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Economics Across the Curriculum: Effective Delivery of Economics Instruction to High School Students

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Abstract

The Economics-Across-the-Curriculum approach encourages the integration of economic concepts into various disciplines. This helps teachers and students experience the beauty of interdisciplinary connections among topics and engage in intellectual inquiry beyond the impermeable walls of a single-subject area. This framework enables students to dig deeper into the content, to wrestle with the information, and to build teams of collaborators in order to tackle a multidimensional project. These are the skills that will make them successful in a dynamic 21st century global marketplace. The program appeals not only to economics teachers but also to teachers of English Language Arts, social studies, math, and foreign languages. The participants' diversity generates a cross-pollination of ideas, dynamism, and an interdisciplinary approach to teaching.

The paper contributes to the literature on economic education by describing the results of a multi-day program of the American Institute for Economic Research that uses the Economics- Across-the-Curriculum approach. It also showcases several lessons that were field-tested by participants in their classrooms after the completion of the program, which could serve as catalysts of other innovative ideas for integration of economics across the high-school curriculum.

JEL code: A21

Key words: economic education, teaching of economics, pre-college, Economics Across the Curriculum

September 2016

Acknowledgment: The author is grateful for the help of AIER research interns Jane Peng and Cindy Li and summer fellow Kristopher Cramer.

1. Introduction

The need for integrating economic concepts into the high school curriculum is well documented, especially after the adoption of Common Core national standards and during the current push for the implementation of those standards. If we abstract from the politically charged discussion about the standards themselves, we still recognize the need to equip the young generation with the skills and knowledge needed for success in the global marketplace of the 21st century.

The consensus among economic educators is that knowledge acquisition of high school students is maximized when (1) teachers understand the content; (2) teachers are trained in teaching economics through a well-designed course; and (3) teachers use high-quality curriculum materials. Therefore, the need for teacher training is undeniable if one wants to impact student learning.

To respond to this demand, the American Institute for Economic Research (AIER) created the Teach-the-Teachers Initiative (TTI) with two objectives in mind. The first is to help high school teachers gain a deeper understanding of various economics concepts, and the second is to demonstrate active engagement as well as other collaborative instructional strategies with the use of nationally-proven curriculum materials. Our hypothesis is that the achievement of these objectives improves the quality of teaching and thus the quality of student learning.

Since AIER is an economic think tank with more than eighty years of economic research experience, we are well positioned to focus the workshops on providing economic content. Additionally, we created the *Economics-Across-the-Curriculum* approach, which encourages the integration of economic concepts into various disciplines. This helps teachers and students experience the beauty of interdisciplinary connections among topics and engage in intellectual inquiry beyond the impermeable walls of a single-subject area. The program, therefore, appeals not only to economics teachers but also to teachers of English Language Arts, social studies, math, and foreign languages. The participants' diversity generates a cross-pollination of ideas, dynamism, and an interdisciplinary approach to teaching.

So far three cycles of TTI have been conducted, which correspond to three years – 2014, 2015, and 2016. During the first two cycles we conducted one multi-day in-residence workshop per year at AIER's campus in Western Massachusetts. Twenty-two teachers attended the program on June 23-27, 2014, and 17 teachers attended the program on June 22-25, 2015. During the third cycle, we scaled the program. We conducted three workshops in the summer 2016 in Boston, Chicago, and Philadelphia reaching 83 teachers. We also established collaborative relationships with the regional Federal Reserve Banks and Councils for Economic Education.

This paper describes the framework of the workshops, field-tested ideas of high school lessons, and the results of the first two cycles' evaluations. The third cycle field-tests are still being planned for the Fall 2016.

Section two reviews the literature on the effectiveness of teacher training programs; section three describes the TTI curriculum; section four presents the results and examples of implemented lessons; and section five concludes.

2. Research Findings on Teacher Training Programs

The literature on the effectiveness of teacher training programs in economics is abundant. The delivery of economic concepts, recruitment and retention of students, curriculum design, and active instructional strategies enhancing student performance in economics courses are extensively addressed.

The seminal Walstad and Watts (2015) paper concludes that teacher education in economics is essential for improving student learning in the subject. It outlines two methods of teacher preparation: (1) pre-service training (during undergraduate studies) and (2) in-service training (courses and workshops for those teachers who are already licensed and teaching). Both ways are essential for improving the odds of infusing economics in other subject areas within the K-12 curriculum. We selected the second way of teacher training (in-service) because the institute is not an academic institution and can only effectively contribute in the area of professional development workshops and other out-of-classroom engagements.

In order to create the most effective, dynamic, and memorable program for teachers, we explored research findings on teacher training programs. We concentrated on evidence of the best format, best pedagogical approaches, best assessment methods, and the biggest impact on student learning.

A large body of literature deals with the medium of teacher training, encompassing the organization and the logistics of the workshops. These studies measure the effect on teachers: their knowledge acquisition and retention, their confidence building, and their creativity generation. Swinton, Scafidi, and Woodard (2012) found that the most effective workshops for high-school teachers are seminar-style delivery of information in the form of in-service training.

The Centers for Public Education of the National School Board Association's (Gulamhussein 2013) report suggests that professional training workshops for teachers should be in the form of active learning where teachers are engaged in making sense of a new concept or practice. Another feature of a successful workshop is substantial duration, to allow time for teachers to learn, process, and ponder the implementation of a new strategy.

The delivery of information to students is very important. If students are engaged in the learning process rather than being bystanders, they will retain the information presented to them. Contemporary pedagogy must include active learning, hands-on activities, collaboration, and team-work. Teachers, therefore, should be able to deliver content in an engaging way. These methods are new to teachers, as

they have not been taught this way, they have not used technology to the extent their students do, and a majority of teachers have never been trained in these pedagogical approaches. In addition, the pressure of compliance with national and state standards and school district-specific requirements add to the difficulty of finding time and resources for creative innovation in the classroom.

The role of the professional development course is thus in the selection and modeling of new pedagogical methods that help teachers be successful in the new 21st century classroom. We use Framework for Teaching (Danielson 2007) and the Understanding by Design (Wiggins and McTighe 1998) as the basis for the structure within which each teacher can be creative and flexible in his or her pedagogy.

Framework for Teaching, designed by Danielson (2007), identifies teacher practices that promote improved student learning and encourages teachers to use them. According to Danielson, the complex activity of teaching is clustered into four domains of teaching responsibility: (1) planning and preparation, (2) classroom environment, (3) instruction, and (4) professional responsibilities. Danielson bases her rubrics on three priorities of student learning: cognitive engagement, constructivist learning, and 21st century skills.

A prerequisite for student learning is cognitive engagement. The engaged student not only attends to built-in procedures of instruction but also interacts with the content of the lesson in a deep and thoughtful way. Thus, cognitive engagement promotes active learning and builds on pre-existing knowledge. It encourages learning to take place in a social context and uses the inquiry model.

Constructivist learning, according to Danielson (2007), maintains that teaching and learning are student centered. Teachers are asked about (and evaluated on) students' learned ability to construct their own understanding, connect to what they already know, create their own schema of understanding, and reflect on their own learning.

The demands of the global economy require 21st century skills of teamwork, consensus building, and collaboration through various channels. Thus, development of communication, collaboration, creativity, critical thinking, and problem solving skills are required by this priority.

Another pedagogical approach with a big impact on student learning outcomes is Understanding by Design (UbD) developed by Wiggins and McTighe (1998). This approach is a framework for designing curriculum units, performance assessments, and instruction that leads students to a deep understanding of the content. Deep understanding, according to Wiggins and McTighe, includes students being able to explain, interpret, apply, empathize, have perspective, and develop self-knowledge concerning a given topic. The way to achieve these results is to start by designing activities based on the assessment of what students will be able to do and then design the curriculum materials.

Both pedagogical approaches, Framework for Teaching and Understanding by Design, promote active learning techniques and collaborative learning through various delivery methods and media. Active

learning techniques and experiments are now widespread in both economics and the social sciences (Mitchell et al., 2009; Lantis et al., 2010; Gremmen and Van Den Brekel 2013), allowing teachers to reach various types of learners (Emerson and Taylor 2007, Durham et al., 2007).

