Agg. Supply & Demand	91	63	+28
Macro #14	B. Agg. Supply & Demand	61	48	+13
Macro #15	B. Agg. Supply & Demand	91	61	+30
Macro #16	C. Money & Fin. Mkts.	30	38	–8
Macro #18	D. Monetary & Fiscal Policies	57	45	+12
Macro #19	A. Measuring Aggr. Performance	65	40	+15
Macro #21	B. Agg. Supply & Demand	44	42	+2
Macro #22	C. Money & Fin. Mkts.	35	33	+2
Macro #24	D. Monetary & Fiscal Policies	52	33	+19
Macro #25	D. Monetary & Fiscal Policies	83	60	+23
Macro #26	E. Policy Debates & Applications	52	31	+21
Macro #29	F. International (macro)	65	34	+31
Macro #30	F. International (macro)	70	44	+26
Average	Overall Macroeconomics	65	46	+18

Table 4 - Student Knowledge Results
By Grade Level

	TEL Overall Grades 9–12	TEL Overall Grades 10–12	TEL Overall National Norm	TEL Grade 12	TEL Grade 11	TEL Grade10	TEL Grade 9
Mean	18.21	18.84	19.05	20.48	18.29	13.56	13.69
Median	17	18	–	20	18	13	14
Maximum	39	39	–	39	37	29	28
Minimum	3	3	–	4	5	3	3
Std. Dev.	7.31	7.39	7.99	7.66	6.66	4.98	4.77
n =	943	828	669	440	280	108	114

Table 5 - Student Knowledge Results
By Subject

	TEL NE 10-12	TEL NE Econ	TEL NE Business	TEL NE Soc Std	TEL National 10–12	TEL National Econ	TEL National Soc Std
Mean	18.84	19.00	17.61	18.74	19.05	24.30	16.05
Median	18	18	16	18	–	–	–
Maximum	39	39	39	38	–	–	–
Minimum	3	3	5	4	–	–	–
Std. Dev.	7.39	7.60	6.81	8.27	7.99	7.73	6.65
n =	828	334	449	139	669	2,124	376

Table 6 - Student Knowledge Results
By Demographics and Teacher Scores

	TEL Overall 9–12	TEL MALE	TEL FEMALE	TEL RURAL	TEL URBAN	TEL TOPTEACH	TEL BTTMTEACH
Mean	18.21	18.30	18.19	17.97	18.45	20.25	17.31
Median	17	17	17	16	18	19	16
Maximum	39	39	39	39	39	38	36
Minimum	3	3	5	3	3	4	3
Std. Dev.	7.31	7.52	7.13	7.32	7.30	7.97	6.95
n =	943	449	489	463	480	129	156

Table 7 - Item Analysis: TEL Score Comparisons

TEL Form A	Economic Concept	NE Student % correct 9–12	NE Student % correct 10–12	National % correct w/o econ	Difference (NE 10–12 & National)
TEL Q#1	Scarcity	47	48	37	+11
TEL Q#2	Scarcity	41	44	31	+13
TEL Q#3	Scarcity	72	75	66	+9
TEL Q#4	Opportunity Cost	39	42	29	+13
TEL Q#5	Opportunity Cost	35	36	39	–3
TEL Q#6	Productivity	48	48	44	+4
TEL Q#7	Productivity	47	48	52	–4
TEL Q#8	Econ. Systems	66	69	60	+9
TEL Q#9	Econ. Systems	37	39	40	–1
TEL Q#10	Econ. Institutions	48	51	48	+3
TEL Q#11	Econ. Institutions	57	35	53	–18
TEL Q#12	Econ. Institutions	33	53	39	+14
TEL Q#13	Money	51	58	54	+4
TEL Q#14	Money	55	58	57	+1
TEL Q#15	Market Structure	52	54	58	–4
TEL Q#16	Supply & Demand	51	54	51	+3
TEL Q#17	Supply & Demand	56	57	62	–5
TEL Q#18	Markets	45	47	40	+7
TEL Q#19	Supply & Demand	56	60	63	–3
TEL Q#20	Market Structure	49	50	58	–8
TEL Q#21	Income Distribution	52	53	52	+1
TEL Q#22	Market Failures	37	38	47	–9
TEL Q#23	Market Failures	35	36	38	–2
TEL Q#24	Role of Government	43	43	43	0
TEL Q#25	GDP	37	38	43	–5
TEL Q#26	Agg. Supply & Demand	44	46	45	+1
TEL Q#27	Agg. Supply & Demand	50	52	59	–7
TEL Q#28	Unemployment	46	47	54	–7
TEL Q#29	Inflation	50	52	53	–1

