THEY PASS THE TESTS, BUT WHAT DO THEY REALLY BELIEVE? COLLEGE STUDENTS' VIEWS ON THE ROLE OF GOVERNMENT IN AMERICAN ECONOMICS

Lloyd P. Rieber[1]
William J. Rieber[2]

Abstract

Teaching college economics poses challenges, such as engaging students and fostering critical thinking, given the subject's abstract and intimidating nature. To address these challenges, this project explored the integration of an adaptation of Q methodology, termed Q pedagogy, in a college undergraduate macroeconomics course. The project involved 33 students who completed a Q sort to express their views on the role of government in American economics. The data analysis revealed four distinct viewpoints among the students ranging from limited to no government interference in the economy to governments serving a critical role. This project provides preliminary evidence of using Q pedagogy to promote "big think" critical thinking among economics students. The project also demonstrates how Q pedagogy can provide a safe space for students to share opinions and appreciate diverse perspectives of their classmates.

Keywords: economics education, Q methodology

Introduction

Teaching college economics presents a complex array of challenges and opportunities for educators and students alike. Economics can often be perceived as abstract and intimidating. Consequently, instructors face the task of making the subject matter engaging and accessible. Instructors must also wrestle with the diversity of students' prior knowledge and backgrounds, which requires striking a balance between catering to beginners while still challenging advanced learners. Additionally, the ever-changing nature of the global economy necessitates a constant update of course content to remain relevant.

Students also come to class with an assortment of preconceptions and misconceptions about economics. In a survey of 596 first-year college students taking a required course on principles of economics, Busom, Lopez-Mayan, and Panadés (2017) found that students' preconceptions about many economics principles persist after completing the course and passing all the tests. It seems that exposure to the economics course did little to change their misconceptions. They conclude that,"This suggests that standard teaching practices may not be sufficiently effective in having students integrate the tools of economic analysis into their reasoning processes, and consequently on their judgments and decision" (Busom et al., 2017, pp. 85-86). It is likely that "standard teaching practices" in this context equate generally to lecture-based teaching methods.

[1] Professor of Learning, Design, and Technology, Department of Workforce Education and Instructional Technology, The University of Georgia, Athens, GA 30602 | email: lrieber@uga.edu
[2] Professor of Economics, Department of Finance, Risk & Insurance, and Economics, Butler University, Indianapolis, IN 46208

The National Quinquennial Survey has been conducted since 1995, and in 2000, 2005, 2010, 2015, with most recent wave in 2020. In the 2020 survey, Asarta, Chambers, & Harter (2021) found that, at least in introductory economics sections, lecture coupled with presentation using whiteboard/chalkboard remained the dominant teaching method, as it has been since the survey began in 1995. PowerPoint presentations, though, have increased in prominence over time. More class discussion among students was reported in the 2020 survey as compared with the 2010 and 2000 surveys, yet class discussion including the instructor was unchanged since 2000. Textbooks continue to be the primary learning tool, although more course sections use online textbooks than in the past. Virtually no discussion of diversity, inclusion and gender was reported to have taken place in 2020, which is consistent with earlier surveys. Asarta et al. (2021) conclude (p. 25): "In 2020, we find that little has changed [in teaching undergraduate introductory economics courses] in the past quarter-century." Other general results from these surveys indicate that economics instructors spend about 83% of class time lecturing (M. Watts & Schaur, 2011). The survey results also showed that class discussion is rarely used in undergraduate economics courses.

In another analysis of the 2020 National Quinquennial Survey, Harter, Chambers, and Asarta (2022) reported on results of the assessment methods used in four types on economics courses: introductory, intermediate theory, statistics/econometrics, and upper level other than intermediate theory. The assessment methods included examinations (multiple choice, short essays/problems, and long essays/problems), written assignments (term papers, shorter papers, homework/problem sets, and other), and miscellaneous (class participation, oral presentations, performance in games, simulations, or experiments, and others which included, among others, clicker response systems, attendance, knowledge checks, video and blog creations). Examinations were the primary assessment method used in 2020 in all four types of courses, as in past surveys, although multiple choice questions had the highest weight in introductory courses, while short-answer questions had the highest weight in the other three types of courses. The assessment method with the next highest weight after examinations differed depending on the type of course: other miscellaneous assessments in introductory courses, homework/problem sets in intermediate courses. Assessment methods used in upper level courses other than economic theory included statistics/econometrics, and term papers.