Lopus and Hoff (2009) studied economists who train high school economics teachers. They find that teachers should be taught to use different types of assessment activities to promote success for different types of students. Formative assessment is ongoing and designed to monitor student achievement and understanding while providing teachers with data that will enable them to adjust instruction to meet student needs. Formative assessment also allows students to monitor their own learning. Examples of formative assessment are questioning, discussion, exit tickets, learning logs, presentations, and think-pair-share. Summative assessment is cumulative in nature and is designed to help teachers understand if concepts were learned, need to be retaught, or should be taught in a different manner. Examples of traditional summative assessment are state-mandated assessments, district benchmark assessments, and chapter tests.

Chetty, Friedman, and Rockoff (2014) provide evidence of the impact of content knowledge and the effectiveness of teachers on improving students learning outcomes. Walstad (1992, 2001) demonstrates that teacher training and teacher experience are important determinants of student learning in economics. Watts (2006); Clark, Schug, and Harrison (2009); and Asarta, Hill, and Meszaros (2014) provide evidence that a well-designed course taught by properly trained teachers has a positive effect on the content learning of high school students.

The literature recognizes students' knowledge acquisition and retention, their confidence building, and their future career/major selection as outcomes of the teaching process. The evidence suggests that student learning outcomes are improved by interactive teaching strategies, real-world applications, and various forms of visualization, communication, and interaction, such as videos, online activities, and the utilization of Facebook and Twitter in the classroom. For example, Rebeck and Asarta (2012) and Kassens and Enz (2014) report a strong impact on student learning when social media is utilized in the classroom.

Shulman (1986) emphasized the importance of Pedagogical Content Knowledge (PCK), which is a blend of content knowledge and pedagogical knowledge that is unique to a particular subject. He argued that teachers should be trained to transform content knowledge into pedagogically powerful and flexible tools that can serve students of various abilities and backgrounds.

Research supports active learning practices in the classroom for better knowledge retention in economics (Holt 1999; Mitchell et al., 2009; Ha and Wisniewski 2011; Lantis et al., 2010; Kaplan and Balkenborg 2010; Green 2014). Such studies as McGoldrick (2012), Hansen and Salemi (2012), Emerson and Hazlett (2012), and Wolla (2014) produced evidence that active and collaborative learning increases students' learning outcomes.

By utilizing the best practices in economics education, we are able to create instructional goals, methods, and materials that are flexible and can be customized and adjusted for individualized classroom needs. The presentation of economic concepts is facilitated by the incorporation of interactive graphics, videos, and experientially based examples and assignments. This interactive pedagogy enhances students' ability to understand the material and retain the information.

Based on the evidence from the literature, the American Institute for Economic Research (AIER) decided to contribute to the improvement of teacher training with the goal of infusing economics into various subjects. The AIER Teach-the-Teachers Initiative (TTI) is a multi-day workshop where teachers are trained in both content and pedagogy as a method of integrating economics across the curriculum, engaging students, and improving learning outcomes. Teachers are exposed to active teaching techniques and are introduced to performance-based assessment ideas such as authentic projects, demonstrations, digital images, animations, interactive quizzes, video-casts, writing samples, spreadsheets, and others. Teachers leave the workshop with one creative lesson idea in hand and with a plan to field test this idea in their classroom. We outline special features of the program in the next section.

3. Special Features of the Teach-the-Teachers Program

TTI utilizes the approach of an in-service training seminar with a new twist: It adds AIER's 80 years of expertise in the topics covered. The deep knowledge of content areas coupled with best educational practices translates into high-quality economics instruction in an active learning format. The special features of the program are an interdisciplinary Economics-Across-the-Curriculum approach, innovative pedagogy and assessment, and the follow-up process assessing student learning outcomes.

The Economics-Across-the-Curriculum feature is borrowed from the well-known educational practice of studying concepts across disciplines in a coherent and coordinated manner.[1] Within the TTI program, we demonstrate how to integrate economic concepts into various disciplines taught at the high school level. The TTI curriculum is flexible enough to be adopted in English Language Arts (ELA), social sciences, or math classes. In addition to being a valuable approach in its own right, this flexibility allows teachers to comply with the interdisciplinary integration demands of the Common Core, which calls for incorporating critical thinking and knowledge building into every subject matter. The TTI syllabus allows teachers to choose the aspects of economic topics and informational texts that are relevant to their subjects and most closely aligned with their students' levels.

[1] For information about writing-across-the curriculum approach and publications see: http://wac.colostate.edu/network/

Economics Across the Curriculum allows for knowledge transfer. By embedding an economic concept into various subjects as well as into various points of the subject-specific curriculum, we provide an opportunity for deeper understanding of that concept.

The second special feature of the program is the pedagogy, which encompasses creative approaches to deliver information to students and a variety of delivery methods. AIER's TTI uses the Framework for Teaching and Understanding by Design methods described in the previous section.

We promote the use of techniques to engage various learning styles by creating flexible and interesting hands-on activities. These activities include: using the Internet to find data that is easily downloadable and interactive (for example, using FRED, or Federal Reserve Economic Data); creating cooperative learning exercises that explore the richness of information available within the experiences and interests of the students (for example, the Scavenger Hunt activities); and leading a discussion about various economic indicators, trends, and results discovered during the exercises (for example, discussion of the AIER Everyday Price Index and its comparison with the Consumer Price Index). By demonstrating the concepts and requiring interaction with them, TTI assures that learners (in this case, teachers) retain and comprehend information and develop a deeper understanding.

The third special feature of AIER's TTI is the assessment of student learning outcomes. The emphasis on reaching students through the treatment of teachers is a very important aspect of the program. The TTI program encourages teachers to use the above-mentioned pedagogical strategies by demonstrating lessons and presenting a variety of contemporary resources.

TTI introduces formative and summative assessment methods and encourages their integrated use. During the TTI program teachers are trained to use formative and summative assessments together. This assessment integration helps teachers make appropriate pedagogical decisions to maximize student learning. It informs teachers as to what students have learned and enables them to modify and adjust their instruction.

The next sections of this paper describe the evidence of the positive effect of the Teach-the-Teachers program on teachers and on students during two inaugural cycles. Teachers were gratified to learn how to incorporate economic concepts into their lessons as well as to have the opportunity to network, share classroom stories, and be with peers from diverse backgrounds. Students were pleased with the teachers' engaging strategies, real-life examples, and the spectrum of resources provided to them.

Even though the sample size of this study is small (39 teachers, 483 students), the qualitative evidence of personal conversations, evaluation write-ins, and classroom observations suggests that such a program is an appropriate vehicle to motivate teachers and entice students. The sample of this study is not random. Teachers who came to the program were self-selected and highly motivated. This study, therefore, serves as an illustration of the successful practice of a professional development workshop.

4. Economics Across the Curriculum

The TTI workshop focuses on three areas of economics—money and inflation, business cycles and unemployment, and government and the economy—and how each of these areas affects daily lives. We selected these three topics because they are important to grasping the general notions in economics. They also coincide with AIER's 80 years of experience in assessing and analyzing these concepts and presenting the information in interesting and engaging ways. These topics also cover various parts of all Voluntary National Content Standards in Economics developed by the Council for Economic Education in 2010, which makes them very useful in satisfying state and district requirements in economics, as well as Common Core national standards.

Participants learned not only economic concepts and their application to real-life problems but also were trained in innovative pedagogical approaches to deliver the content and with assessment techniques appropriate for the 21st century learners. At the end of the workshop, each teacher presented his or her own lesson idea using the economic concepts and teaching and assessment strategies demonstrated during the workshop. Upon their return to their classrooms in the fall semester, the teachers field tested their lesson plan ideas, increasing the impact of our educational curriculum to dozens of students in actual high school classrooms.