Table 7 - Item Analysis: TEL Score Comparisons – Continued

TEL Form A	Economic Concept	NE Student % correct 9–12	NE Student % correct 10–12	National % correct w/o econ	Difference (NE 10–12 & National)
TEL Q#30	Inflation	52	54	54	0
TEL Q#31	Monetary Policy	23	24	28	–4
TEL Q#32	Monetary Policy	25	26	26	0
TEL Q#33	Fiscal Policy	45	47	54	–7
TEL Q#34	Fiscal Policy	49	50	53	–3
TEL Q#35	Fund. of Trade	50	51	53	–2
TEL Q#36	Fund. of Trade	38	40	44	–4
TEL Q#37	Fund. of Trade	44	45	50	–5
TEL Q#38	Balance of Payments	47	48	53	–5
TEL Q#39	Balance of Payments	33	35	37	–2
TEL Q#40	Intl. Growth & Stability	39	40	42	–2
Average	Overall TEL	46	47	48	–.45

Table 8 – Explanation of Variables

Variable	Description	Mean	Max	Min	Stdev.	Obs.
GENDER	Indicator for Student Gender, Male = 1	0.375	1	0	0.484	942
RACE	Race Indicator, White =1, non-White = 0	0.603	1	0	0.49	942
URBAN	Urban/Rural indicator, Non-rural = 1	0.614	1	0	0.487	942
PERCENTLUNCH	Percent of students participating in free or reduced lunch programs.	0.378	70%	4%	0.199	917
SCHOOLSIZE	School size variable.	0.381	1	0	0.486	942
ECONTENURE	Number of years the teacher has taught economics.	11.408	33	0	9.985	942
INSERVICE	Number of in-service instructional hours attended.	1.774	5	1	1.028	942
ECONCLASS	Indicator variable for class type, EconClass = 1	0.278	1	0	0.448	943
POSTGRADHOURS	Number of Post Graduate Hours in Economics.	1.83	5	1	1.309	942
TUCESCORE	Number of years teaching.	23.642	36	12	5.803	942
TENURE	Teacher's Score on TUCE Exam	17.707	38	2	10.273	942
INSERVICELOW	Whether or not teacher has below the median number of in-service hours. Below = 1	0.649	1	0	0.477	942
INSERVICEHIGH	Whether or not teacher has above the median number of in-service hours. Above = 1	0.136	1	0	0.343	942

Table 9 – Estimation Results

Regression Estimates with TelScore as the Independent Variable

	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
C	15.209	14.859	14.819	10.707	12.980
	(1.123)*	(1.123)*	(1.307)*	(1.004)*	(0.961)*
GENDER	0.421	0.371	0.440	0.455	0.455
	(0.447)	(0.446)	(0.448)	(0.456)	(0.456)
RACE	3.584	3.415	3.715	3.769	3.769
	(0.59)*	(0.586)*	(0.587)*	(0.592)*	(0.592)*
URBAN	2.78	3.551	3.217	2.045	2.045
	(0.733)*	(0.714)*	(0.694)*	(0.69)*	(0.69)*
PERCENTLUNCH	-5.594	-5.685	-5.986	-3.477	-3.477
	(1.533)*	(1.542)*	(1.569)*	(1.562)**	(1.562)**
SCHOOLSIZE	1.005	0.740	0.917	0.430	0.430
	(0.498)**	(0.48)	(0.495)	(0.494)	(0.494)
ECONTENURE	0.176	0.129	0.180	0.180	0.180
	(0.023)*	(0.028)*	(0.023)*	(0.024)*	(0.024)*
INSERVICE	-1.969	-2.17	-2.019		
	(0.346)*	(0.358)*	(0.351)*		
ECONCLASS	2.383	3.014	2.298	1.539	1.539
	(0.563)*	(0.601)*	(0.583)*	(0.538)*	(0.538)*
POSTGRADHOURS	0.477				
	(0.237)**				
TENURE		0.099			
		(0.028)*			
TUCESCORE			0.049		
			(0.044)		
INSERVICELOW				2.273	
				(0.78)*	
INSERVICEHIGH					-2.273
					(0.78)*
R-squared	0.170	0.174	0.166	0.137	0.137
Adjusted R-squared	0.162	0.166	0.157	0.129	0.129
F-statistic	20.680	21.360	20.068	17.950	17.950
Log likelihood	-3043.480	-3040.920	-3045.790	-3061.739	-3061.739