Harter, et. al (2022) conclude (p. 264) that the 2020 survey "indicates a small but observable increase in the variety of assessment methods being used in undergraduate economics classes…. Some of the variations were driven by technological change" (p. 264). They identify greater use by instructors of miscellaneous assessments, including discussion board assignments, clicker response systems, online assignments, debates, and interactive textbooks. A key feature of interactive textbooks is providing students with questions that are scored automatically and immediately. If students answer a question incorrectly, they then receive another question, but with new data automatically generated on the same topic, for them to try again.

Given the results of the 2020 National Quinquennial Survey, the observation in 2011 by M. Watts and Schaur (2011, p. 303) still applies: "Despite recent attention given to cooperative and active-learning methods by economists and to alternative classroom-assessment techniques, there is still relatively little use of these practices in undergraduate economics courses." In response to the overuse of lecture, there has been a call for college instructors to use active learning strategies as a central part of their teaching. Active learning has been defined as "instructional activities involving students in doing things and thinking about what they are doing" (Bonwell & Eison, 1991, p. iii). Calls for faculty to engage in "active teaching" (Freeman

et al., 2014) offer incentives for faculty who have resorted to teaching completely or solely through lecture-based methods. According to Freeman, et al. (2014, pp. 8413-8414), "Active learning engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher-order thinking and often involves group work."

In addition, many economic instructors encourage their students to think critically about economic issues. So, what exactly is critical thinking? Although somewhat dated, here is the definition offered by Abrami et al. (2015) in their meta-analysis of critical thinking teaching strategies:

> "We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based" (Facione, 1990, p. 3).

When considering definitions of critical thinking, Thoma (1993, p. 128) suggests that "Definitions of critical thinking generally include the ability to identify key aspects of an issue and reach a conclusion or position using appropriate methods and standards of evaluation…" Thoma (1993, p. 128) goes on to state: "Genuine critical thinking requires the recognition of the evolutionary nature of knowledge and the ability and responsibility of individuals to make independent intellectual choices." Siegfried and Colander (2022), referring to Edward Glaser's (1941) seminal conception of critical thinking, suggest that Glaser conceived critical thinking as consisting of "(1) a disposition to consider problems and subjects in an objective, thoughtful way; (2) knowledge of methods of logical inquiry; and (3) skill in applying those methods" (Siegfried and Colander, 2022, p. 73).

A framework used in economics education to help students develop critical thinking skills was formulated by William Perry (1970) (see also Hoyt & McGoldrick, 2019). A variant of Perry's framework was developed by Craig Nelson (1989), which simplified the presentation of Perry's framework to four modes of thinking: dualism; multiplicity; contextual relativism; and contextually appropriate decisions. Dualism is characterized by a world view where there is right and wrong, truth and falsehood. Here, students accept what experts or authorities, such as economics professors, tell them. In this mode, there is little or no tolerance for uncertainty and ambiguity. Advancing from one mode to the next involves key transitions. For example, in order to move from dualism to multiplicity, one must accept uncertainty and ambiguity. Here, while there is tolerance for a multitude of opinions, there is little discernment about the quality of opinions. To move to contextual relativism, one must recognize the need to move beyond accepting all opinions with equal weight and to find appropriate criteria to judge which opinions are more or less supported than others. Finding and using such criteria in order to make individual decisions about committing to a position is a characteristic of mode 4, contextually appropriate decisions.

How does one teach economics to help or support students to move beyond a dualistic mode of thinking? Thoma (1993) provides several suggestions for how Perry's model can be used to promote critical thinking, including mini-research projects, group discussions, analysis of paired readings, to name but a few. Economic instructors use various methods to engage students and promote active learning and critical thinking in the classroom, including simulations (Cook & Pantuosco, 2022), group/team exercises (Ruder, Maier, & Simkins, 2021), puzzles (Frank,

2007), games (Dissanayake & Jacobson, 2021), videos (Allison, 1976), excel spreadsheets (Barreto, 2015), flipped classrooms (Wozny, Balser, & Ives, 2018), and homework discussions (Al-Bahrani, Apostolova-Mihaylova, & Marshall, 2022). Mallory et al., (2024) assert that adopting interactive and relevant teaching methods associated with active teaching (e.g., problem-based learning and collaborative learning) improve gender diversity in economics teaching.