For the money and inflation topic, in addition to a regular textbook exposition of the functions of money, the Federal Reserve System structure, and inflation calculation, we introduce the Everyday Price Index (EPI). This AIER proprietary index captures day-to-day experiences of the consumer by tracking prices for goods that people cannot easily postpone or forgo purchasing. The EPI thus reflects the inflation risk to people's everyday budgets by looking at the purchases consumers cannot easily adjust from one month to the next. We direct the participants to AIER's EPI web page, where they can interact with the EPI and download current data comparing the EPI and the Consumer Price Index. The workshop helps teachers create a lesson plan that builds knowledge through content-rich informational text, which plays an essential role in English Language Arts (ELA) literacy and in the Common Core standards.

The second topic, business cycles and unemployment, is also a cornerstone of AIER's research. When the institute was created in 1933 the task was to investigate the causes of the Great Depression and provide guidance to the general public of how to prepare for economic downturns. AIER has created a Business-Cycle Conditions (BCC) model, which we share with the participants. We explain how AIER monitors economic activity on a monthly basis; we hand out the most current BCC publication, and we generate a discussion about gross domestic product and leading, coincident, and lagging economic indicators.

This interaction provides teachers with tools to create assignments that ask students to use evidence from texts to present careful analyses, well-defended claims, and clear arguments. These real-life and

well-developed assignments help teachers cultivate the command of sequence and detail that is an essential foundation for effective argumentative and informational writing.

The unemployment rate is taught through an example of the Unemployment Survey[2], using a role-playing interaction to introduce a nuanced Bureau of Labor Statistics approach to the rate's calculation. As participants struggle to decide if stay-home-moms or retired accountants are counted as part of the labor force, they start to appreciate the procedural difficulty of data collection. In addition, by allowing supplementary topics to bolster students' interest in the subject matter, teachers are able to engage the class in substantive discussions and debates as well as to create coherence and linkages between the fields of study. This interdisciplinary feature of the TTI curriculum is at the core of the teaching philosophy of the Economics Across the Curriculum workshop.

The third economic topic that is covered is government and the economy. Here we base our instruction on AIER's publications on property rights and fiscal policy. The curriculum also includes discussion of the functions of government, the provision of public goods, and the notion of externalities[3]. We carefully select government websites to show the location of current public-sector data and use games and other interactive activities to entice interest in understanding the pros and cons of government intervention in the economy. The interactive TTI pedagogy enhances students' abilities to conceptually understand the role of government in the current economy as well as through history and from a number of perspectives.

The reading standards within the Common Core focus on students' ability to read carefully and grasp information, arguments, ideas, and details based on text evidence. The TTI materials provide an opportunity for teachers to select the most appropriate text for their students' levels and to create a range of text-dependent questions.

The next section presents the evidence of the positive impact of the TTI curriculum on participating teachers and on their students.

5. Results of the Economics-Across-the-Curriculum Workshops

The participants in each of the three cycles of Teach-the-Teachers program represented diverse fields of study as well as diverse geography and types of institutions. Since the third cycle of the program was very different from the first two (the sessions were conducted in various locations and teachers were recruited in those localities with the help of our collaborators), we will be separating this group from the previous two years' participants. The 2014 and 2015 cohorts' statistics are shown in Table 1.

[2] Anderson et al., 2014: pp. 259-276.
[3] Lopus and Willis, 2003 (Reprint 2008): pp. 29-40.

Table 1. Participants' subject areas, school location, and type

	Number of Teachers = 39		
Field of Study	*2014*	*2015*	*Total*
Economics	8	2	10
Mathematics	5	2	7
Business	3	3	6
History	3	10	13
Psychology	1	0	1
Science	1	0	1
Spanish	1	0	1
School Location			
New Jersey	12	1	13
Massachusetts	9	11	20
Connecticut	1	1	2
Pennsylvania	0	1	1
Rhode Island	0	2	2
New Hampshire	0	1	1
Type of School			
Public Schools	18	15	33
Private Schools	4	2	6

During the summer of 2016, we collaborated with the Federal Reserve Banks of Boston, Chicago, and Philadelphia as well as with Massachusetts and Illinois Councils for Economic Education to bring this program to the national stage. Three sessions of *Economics Across the Curriculum* were held in 2016 with a total of 83 teachers attending the program. See Table 2 for the states and disciplines represented.

Table 2: TTI Participants – 2016, number of teachers = 83

TTI Location	**States Represented**	**Disciplines Represented**
BOSTON (36):	MA=34 (23 from Boston Public Schools) NJ=1 NY=1	History=19, Math =5, Economics =3, Personal Finance/Financial Literacy=2; English=2; ESL (English as a Second Language) =2; Humanities=1; Biology=1; Psychology=1.
	Public schools = 34 Private schools = 2	
CHICAGO (29):	IL=28 (8 from Chicago Public Schools) MO=1	Consumer Science/Ed=6; History=5, Economics =5, Business=4; Instructional Technology=2, Elementary schools=2; Graphic Design=2; Enrichment=1; School Counsellor=1.
	Public schools = 28 Private schools = 1	
PHILADELPHIA (18):	PA =10 NJ=7 NC=1	History=5, Economics =4; Financial Literacy =3, Consumer Science=2; Math=2; Business=1; Humanities = 1.
	Public schools = 15 Private schools = 3	

We observed that the level of preparation of teachers in the field of economics differs. It is not only different based on the fields of study of the high school teachers, but it also depends on the state requirements regarding economics curriculum. For example, Massachusetts and Connecticut include economics as an elective in the high school curriculum. New Jersey's more stringent arrangement requires school districts to offer economics courses and students to take them. New York has even more rigorous standards: in addition to offering economics, the state requires testing students' learning outcomes[4]. Based on these state differences, we must be attentive to teachers' economics preparedness and to adjust the content exposition to the level of the group.

After the economic topics are presented and lessons are demonstrated, participating teachers develop their own lesson ideas based on the information they have learned. They must adjust the lessons to appropriately fit the student constituency in their classrooms. Participants present one unique idea during the last day of the program before members of their cohort and a panel of judges. Teachers are encouraged to field test their lesson idea in the classroom. The creativity of teachers who participated in TTI 2014 and 2015 resulted in innovative approaches to exposition, imaginative pedagogy, and sensitivity to various learning styles. Below are several examples of the lessons implemented by TTI teachers during the field tests.

5.1. Implemented Lessons

In this section we showcase ten lessons that we observed in action. One lesson is for special needs population and the others are presented by the topic covered. These ideas could be used as catalysts for other creative approaches to incorporating economic concepts into the high school curriculum.

A. Topic: Money and Inflation

1) Teaching Quantity Theory of Money in Spanish Class

We observed a Spanish II class at the Monument Mountain High School in Great Barrington, Massachusetts. The class was conducted in Spanish.

The topic was market-price determination. Students participated in a demonstration of how prices are set in actual, roadside markets in Guatemala, Ecuador, Columbia, Bolivia, or Peru. A lesson in *laissez-faire* involved various folk objects from Latin American countries (supplied by the teacher) to be traded by active bargaining (in Spanish) by students. Among the objects were baskets, knitted goods, blankets, and masks. The currency was the actual legal tender bills from the relevant countries (provided by the teacher). Students volunteered to be the seller or the buyer through different rounds of the game and the role-play was engaging and at times quite humorous.

[4] Council for Economic Education. 2016. *Survey of the States: Economic and Personal Finance Education in Our Nation's Schools, 2016.* http://councilforeconed.org/policy-and-advocacy/survey-of-the-states/

Underneath the rowdy classroom interactions was an important lesson in economics. The students recorded prices of the goods on the board, and as the rounds progressed, they were able to experience and understand how an increase in money supply caused the prices of the goods to rise.

The discussion at the end of the lesson, still in Spanish, focused on factors that determine the price of a good in a market. Many factors were named, such as the size, the material, and the utility of an object. However, students dug deeper and mentioned the state of the economy, the quantity of money, and the cultural differences as other main factors of the market-price determination. The main conclusion of the lesson: Too much money chasing the same amount of goods will raise the price level in the economy.