*Note: *Denotes significance at the 1% level, **denotes significance at the 5% level.*

Table 10– Teacher Attitudes
Attitudinal Survey Responses By Item and Group

1. Tariffs and import quotas usually reduce general economic welfare.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	71.30%	21.30%	6.50%	1.35	460
Econ. Educators	85.2	11.1	3.7	1.19	135
Econ. Teachers	65.5	18.6	14.1	1.48	174
NE Teachers	43.4	30.4	26.1	2.17	23
Other Teachers	40.1	36.5	22.6	1.82	688
Journalists	54.8	30.4	12.7	1.57	641

2. A large federal budget deficit has an adverse effect on the economy.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	35.10%	47.60%	15.70%	1.8	457
Econ. Educators	46.7	46.7	5.9	1.59	134
Econ. Teachers	61	31.6	7.3	1.46	177
NE Teachers	56.5	34.8	8.7	2.48	23
Other Teachers	70.5	22.8	6.6	1.36	693
Journalists	73.6	21.1	4.6	1.3	650

3. The money supply is a more important target than interest rates for monetary policy.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	34.30%	22.40%	40.10%	2.06	449
Econ. Educators	37.8	37.8	22.2	1.84	132
Econ. Teachers	40.1	29.4	29.4	1.89	175
NE Teachers	30.4	26.1	43.5	1.87	23
Other Teachers	25.9	33.9	37.9	2.12	678
Journalists	24.6	33.4	34.7	2.11	607

4. Flexible and floating exchange rates offer an effective international monetary arrangement.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	56.00%	33.60%	8.40%	1.51	455
Econ. Educators	65.9	31.9	1.5	1.35	134
Econ. Teachers	61.6	31.6	5.1	1.43	174
NE Teachers	65.2	26.1	8.7	2.57	23
Other Teachers	49.9	39.1	6.9	1.55	665
Journalists	52.2	35.3	5.2	1.49	607

Table 10.1 – Teacher Attitudes
Attitudinal Survey Responses By Item and Group

5. As the USSR moves toward a market economy, a rapid and total reform would result in a better outcome than a slow transition.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	27.20%	30.40%	40.10%	2.13	453
Econ. Educators	34.8	38.5	25.2	1.9	133
Econ. Teachers	19.8	28.3	50.9	2.31	175
NE Teachers	4.4	4.4	91.3	1.13	23
Other Teachers	19.9	21.9	57.2	2.38	687
Journalists	22.8	30.1	44.3	2.22	636

6. Fiscal policy (e.g., tax cuts and/or expenditure increases) has a significant stimulative impact on a less than fully-employed economy.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	59.30%	30.60%	9.10%	1.49	459
Econ. Educators	40.7	51.1	7.4	1.66	134
Econ. Teachers	51.4	34.5	14.1	1.63	177
NE Teachers	52.2	26.1	21.7	2.3	23
Other Teachers	45.1	38.5	14.8	1.69	683
Journalists	35.3	45.5	17.4	1.82	643

7. The distribution of income in the U.S. should be more equal.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	48.50%	24.40%	26.70%	1.78	462
Econ. Educators	23.7	40	34.8	2.11	133
Econ. Teachers	35.6	28.8	35.6	2	177
NE Teachers	34.8	26.1	39.1	1.96	23
Other Teachers	40.1	31.7	26.8	1.87	684
Journalists	35	30.8	33.1	1.98	648