Asarta (2024) advised economics instructors, particularly those new to teaching, to focus on instructional techniques beyond lecture and offered some fundamental advice on how to engage students. For example, there are simple strategies that can easily be integrated with little training. One example is the one-minute paper which requires students to answer two basic questions at the close of class: 1) What is the most important thing you learned today?; and 2) What is most confusing to you from today's class? He also cautions instructors about using outdated examples, which is unfortunately common in many economics textbooks. Instead, he recommends using real-life examples that are relatable to students. McCann (2017) cautions against the use of traditional tests administered and supervised during classroom due to the fact that this type of assessment promotes surface-level learning such as memorization. Instead, he advocates for the use of constructive alignment of teaching, learning, and assessment activities by way of out-of-class projects or other assignments in which students need to dive deep into the content and its application. The principle of constructive alignment requires that if the assessments change, then the classroom instruction must change accordingly to both prepare students for the out-of-class projects and to provide feedback.

Even if faculty wish to incorporate methods which engage students to interact during class, such as with class discussions, doing so comes with challenges. Economics often involves ideological differences and contentious economic theories which can make it difficult for instructors to create a learning environment where free and open discussion is possible. One approach has been to use classroom debate. Advantages of the use of debates as an instructional strategy reported in the literature include teaching critical thinking skills and soft skills such as teamwork, communication, and leadership (Wolla, 2018), active involvement and engagement of students in economics content (Vo & Morris, 2006), helping students develop research skills (Pernecky, 1997), and helping students to move away from self-interested behavior (Owings-Edwards, 2021). Hennessey (2014, p. 225) suggested that integrating debates within the teaching of economics offers "… an exercise to engage students in heated topics where they may have strong prior views in a way that both highlights the issues and pushes them to re-evaluate how they form their own opinions. In-class debates seem to meet this goal, serving as a formal structure to explore controversial issues while also developing critical thinking and communication skills." Wolla (2018) reported favorable results using a structured classroom debate on the topic of minimum wage within in an introductory college economics course. The activity necessitated students to apply and evaluate economic content to the real-world problem of income inequality. As Wolla (2018) points out, "for students to have a meaningful debate, they must first know the content" (p. 248).

The typical format of classroom debates includes four main phases: Presentation of the affirmative position (e.g., in favor of increasing the minimum wage); presentation of the negative position (e.g., opposition to increasing the minimum wage); time for rebuttal; and class interaction and debriefing (Pernecky, 1997). For example, Hennessey conducted four in-classes debates during a course on the topics of Social Security, Medicare, labor taxes, and corporate/savings tax. Each debate featured six students with three each representing one of two

sides of the argument. Students were given specific guidance on how to prepare for the debate with the main message to think like an economist. This meant learning how to gather and analyze data and then how to use this data as evidence to support their argument. They were also reminded to consider diverse viewpoints on the topic in order to try to understand the beliefs of others. Class time for the debates was carefully structured with clear time limits for each portion of the debate (e.g., opening statement). Grades were assigned to students based on the quality of the debates and also on a short reaction paper each student had to write. The reaction paper was used to promote reflection on their performance but also on whether their personal opinion on the topic changed by participating in the debate. Hennessey felt that the reflection paper was essential in to helping students develop critical thinking.

Treme (2018) warned instructors about obstacles that can seriously lessen the effectiveness of traditionally structured debates. For example, it is typical for only a portion of students enrolled in a course to participate directly in the debate, such as one group of students representing the pro position, and another group representing the con position. This approach leaves the remaining students in the class in a passive role. Instead, they recommend coming up with strategies to alter the format to have all students in the course participate in the debate in a meaningful way. One approach they recommend is the use of speed rounds either during a debate or as part of the whole class interaction and debriefing. In short, a speed round consists of requiring all students to make an individual statement with a very short time limit of about 20 seconds. Once a student speaks, "they are not eligible to speak again until the remaining students have spoken or another speed round is put into place" (Treme, 2018, p. 86). The competitive nature of debates means there are winners and losers, which may interfere with consideration and respect for viewpoints that "lose."