This visit demonstrates that our Economics-Across-the-Curriculum model encourages teachers from various disciplines to bring creativity and non-standard interactive approaches into their classrooms. In addition, it demonstrates the dissemination of economic and financial literacy information in an imaginative manner.

2) Building a Price Index with Doughnuts and Mountain Dew

Students at Monument Mountain Regional High School were also involved in an interesting and creative twist on traditional economic indexing. This lesson was presented in a financial algebra class.

The Everyday Price Index, calculated each month by the American Institute for Economic Research, reflects price changes felt by Americans on a day-to-day basis. It measures the prices of those items that people buy frequently, such as food, utilities, fuel, and prescription drugs. Students in this class went a step further. They created a Student Price Index, focusing on goods and services that are most often purchased by high school students.

First, students worked together to identify which goods and services they buy at least once a week and opted for a list that was a reflective of their daily lives, as you can see in Table 3. They decided in which stores in Great Barrington to record prices, and exactly which products to monitor, down to the size and packaging options of each brand.

Over the 10 weeks that followed the initial lesson, students collected price data from the designated businesses. They used that information to create their Student Price Index, in much the same way AIER constructs the Everyday Price Index and the Bureau of Labor Statistics constructs the CPI, showing the change in prices over time.

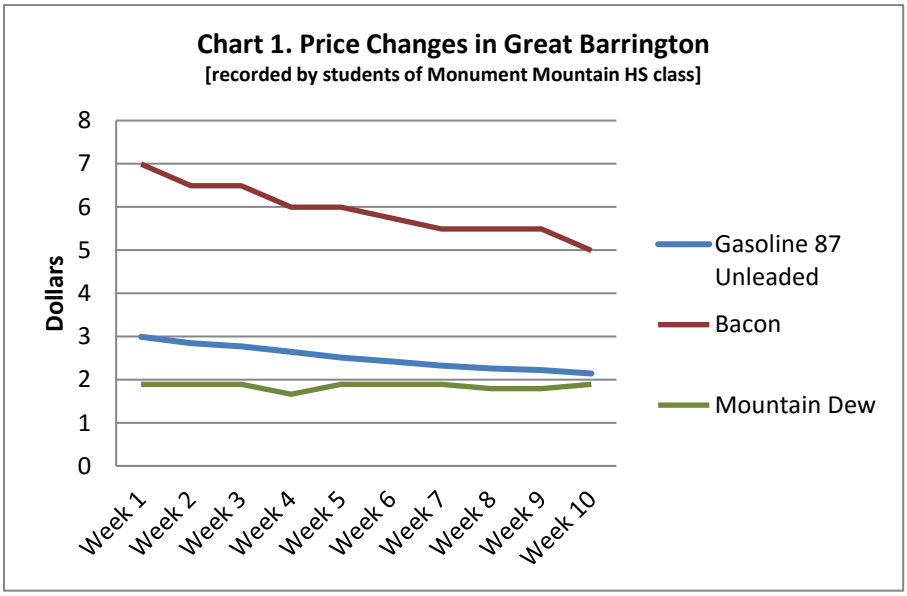
This exercise taught students a powerful, experiential lesson about the definition and importance of a market basket and diverse methods of building price indexes, and it exposed them to the process of gathering price data and the limitations of this process and these data.

Table 3. Market Basket Created by Students in Great Barrington, Mass.

Item	*Quantity*	*Location*
1. Gasoline – 87 unleaded	15 gallons	Cumberland Farms, Main Street
2. Chips – Lay's potato chips, sour cream, family size	2 bags	Cumberland Farms, Main Street
3. Doughnuts -- regular	6	Price Chopper
4. Bagels -- regular	2	Price Chopper
5. Arizona iced tea – 16 oz. can	5	Price Chopper
6. Soda – Mountain Dew, 1 liter	2	Price Chopper
7. Coffee – medium cup, regular	3	Price Chopper
8. Bacon, 1-pound pack	1	Price Chopper
9. Movie ticket	1	Triplex Movie Theatre
10. Lighter -- BIC	1	Mobile Gas Station, Main Street

When the Student Price Index project started in November, the expectation was that there would be limited price changes in Great Barrington stores during the 10-week data collection time span. When we returned to Monument Mountain High School class in March, we were surprised by the outcome, shown in Chart 1.

Through the three-month period, students diligently collected prices at agreed-upon locations for ten items identified in their market basket. Gasoline prices declined, as expected. However, bacon and Mountain Dew also changed prices. This was unexpected. As Chart 1 shows, the price of bacon declined considerably.



Through this extended exercise, students not only studied how a price index is constructed, what a market basket is, and how inflation (or deflation) affects out-of-pocket expenses, but they were also involved in the actual field research, methodically gathering data and recording it.

There was an "Aha!" moment among students when they realized that not only gasoline prices change from week to week. Even though they had the perception that prices of the goods in the market basket are stable, it was interesting to learn that Mountain Dew and bacon prices do fluctuate. Students recognized that if goods are cheaper, it allows them to have extra money in their pockets.

For the final task, each student synthesized and presented what they learned in papers, artwork, presentations, or a small book. These alternative assessment options are the type of variety the TTI workshop encourages.

3) Teaching Inflation, Using a Day at the Ballpark

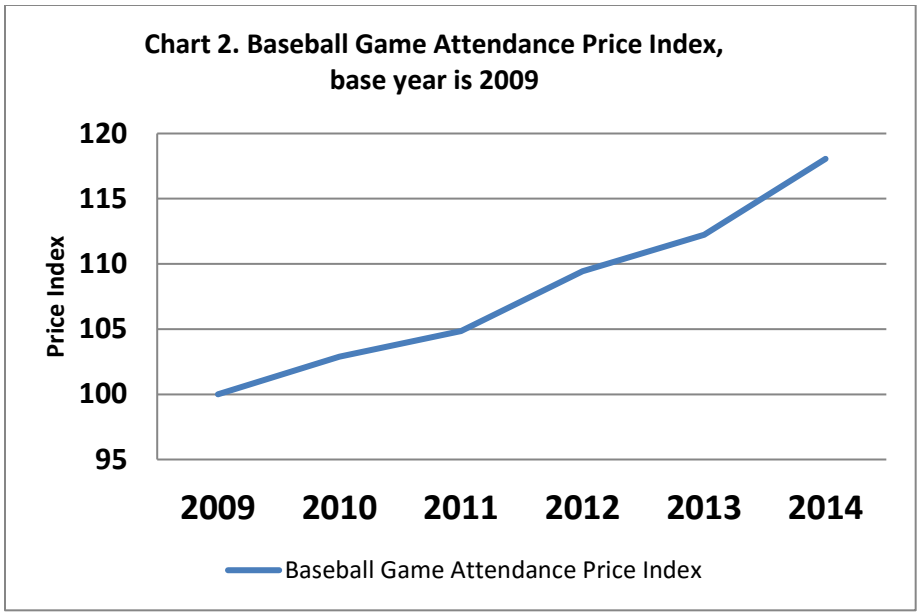
One alumnus of the TTI program crafted an especially creative teaching tool: He demonstrated inflation using things purchased during a day at the ballpark.

The teacher of business and consumer finance at Monument Mountain Regional High school in Great Barrington, Massachusetts, gave his students data on the "market basket" for two fans at a major league baseball game. The goods in the basket were: two tickets, two hot dogs, a large bag of peanuts, two sodas, and one order of nachos. Table 4 provides data of hypothetical prices for each good for the period from 2009-2014.

Table 4. Data for the Baseball Game Attendance Price Index

Item	Quantity	Price per item					
		2009	2010	2011	2012	2013	2014
Ticket	2	$55.00	$56.50	$57.50	$60.00	$61.50	$65.00
Hot Dog	2	$4.50	$4.50	$4.55	$4.65	$4.65	$4.75
LG Peanuts	1	$3.50	$3.55	$3.75	$3.85	$3.95	$3.95
Soda	2	$2.50	$2.75	$2.75	$3.00	$3.15	$3.25
Nachos	1	$3.75	$4.00	$4.25	$4.50	$4.75	$5.00

The lesson led students through the calculation of the cost of the market basket, construction of the baseball game attendance price index, and calculation of inflation/deflation. Chart 2 presents the dynamics of the price index of the baseball game attendance. The students were able to see that the baseball game attendance inflation averaged 3 percent per year during this period, and in 2014 it reached 18 percent as compared to 2009.