8. Antitrust laws should be enforced vigorously to reduce monopoly power from its current level.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	34.90%	36.90%	27.60%	1.93	461
Econ. Educators	24.4	50.4	23.7	1.99	133
Econ. Teachers	44.6	37.9	17	1.72	176
NE Teachers	43.5	30.4	26.1	2.17	23
Other Teachers	46.4	35.3	17	1.7	685
Journalists	42.4	35	21.4	1.79	647

Table 10.2 – Teacher Attitudes
Attitudinal Survey Responses By Item and Group

9. Inflation is primarily a monetary phenomenon.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	39.70%	30.40%	28.50%	1.89	457
Econ. Educators	47.4	34.1	17	1.69	133
Econ. Teachers	35	33.9	29.9	1.95	175
NE Teachers	43.5	17.4	39.1	2.04	23
Other Teachers	22.2	35.6	40.4	2.19	681
Journalists	18.5	25.7	50.7	2.34	621

10. The government should restructure the welfare system along lines of a "negative income tax."

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	44.40%	34.10%	19.00%	1.73	452
Econ. Educators	48.2	34.8	15.6	1.67	133
Econ. Teachers	29.4	34.5	33.3	2.04	172
NE Teachers	21.7	17.4	60.9	1.61	23
Other Teachers	26.5	35.7	30.1	2.04	641
Journalists	13.9	28.1	46	2.36	576

11. Wage-price controls are a useful policy option in the control of inflation.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	8.40%	17.70%	73.90%	2.66	464
Econ. Educators	1.5	8.2	90.4	2.89	135
Econ. Teachers	5.7	9.6	84.8	2.79	177
NE Teachers	21.7	8.7	69.6	1.52	23
Other Teachers	10.8	21.3	67.3	2.57	690
Journalists	7.6	19.2	71.9	2.65	647

12. A ceiling on rents reduces the quantity and quality of housing available.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	76.30%	16.60%	6.50%	1.3	461
Econ. Educators	82.2	13.3	4.4	1.22	135
Econ. Teachers	72.3	20.3	6.2	1.33	175
NE Teachers	82.6	13	4.4	2.78	23
Other Teachers	48.3	29.3	20.8	1.72	682
Journalists	51.3	27	20	1.68	644

Table 10.3 – Teacher Attitudes
Attitudinal Survey Responses By Item and Group

13. The Federal Reserve System should increase the money supply at a fixed rate.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	13.40%	30.60%	54.10%	2.42	455
Econ. Educators	11.1	37.8	50.4	2.4	134
Econ. Teachers	10.2	21.5	67.2	2.58	175
NE Teachers	13	8.7	78.3	1.35	23
Other Teachers	11.1	25.9	60.2	2.51	675
Journalists	5.5	23.2	62.9	2.63	600

14. The level of government spending relative to GNP should be reduced.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	35.60%	19.00%	44.60%	2.09	460
Econ. Educators	43.7	27.4	28.2	1.84	134
Econ. Teachers	49.7	27.1	22	1.72	175
NE Teachers	34.8	26.1	39.1	1.96	23
Other Teachers	51.7	31.4	15.7	1.64	686
Journalists	58.9	23.5	15.1	1.55	639

15. The Federal Reserve System has the capacity to achieve a constant rate of growth of the money supply if it so desired.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	25.40%	35.80%	36.60%	2.11	454
Econ. Educators	15.6	49.6	31.9	2.17	131
Econ. Teachers	38.4	35	26	1.88	176
NE Teachers	43.5	26.1	30.4	2.13	0.87
Other Teachers	34.9	35.9	26.7	1.92	676
Journalists	22.8	31.6	37.3	2.16	600

16. Economic evidence suggests there are too many resources in American agriculture.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	48.70%	23.90%	21.30%	1.71	436
Econ. Educators	44.4	24.4	26.7	1.81	129
Econ. Teachers	20.9	20.3	54.2	2.35	169
NE Teachers	21.7	21.7	56.5	1.65	23
Other Teachers	18.2	19.2	56.1	2.41	648
Journalists	14.2	16.2	57.1	2.49	573