The approach we are advocating in this article goes in a very different direction. One of the most difficult tasks an instructor faces is establishing a learning environment where students feel able and safe in expressing their personal views on a class topic, particularly if they perceive their view to be counter to the dominant opinion. Our approach is based on Q methodology (Q), a research methodology designed to study subjectivity (Brown, 1993; Stephenson, 1953). By adapting Q for classroom use, an instructor is able to first identify the three or four most prominent views of students in their class. This is followed by grouping students according to which of the views each most closely aligns, which we term as an "affinity" group. Class discussions are then held beginning with each affinity group having a small-group discussion to identity their group's core position. This is followed by a whole class discussion where each affinity group first presents their viewpoint to the class with a free-flowing discussion afterwards. The goal of these discussions is to promote a classroom atmosphere where students listen and try to understand each of the viewpoints presented. It is important during these discussions to avoid any tendency to suggest some arguments "win" and others "lose," as would be the case in a class debate. Instead, we aim to have students acknowledge that diverse viewpoints exist among their peers on the topic, and all deserve attention and respect. We call this approach Q pedagogy, due to the adaptation of Q research methodology for a classroom setting to enhance and support teaching.

The remainder of this paper is organized into three sections. First, a brief overview of Q methodology is provided. Second, we present a step-by-step approach for how to incorporate Q pedagogy into the teaching of economics. This overview of the Q pedagogy approach is meant to give readers a good sense of how they could incorporate this technique into their classrooms. We present this overview using data from a small-scale research study conducted in a single

undergraduate college classroom where Q pedagogy was integrated into the teaching of course on intermediate macroeconomics. The study is aligned with the framework of the Scholarship of Teaching and Learning (SOTL) as suggested by Ernest Boyer (1990). Boyer outlined and described four separate scholarships of the professoriate: discovery, integration, application, and teaching. Of these, this study is most closely aligned the scholarship of teaching, but also closely related to the scholarship of application. For example, Q pedagogy is designed to "... stimulate active, not passive, learning and encourage students to be critical, creative thinkers, with the capacity to go on learning after their college days are over" (Boyer, 1990, p. 24). As we practice the scholarship of teaching, we aspire to Boyer's position that "…great teachers create a common ground of intellectual commitment. They stimulate active, not passive, learning and encourage students to be critical, creative thinkers, with the capacity to go on learning after their college days are over" (1990, p. 24). Third, we provide an overall discussion and summary of Q pedagogy as it applies to the teaching of economics.

Here is the driving question for this project: What are the personal views of college students enrolled in an economics course on the role of the government in American economics? We also used this question as an opportunity to conduct a field test of the Q pedagogy approach in a college economics course. Would these students find the Q sort activity engaging and relevant to their studies? What are their opinions of the Q sort activity? Do they feel this is a promising area for teaching and learning? This project is part of a line of research and field tests using Q pedagogy to explore the scholarship of teaching and learning in college teaching (see Rieber, 2023 for an overview).

An Overview of Q Methodology

Q methodology (Q) is a research methodology focused on the study of people's subjectivity (Stephenson, 1953). The theoretical foundations of Q include subjectivity and self-reference (Brown, 1980), concourse and communication theory (Stephenson, 1978; Stephenson, 1986, 2014), and abductive logic (S. Watts & Stenner, 2012). Q also involves an adaptation of Spearman's factor analysis, a data reduction technique. Traditional uses of factor analysis involve studying how a collection of measures given to participants correlate, thus indicating whether various measures are effectively measuring the same construct. However, instead of reducing a diverse set of measures into a smaller number of constructs, factor analysis in Q analyzes the viewpoints of a group of people to indicate where similarities of viewpoints exist. The result reveals that the individual viewpoints of the participants are reduced into a smaller number of shared viewpoints. Unlike traditional factor analysis, which can require a very large number of participants, factor analysis in Q is valid for even a small number of participants. In fact, Q was originally used in single-participant research designs (Stephenson, 1953).

Q methodology involves six main steps or phases (Brown, 1980, 1993). First, an appropriate research question is chosen for study. Q is well aligned with any research question and topic for which there is interest in learning and understanding the opinions and perspectives of a group of people. Second, the range of possible viewpoints on a topic are identified, catalogued, and documented. This range of viewpoints is called a concourse of the topic and can consist, theoretically, of hundreds of statements depending on the topic. Third, the concourse is subsequently sampled to reduce the number of statements to represent the concourse in a fair and balanced way. This is called the Q sample or the Q set. Fourth, the Q sample is used in a unique data collection instrument called a Q sort. A Q sort is a forced sorting activity where participants must sort the Q sample statements along a continuum according to specified criteria, such as

agreement or preference. There are exactly as many sorting cells in the grid as there are statements to sort. An example of a Q sort grid is shown in Figure 1. The sorting grid resembles an inverted normal curve with most sorting cells near the center of the grid and few sorting cells at each end. As students sort the statements into the sorting grid, they must carefully prioritize the statements. Deciding where to place a statement can be very challenging, particularly for the statements they feel most strongly about. Each statement is given a rating score corresponding to the column of the grid. Fifth, the completed Q sorts are factor-analyzed to reveal clusters of likeminded views. Sixth, and arguably most difficultly, the resulting clusters of viewpoints are interpreted.