Through the TTI program teachers acquire deep knowledge of several economic concepts, and they continue using this knowledge to create new assignments; to inspire students to think outside the limits of textbook examples and content; and to intrigue them with novel ideas. In fact, this lesson was an extension and re-application of the Student Price Index described in section A-2 above. This provides the evidence of the long-term value of Teach-the-Teachers program, not just of the short-run improvement of knowledge and enthusiasm of the teacher.

4) Learning American History with Movie Tickets and Babysitting

We observed two American History II lessons taught at Mount Greylock Regional School in Williamstown, Massachusetts. The purpose of the lessons was defined by the teacher as "discovering the story behind economic data and charts."

The teacher used data on babysitting wages per hour and movie ticket prices from 1945 through 2000, to make an interesting point about supply, demand, and price. The data was taken from Virtual Economics[5] published by the Council for Economic Education. The students computed the average annual rate of increase for both values and graphed the relationship between babysitting wages and movie ticket prices. They were able to see that these two values were positively correlated.
The teacher used the increasing price levels of movie tickets to explain simple inflation. But he asked the students to think on a higher level. The class discussed the concept of purchasing power of one hour of work. Then, looking at the data, they concluded that movie ticket prices probably increased before babysitting wages increased. This led to the discussion of the causality between the price and wage movements.

[5] Virtual Economics. Version 4.5 Flash Drive. http://www.councilforeconed.org/resource/virtual-economics-2/

By noting the start date for the data string (1945), the students speculated that the population increase called the Baby Boom probably triggered a general inflation due to increased demand. Subsequently, a higher level of prices in general, and for movie tickets in particular, prompted teenagers to command higher wages for their services so they could afford to go to the movies.

For homework, the teacher asked students to imagine the likely level of prices and wages in the year 2025. He also asked students to consider what would happen to babysitting wages in the future if there were a surplus, or if there were a shortage, of teenagers willing to babysit.

In this class, students learned important concepts such as inflation, the price of labor, and demand and supply as well as correlation, causation, and the vocabulary of demographics. Based on the evidence in the literature we expect that the teacher's use of an interesting, hands-on approach, will result in the students' increased recall and application of those concepts in the future.

5) Teaching Exponential Function in Algebra Class

In April, at 8 o'clock in the morning, 13 students gathered in Monument Mountain Regional High School's Algebra II class. The day before they had studied definitions of inflation, deflation, and disinflation, as well as the consumer price index (CPI). They had also decided on nine items to be included in their market basket. Today their teacher was preparing them to work in groups to perform calculations with the real data.

As the groups were forming, the teacher distributed sheets of paper containing the price information from the Bureau of Labor Statistics (BLS) for the nine goods in their consumer market basket. The first task was to calculate the cost of market basket from 1980 till 2015. To make sure that each student was engaged with the data, each group was assigned a different time period: 1980-1993; 1994-2005; and 2006-2015. To record the answers, the teacher used a large poster paper hung on the board in the front of the classroom. Soon the column for market basket cost was filled in and the class proceeded to calculate the CPI and then inflation. During the subsequent class, the discussion topic was observing the changes in the CPI and the connecting the occurrence of those changes to the recession years.

Students observed that during the recessionary periods of 1981-1982, 1990-1991, 2001-2002, and 2008-2009 the cost of their basket showed a decline, and subsequently the price indexes changed their value, and inflation changed to deflation. It was interesting to see how engaged students were with an economic concept in the math class. Because this was a math class the teacher then connected the CPI trend to the exponential function. What an interesting and engaging conversation this was for students to analyze a real life phenomenon during a lesson on an exponential function.

The most amazing thing about this class is that the teacher, who had never taken an economics class in her studies, was using economic concepts with ease and clarity. She has been a math teacher for many

years and has a great deal of experience explaining mathematical functions and equations. However, after attending the AIER Teach-the-Teachers workshop Economics Across the Curriculum, she discovered that an infusion of economic concepts into her math class would engage students, expose them to the original data source and primary data, and would make them appreciate real world applications of math. When she came up with this lesson idea in the summer she was unsure how it would be received. However, after this module on inflation and exponential function, she excitedly reported that the students mastered exponential functions and had fun doing it.

B. Topic: Business Cycle and Unemployment

1) Teaching the Unemployment Rate in Math Class

We observed the honors algebra class taught at Mt. Everett High School in the Southern Berkshire Regional School District, Massachusetts. The topic of the day was "Slope, Regression Line, and the Trend." One would expect a chalk-and-talk exposition of the mathematical formulae for the derivation of a slope of a linear regression line on the board. In this class, however, students were exposed to the Federal Reserve Economic Data (FRED) website and explored data for Berkshire County (where AIER and the high school are located) on population and the unemployment rate. When students struggled to put both lines on one graph, the teacher used the interactive tools on the FRED website to demonstrate how the scale of the vertical axis will affect the graph and how the domain is affected by the selection of the various time frames. Students observed and discussed the negative slope of a trend and seasonal adjustment of economic variables and connected these concepts to their personal experiences. In addition, they noticed the shaded areas on the FRED graphs. "These represent recessions," the teacher clarified. She then explained what recessions are, and students were able to see that the unemployment rate usually increases during recession periods.

The lesson then moved into an active learning exercise of the unemployment rate calculation. Students were given pieces of paper stating their "role" in the economy -- for example: a full-time student, a retiree, a temporarily laid-off factory worker, or a job seeker who had stopped looking for work. Roles also included an employed person, a person actively looking for a job, and a stay-at-home mom. Students had to interview their peers and decide whether the person they interviewed was employed, unemployed, or neither. Based on this information, they were led through the calculation of the unemployment rate appropriate for "their" population. From the economics point of view, the exercise defined various types of labor market participants and showed special cases of discouraged workers, not-in-labor-force scenarios, part-timers, and retirees. From the mathematics point of view, the activity built skills in critical thinking, information text analysis, and calculation of the percentage and the rate of growth.

As students actively engaged in interviewing each other, figuring out the concept of unemployment, and calculating the share of the unemployed in the total labor force, they were able to understand the relationships among these concepts. As the education literature points out, the interdisciplinary as well

as active learning approaches are well documented tools for bringing real-life applications to the theoretical subjects and for enhancing student knowledge retention.

2) Teaching Random Sampling in Statistics Class

The unemployment lesson has also been adapted to be taught in the AP Statistics. This was a lesson developed by a math teacher from Lee Middle and High School in Lee, Massachusetts.

Students first researched how the federal government gathers data to determine the unemployment rate, and they discussed appropriate sampling methods. Then each student received an employment status card (a retiree, a full-time student, a laid-off person, etc.) to role-play during the survey reporting activity. Each student sampled 10 classmates who were randomly chosen by a computer. This was an attempt to replicate the Bureau of Labor Statistics' monthly survey's use of random digit dialing. Thus, each student had a sample of 10 students and was told to record the labor force status of each student in their sample.

After the discussion of the definitions of employed, unemployed, and not in the labor force, each student calculated the unemployment rate for his or her sample by dividing the number of unemployed by the number of people in the labor force, which is the sum of employed and unemployed. Each student obtained one number to represent the unemployment rate for their sample.

Students put their unemployment rate statistic on a number line on the whiteboard graph in the front of the classroom. As a whole, the class created a dot plot of 20 unemployment rates. Since each of the 20 unemployment rates was different, they represented a distribution of unemployment rates in 20 possible samples. This lesson embodied the definition of the sampling distribution! It was visual, understandable to the students, and engaging.

The teacher then posed the question: "We have only one true number of the unemployment rate in this population, but we have all these dots here…. Why do you think that is?" The students discussed the concepts of a "range," a "mean," and a "standard deviation." The teacher went on to describe the normal distribution and its properties.