Table 10.4 – Teacher Attitudes
Attitudinal Survey Responses By Item and Group

17. Reducing the regulatory power of the Environmental Protection Agency (EPA) would improve the efficiency of the U.S. economy.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	10.60%	25.40%	62.30%	2.53	456
Econ. Educators	11.1	37.8	48.9	2.39	132
Econ. Teachers	11.9	27.1	60.5	2.49	176
NE Teachers	17.4	34.8	47.8	1.7	23
Other Teachers	15.1	21.8	62.3	2.48	688
Journalists	12.4	21.2	64.7	2.53	644

18. If the federal budget is to be balanced, it should be done over the business cycle rather than yearly.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	60.10%	24.80%	13.40%	1.52	456
Econ. Educators	54.8	31.1	11.1	1.55	131
Econ. Teachers	42.4	23.7	32.8	1.9	175
NE Teachers	34.8	30.4	34.8	2	23
Other Teachers	30.8	32.4	31.6	2.01	658
Journalists	26.1	29.9	35.7	2.1	601

19. The cause of the rise in gasoline prices that occurred in the wake of the Iraqi invasion of Kuwait is the monopoly power of the large oil companies.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	11.40%	20.30%	67.50%	2.57	460
Econ. Educators	10.4	15.6	74.1	2.64	135
Econ. Teachers	40.7	22	36.7	1.96	176
NE Teachers	39.1	17.4	43.5	1.96	23
Other Teachers	45.4	25.4	28	1.82	685
Journalists	30.8	19.5	47.6	2.17	642

20. In the short run, a reduction in unemployment causes the inflation rate to increase.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	17.70%	41.00%	39.40%	2.22	455
Econ. Educators	11.9	50.4	35.6	2.24	132
Econ. Teachers	33.3	31.1	35.6	2.02	177
NE Teachers	52.2	17.4	30.4	2.22	23
Other Teachers	27.1	34.7	36	2.09	679
Journalists	20.2	35.1	40.6	2.21	628

Table 10.5 – Teacher Attitudes
Attitudinal Survey Responses By Item and Group

21. There is a natural rate of unemployment to which the economy tends in the long run.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	34.30%	34.10%	30.80%	1.97	460
Econ. Educators	51.1	34.8	14.1	1.63	135
Econ. Teachers	66.1	22.6	10.7	1.44	176
NE Teachers	82.6	13	4.4	2.78	23
Other Teachers	62.1	28.2	7.8	1.45	681
Journalists	44.3	35.9	17.3	1.72	638

22. Consumer protection laws generally reduce economic efficiency.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	18.30%	23.90%	55.80%	2.38	455
Econ. Educators	23	36.3	39.3	2.17	133
Econ. Teachers	14.1	24.9	61	2.47	177
NE Teachers	8.7	47.8	43.5	1.65	23
Other Teachers	13.7	23.9	61.2	2.48	686
Journalists	12.7	22.9	62.3	2.51	641

23. In the movement from a non-market to a market economy (e.g., Poland) it is important that the ownership of productive resources be privatized at the onset.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	35.10%	38.40%	23.70%	1.88	451
Econ. Educators	51.9	44.4	3.7	1.52	135
Econ. Teachers	33.9	50.9	14.1	1.8	175
NE Teachers	26.1	56.5	17.4	2.09	23
Other Teachers	30.6	47	19.7	1.89	675
Journalists	34.2	45.5	16	1.81	627

24. A large balance of trade deficit has an adverse effect on the economy.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	26.30%	37.30%	33.80%	2.08	452
Econ. Educators	19.3	41.5	37	2.18	132
Econ. Teachers	56.5	31.1	11.9	1.55	176
NE Teachers	43.5	30.4	26.1	2.17	23
Other Teachers	64.3	24.8	9.7	1.45	685
Journalists	58.6	28.2	10.4	1.5	637