Based on the sampling distribution of the unemployment rate depicted on the board (this class had rates that were as low as 17% and as high as 57%), students predicted the unemployment rate for the whole population and then compared this prediction with the actual unemployment rate defined by the teacher for this activity. This helped them understand that although there was one true unemployment rate for the population (33%), individual samples varied widely. The class discussed the reasons for the "errors" and proposed ways to minimize them, such as using a larger sample, for example.

This creative lesson required students to actively engage with the concepts of an unemployment rate and a sampling distribution. In addition to employing the inquiry-based method, it allowed the infusion

of economic concepts into a statistics class, promoting an interdisciplinary approach to teaching and learning. All of these things are important for building college- and career-readiness skills among high school students. We are excited that our program helped the teacher create such a stimulating lesson.

C. Topic: Government and the Economy

1) Teaching Fiscal Policy in Government Class

We observed the advanced placement government and politics class at the Pomperaug High School in Southbury, Connecticut. The topic of the lesson was fiscal policy.

The teacher seeded the discussion by introducing the concepts of government expenditures, government revenues, and debt and deficit. It was followed by student inquiry about the details they did not understand. The main portion of the class was spent by simulating the federal government budgeting process using an online portal (www.federalbudgetchallenge.org). Students worked individually, with occasional discussion about the unfamiliar terms with peers and the teacher.

After reducing the projected federal budget deficit, each student shared his or her result. They offered explanations of their rationales for the policy choices they made, identified beneficiaries and sufferers under each scenario, and considered whether it is possible to reduce the federal budget deficit without "hurting" anyone.

A topic such as the federal budget is too often presented to secondary school students as one embodying simple choices. This class helped students understand the complexities of the budgeting process. One student, for example, reported that the most memorable part of the lesson was "the difficulty that trying to balance the federal budget presented. There were many options and good reasons for each." A further benefit of the hands-on approach is that abstract notions become more concrete and experiential. For example, another student said that "the budget simulation really helped [him] to understand how everything in the economy is tied together and how complex it is."

2) Helping Students Understand Government Budgets

The Teach-the-Teachers Initiative program includes a section on government budgets. In an interactive manner we look at federal, state, and local budgeting processes, revenues, and expenditures. The 2015 TTI teacher from Canton High School in Connecticut decided to adapt this lesson to her 12th grade government class by asking her students to look at their school district budget.

This exercise gave the students a chance to learn about the budgeting process by looking at how the school district's money is spent. The teacher divided her class into five groups, and each group was given

a task to identify the top five questions they had for the superintendent after two days of researching the district's budget.

The superintendent then visited the class to clarify the budget process and priorities and to answer questions. For instance, students noticed that spending in several areas had declined, including technology, utilities, special education, employee benefits, and capital improvement projects. The superintendent carefully explained the rationale for every move, every dollar. He said that savings were realized in the area of employee benefits due to recent contract negotiations. Special education savings, he said, were realized due to decreasing enrollment at the elementary level. It was interesting to observe how students processed the realization that the demographic and political trends in their town are captured in the budget.

The superintendent also spent time engaging students in an exploration of the school district budget timeline, showed steps in the budgeting process in their town and explained other differences between 2014-15 and 2015-16 budgets.

The lesson helped students understand the inner workings of local governments in general and the school district budget in particular. It also illustrated the importance of civic engagement for every resident in town. As those high school seniors prepare for college, they can carry with them an important application of the role of government and make them more engaged members of society.

D. Special Needs Populations

1) Economics in Special Education and English as a Second Language (ESL) Classes

The benefit of a high school education in economics is especially challenging to attain for students with learning disabilities or students who use English as a second language.

We were pleased to work with a teacher from Eastside High School in Paterson, New Jersey. She teaches both types of students in a single classroom. The TTI program provided her with a deeper understanding of economic concepts. This helped her reach special education and ESL students, who require individualized instruction and highly organized planning. The students were taught how to calculate the unemployment rate, but before that, they had to learn the vocabulary of economics.

The teacher employed a strategy called "Quiz-Trade-Quiz." This approach provides each student with vocabulary and definitions on a sheet of paper. The students move around the room and meet in pairs. They quiz each other, giving praise for correct responses and identifying the appropriate term if the response is inaccurate. They then trade their lists and seek out a different student to quiz.

Since this procedure provides many opportunities for interactions with classmates, repetition, and no negative repercussions for incorrect responses, it proved to be an extremely useful tool for her students

to learn vocabulary. After this preparation, the students were ready to engage in the interviewing activity for the unemployment rate calculation.

The use of this lesson for ESL students and students with learning disabilities emphasizes the importance of AIER's Teach-the-Teachers Initiative in providing economic knowledge to everyone.

5.2. Evaluation Results

The evaluation of the program is two-pronged. We asked both the teachers and the students to evaluate their experience in the classroom following the field-test lessons.

Out of 39 teachers who attended the TTI in 2014 and 2015, 24 (62%) field tested the lesson ideas they developed. We asked the teachers about their experience with the lesson implementation and whether they thought that their students learned and were engaged with the material. (See Appendix 1 for the Teacher Feedback Form.) The evaluations were on a Likert scale, "Strongly Agree, Mostly Agree, Agree, Disagree, and Strongly Disagree." While the number of teacher responses is low and impedes our ability to make inferences, the feedback is important for critical evaluation of the program and enhancing evaluation instruments.

The most important goal of the program is to increase content knowledge of the teachers in order to improve their ability to incorporate economic concepts into their curriculum. We are excited that the strongest positive response was for the statement, "My understanding of the topic improved," gaining 54 percent "Strongly Agree" responses and 33 percent of "Mostly Agree" responses.

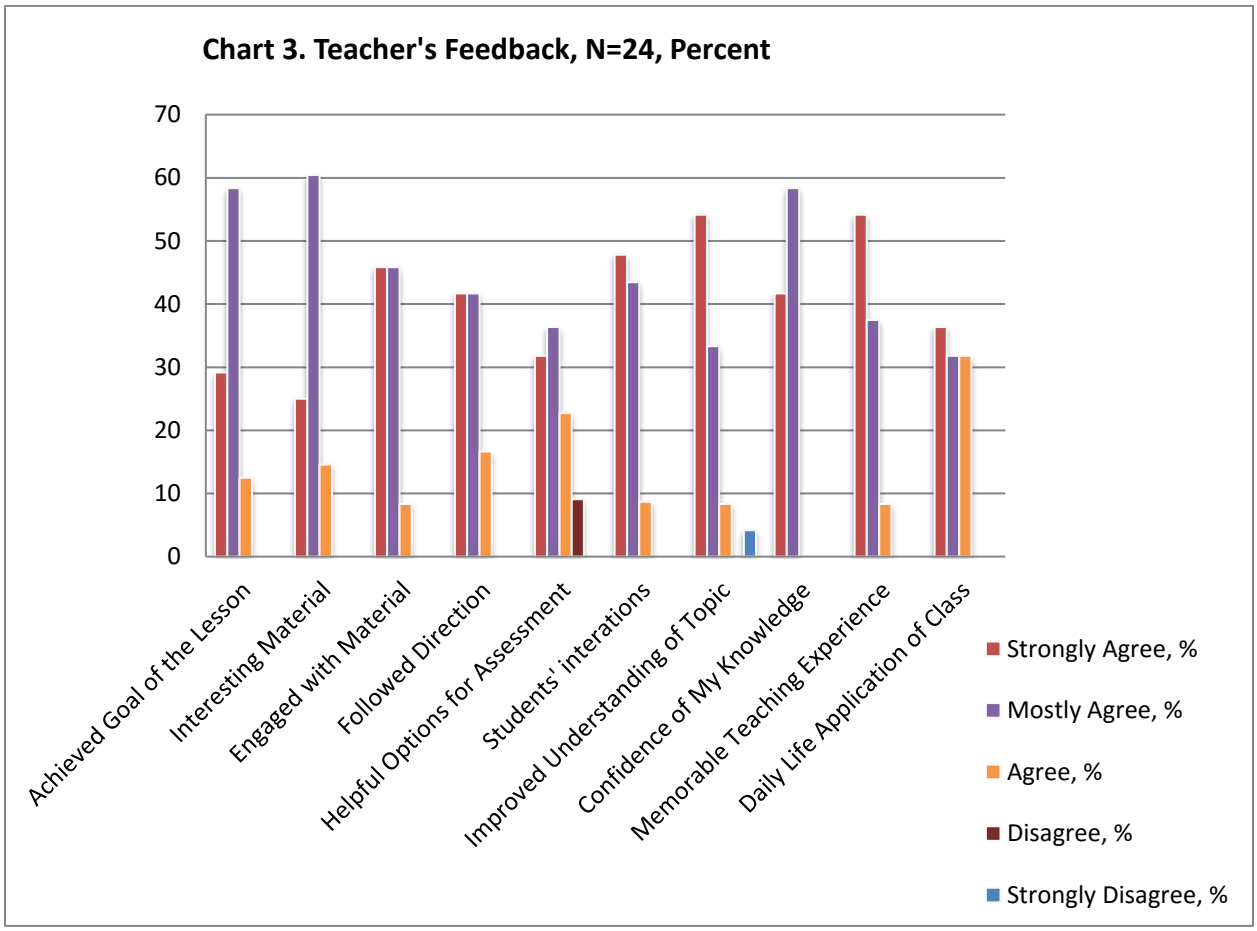
An effective teacher is the one who projects confidence and ease of understanding the material. The statement, "I am confident in my knowledge about this topic" gained only most positive responses (42 percent "Strongly Agree" and 58 percent "Mostly Agree").