Table 10.6 – Teacher Attitudes
Attitudinal Survey Responses By Item and Group

25. Lower marginal income tax rates reduce leisure and increase work effort.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	22.60%	32.80%	43.80%	2.21	460
Econ. Educators	20.7	41.5	34.1	2.14	130
Econ. Teachers	21.5	23.7	50.9	2.31	170
NE Teachers	17.4	26.1	52.2	1.57	23
Other Teachers	13	24.1	54.3	2.45	634
Journalists	8.4	20.8	60.6	2.58	588

26. The trade deficit is primarily a consequence of the inability of U.S. firms to compete.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	18.10%	29.70%	51.50%	2.34	134
Econ. Educators	18.5	35.6	45.2	2.27	134
Econ. Teachers	35.6	35	29.4	1.94	177
NE Teachers	8.7	26.1	65.2	1.43	23
Other Teachers	35.5	39.6	23.5	1.88	684
Journalists	25.2	37.4	35.6	2.11	643

27. Reducing the tax rate on income from capital gains would encourage investment and promote economic growth.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	21.10%	28.20%	49.80%	2.29	460
Econ. Educators	34.1	37.8	27.4	1.93	134
Econ. Teachers	44.1	33.3	22	1.78	176
NE Teachers	47.8	52.2	0	2.48	23
Other Teachers	35.3	34.2	28.1	1.93	677
Journalists	40	33.4	25.3	1.85	647

28. The U.S. government should retaliate against dumping and subsidies in international trade.

Groups	Generally Agree	Agree with Provisos	Disagree	Mean	N
Economists	15.10%	35.10%	47.60%	2.33	454
Econ. Educators	7.4	35.6	56.3	2.49	134
Econ. Teachers	30.5	38.4	31.1	2.01	177
NE Teachers	34.8	30.4	34.8	2	23
Other Teachers	35.7	40.4	21	1.85	674
Journalists	32.1	41.8	23.2	1.91	636

Appendix 2 - Nebraska Economics Standards
Correlated to the TUCE and TEL

NE ECONOMICS STANDARDS (Grades 9-12)	TUCE Form A	TEL Form A
12.3.10 Students will compare the United States political and economic systems with those of major democratic and authoritarian nations. • Compare the structures, functions, and powers of political and economic systems. • Describe the rights, responsibilities, and powers of the governed, e.g. grass roots citizens' movements • Compare the relationship between economic and political freedom. • Explain the allocation of resources and its impact on productivity. • Describe the development and implementation of personal economic decision-making skills in a democratic society.	Micro: 6, 7, 15, 16, 23, 24, 25, 26, 27 Macro: 5, 12, 16	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 21
12.3.11 Students will analyze characteristics of the United States free market economy. • Define labor, capital resources, and natural resources. • Describe the role of private ownership, private enterprise, profits, and entrepreneurship. • Compare the relationship between households, firms, and government. • Explain the labor and management relationships. • Discuss opportunity costs, scarcity, and balancing unlimited wants versus limited resources. • Explain supply and demand, and the formation of basic economic questions, including what to produce, how to produce, and for whom to produce	Micro: 1, 2, 3, 9, 11, 8, 10, 11, 18, 19 Macro: 26	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 21, 27, 30, 40
12.3.12 Students will analyze the role of the national, state, and local government in the United States economy. • Compare interstate commerce and trade policies. • Discuss promoting economic growth by providing favorable conditions for markets. • Compare providing public goods, services, and protection of the environment. • Explain the interrelationship of producers, consumers, and government in the United States economic system. • Discuss the impact of fiscal and monetary policy. • Identify the basic economic goals in a free market system, including growth, stability, full employment, and efficiency versus equity and justice.	Micro: 11, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27 Macro: 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 27	4, 5, 8, 9, 11, 12, 14, 15, 16, 17, 19, 20, 22, 23, 24, 26, 31, 32, 33, 34
12.3.13 Students will examine the basic economic indicators and fundamentals of international trade. • Define Gross Domestic Product • Define Consumer Price Index, employment statistics, and other measure of economic conditions. • Explain comparative and absolute advantage. • Discuss exchange rates. • Explain international trade policies, and the United States relationship to the global economy.	Micro: 28, 29, 30 Macro: 1, 2, 3, 4, 5, 11, 19, 28, 29, 30	25, 26, 27, 28, 29, 30, 35, 36, 37, 38, 39, 40