"Students actively engaged with the materials" gained 46 percent "Strongly Agree" and 46 percent "Mostly Agree" assessments. Since one of the program's goals is to enhance active learning techniques, this result is very encouraging. Additionally, teachers felt that on the "Students interacted with the teacher and others" statement, 48 percent "Strongly Agreed" and 44 percent "Mostly Agreed."

The least enthusiastic responses were for the statement, "The options for assessment were helpful," where two teachers disagreed with this statement, and there was a spread of opinion among other scale categories. We take this result as a curriculum improvement opportunity. We added an assessment segment to our 2015 workshop and will enhance the presentation of the assessment topic in the future rounds. Interestingly, during the workshop teachers were least enthusiastic about learning new methods of assessment techniques. They reported that they are exposed to those very often through their professional development events covering the Common Core standards. But our results definitely

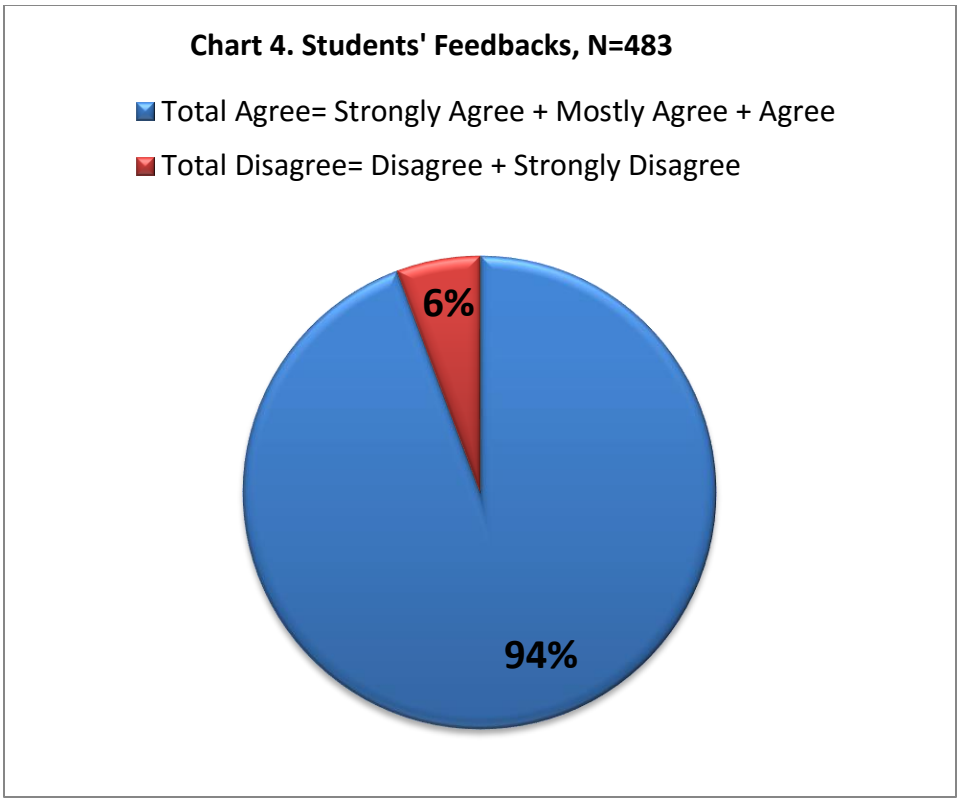
show that there is still room for improvement in presenting to teachers the most useful, relevant, easy-to-administer, informative, and fun assessment methods for a contemporary classroom.

Chart 3 presents the results of the teacher field-test feedback survey.



While only 24 teachers field tested their lesson idea, there were 483 students who attended those lessons. The questionnaire was administered at the end of the class and students were asked about their experience. (See Appendix 2 for the Student Feedback Form.) The student evaluations were on a Likert scale, “Strongly Agree, Mostly Agree, Agree, Disagree, and Strongly Disagree.” Some questions did not have 483 responses as some students did not provide answers.

Overall, we received an overwhelming positive feedback from the students. On average, 94 percent of students showed positive attitudes toward field-tested lessons; i.e., 94 percent of students responded as “Strongly Agree,” “Mostly Agree,” or “Agree” to the end-of-the lesson survey questions. Only 6 percent of students responded “Disagree” or “Strongly Disagree” or did not provide any answer to the survey questions (see Chart 4).



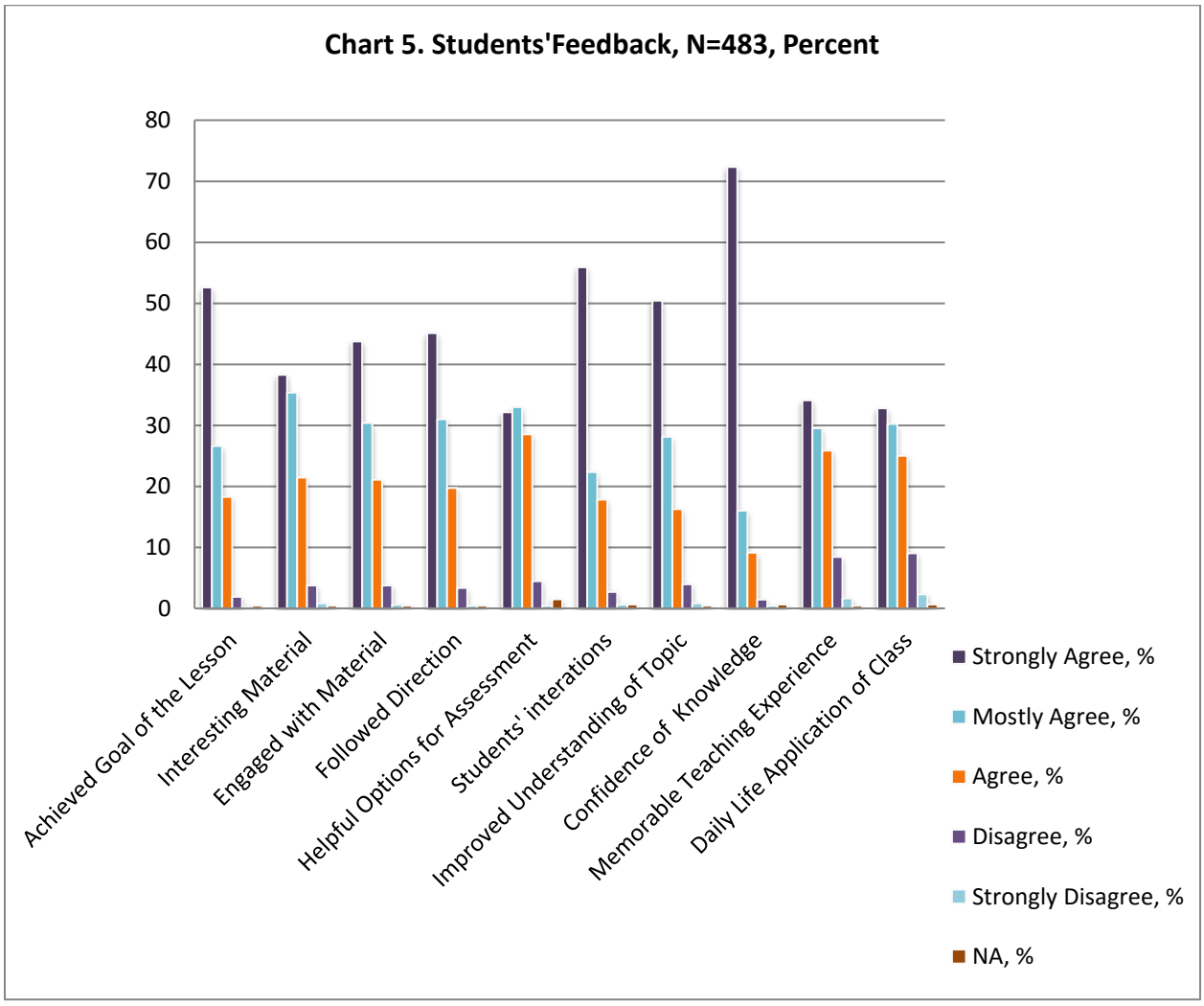
Analyzing responses to each question, the strongest positive student response was for the statement, "My teacher is knowledgeable about this topic," which gained 72 percent of "Strongly Agree" and 16 percent "Mostly Agree" responses. It is important to notice that the teachers who participated in the workshop and who implemented the field test were not necessarily teachers of economics. Some of them have not taken more than one course of economics in college. The fact that students observed that the teacher was knowledgeable of and comfortable with the economic concept presented is a very positive outcome of the program. Our emphasis on the teaching economic content to the teachers regardless of their field of expertise seems to pay off in the classroom.

Fifty-six percent of students strongly agreed and 22 percent mostly agreed that "student interactions and responses were encouraged," and 53 percent strongly agreed and 27 percent mostly agreed that "the goals for the lesson were clearly identified." Since the objectives of the workshop are focused on pedagogy as well as content, this feedback is very encouraging. Overall, students said that the materials were relevant, the activities were engaging, and their understanding of the topic improved.

Not so overwhelmingly positive student responses were to the statements about the helpfulness of the assessment (6 percent strongly disagreed, disagreed, or did not provide any answer), the applicability of the topic to the daily life (12 percent strongly disagreed, disagreed, or did not provide any answer), and the memorability of the lesson (10 percent strongly disagreed, disagreed, or did not provide any answer). The assessment question was probably not appropriate for inclusion in the students' survey. Because many did not answer this question, we may hypothesize that they did not understand the

wording or the reason for being asked. Their evaluation that memorability and daily life applicability of the topic is not up to par is troubling. The workshop encourages teachers to use real-world examples, relate explanations to the students' lives, and present the material in a memorable way. Even though the majority of students agreed that these features were satisfied, the opinions differed widely.

Chart 5 shows the results of the students' feedback about the field-tested lesson.



These student and teacher evaluations present only the attitudes about the lesson execution. The evaluation instruments were not designed to measure the impact on learning. However, we do have adequate evidence that teachers included economic concepts in their lessons in innovative and obviously engaging ways. We have evidence that teachers felt that they have a better understanding of the economic concept and that students observed that knowledge. This bodes well for the prospect of the students retaining the information as suggested by the literature.

6. Conclusion

The Teach-the-Teachers Initiative (TTI) program of the American Institute for Economic Research (AIER) was developed based on the scientific evidence about the best practices of delivery of economic content to high school teachers, incorporating advanced pedagogy and assessment methods. The content of the program consist of three topics in which AIER has more than 80 years of expertise. These topics are: money and inflation, business cycles and unemployment, and government and the economy.

The unique features of the TTI workshop are the Economics-Across-the-Curriculum approach and the follow-up with the participants during the academic year after the program's completion.

Economics Across the Curriculum encourage the infusion of economic concepts into various disciplines. The program appeals not only to economics teachers and produces a diverse cohort of participants. This diversity generates a cross-pollination of ideas, dynamism, and an interdisciplinary approach to teaching. The integration of economic concepts into various subjects helps the students develop critical thinking, informational text analysis, real-world application, and other skills that are transferable to various fields of study, academia, and the workplace.

Follow-up allows for continued collaboration between the TTI team of experts and the teachers. Since teachers feel connected and supported during the academic year, they have a higher prospect of developing their lesson idea into a lesson plan and executing the lesson. The lesson implementation rate stands at 62% during the first two cycles of the program.

After two cycles of the TTI program, the impact on teachers is apparent, as they reported in the end-of-course and the field-test surveys. Teachers agreed that they are more knowledgeable about the topics and they learned new pedagogical and assessment methods. Their confidence in incorporating economic concepts into their classes increased. It is especially satisfying because many teachers came from fields other than economics, but they were confident enough to teach an economic concept after going through the TTI program.

Students who received a lesson from a TTI participating teacher reported that the teacher was knowledgeable about the topic, the lesson was interactive, and their understanding of the topic improved. In order to measure the impact of the lesson on students' knowledge, during the 2015 TTI we asked the teachers to administer pre- and post-tests in their classes before and after the field test. This initiative did not achieve its goal of measuring learning outcomes. Since teachers are encouraged to create their own lessons that are appropriate for their subjects, their tests reflected the lesson content they covered and required modification of the pre- and post-test instruments provided for them at the workshop. While administering these modified tests, the teachers are gaining very valuable information about their students' learning outcomes. However, the data gathered through those instruments is not

uniform across all classes and thus does not allow for making inferences about the impact of our program on students' knowledge acquisition.

Overall, the practice of a multi-day workshop where teachers from different disciplines come together to learn economic concepts and contemporary pedagogy and assessment methods is an innovative way to bring economics into the high school curriculum.

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Appendix 1

Field Test **– Teacher** Feedback Form

		Strongly Agree	Mostly Agree	Agree	Disagree	Strongly Disagree
1	The goal for the lesson was achieved.					
2	The materials used seemed interesting to students.					
3	Students actively engaged with the materials.					
4	Students followed the directions with ease.					
5	The options for assessment were helpful.					
6	Students interacted with the teacher and others.					
7	My understanding of the topic improved.					
8	I am confident in my knowledge about this topic.					
9	The lesson was a memorable teaching experience.					
10	Students identified how to apply the topic in daily life.					

Please answer the following questions:

A) What part of the lesson was most productive? Why?

_____

B) What part of the lesson was least helpful in students' understanding the topic? Why?

_____

C) For future lessons, what could be improved?

_____

We appreciate your responses so we can improve our program. Thank you!

Appendix 2

Field Test -- **Student** Feedback Form

We appreciate your responses so we can improve this lesson. Your responses will be anonymous.

		Strongly Agree	Mostly Agree	Agree	Disagree	Strongly Disagree
1	The goal for the lesson was clearly identified.					
2	The materials used were relevant and interesting.					
3	The activities were engaging and informative.					
4	The presentations were clear and easy to follow.					
5	The options for assessment were helpful.					
6	Student interaction and responses were encouraged.					
7	My understanding of the topic improved.					
8	My teacher is knowledgeable about this topic.					
9	The lesson was interesting and memorable.					
10	This topic can be applied in my daily life.					

Please answer the following questions:

A) What part of the lesson made this topic memorable? Why?

_____

_____

B) What part of the lesson was least helpful in understanding the topic? Why?

_____

_____

C) For future lessons, what could be improved?

_____

Thank you!