Figure 1. Example of a Q sort grid.

Most Disagree Most Agree

-4	-3	-2	-1	0	1	2	3	4

Q Pedagogy: A Step-By-Step Approach

Q pedagogy is an instructional adaptation of Q methodology. Understanding Q pedagogy is best achieved by considering an example. In this section, we describe each step in the Q pedagogy approach using the example of implementing a Q sort in the spring 2023 on the topic of the role of the government in American economics with college undergraduates enrolled in a on intermediate macroeconomics economics course. This project was conducted within a one-week period with both in-class and out-of-class components. Two 50-minute in-class sessions were included in the procedures. A total of 39 students were enrolled in the course. Of these, 33 agreed to participate in this project by providing written informed consent. (The data from the six students who declined were removed from the analysis.) Students were juniors, seniors, and two fifth-year students.

Q Pedagogy Step 1: Identify a Topic for Classroom Discussion

The first step is to identify a suitable topic. Q pedagogy is most appropriate for topics for which there is a divergence of opinions. For example, we chose the following question as the topic for the Q sort we used in the college macroeconomics course: What is the role of the federal government in American economics? This question is appropriate given that it engenders

a diversity of opinions within all American citizens, whether they be college students or otherwise. This question also reflects the diversity of opinion among economists throughout American history, such as the contrasting views of John Maynard Keynes and Milton Friedman.

Q Pedagogy Step 2: Build a Concourse of Statements Relevant to the Topic

Once a suitable topic has been selected, the next step is to compile a list of opinion statements that related to the topic. In a sense, this step becomes the raw material for step 3. The key feature of this step is the "mining or harvesting" of statements from all available sources. Sources can be scholarly (e.g., published literature), popular media (e.g., newspapers or news reports), or informal (e.g., social media). Each statement found needs to describe a viewpoint or position that is distinct from all of the other statements collected so far. Each statement in the concourse needs to meet two main criteria. First, each statement needs to represent an opinion about the topic, not a fact. For example, a statement such as "Government economic policies have unintended consequences" is appropriate, but a factual statement such as the following would not be appropriate: "The gross domestic product (GDP) increased at an annual rate of 3.0 percent in the second quarter of 2024, according to the U.S. Department of Commerce Bureau of Economic Analysis."

In theory, one stops building the concourse when saturation is achieved, that is, when no new viewpoints can be found. When conducting Q research, the number of statements in the concourse is usually quite large, often several hundred statements. However, for the purposes of Q pedagogy, an instructor would likely confine their sources to what is relevant for the topic chosen for class. For example, the instructor might identify the statements for a Q sort based on the readings assigned in class augmented with statements from the instructor's own understanding of the topic. Another source can be from surveys of students in the course. A simple survey question such as "In 20 words or fewer, what is your opinion of the proper role of government in American economics?

Q Pedagogy Step 3: Select a Representative Sample of Statements from the Concourse

Once the concourse of statements has been developed, the next step is to select a sample of statements that will be used in the Q sort. It would be impractical to ask students to sort a hundred or more statements in any meaningful way. A typical Q sort contains somewhere between 30 and 60 statements. Consequently, the sample needs to represent the concourse in a fair and balanced way. For example, the Q sort on the role of the government in American economics used in our project has statements representing the diverse views of John Maynard Keynes and Milton Friedman as well several based on socialist policies of Marxism; the point being that the Q sort needs to capture the main perspectives represented in the concourse. Table 1 lists the statements used in our Q sort on the role of government in American economics.

Table 1. List of statements used in a Q sort on the role of government in American economics.

1. Judge policies by their results, not their intentions.
2. Workers need to spend, not save, any extra income in order to grow the economy.
3. The Federal Reserve should be independent of Congress and the Executive branch of government.
4. Government bureaucrats cannot control the economy.
5. Governments should not intervene in economic matters.

6. Low interest rates stimulate the economy.
7. Government regulations hurt the economy.
8. The natural cycle of economics is rapid economic growth and economic woe (aka boom and bust).
9. The Federal Reserve should not raise interest rates to correct for inflation because higher interest rates will cause a recession.
10. During a period of economic woe (bust), the government should spend more money to stimulate economic activity.
11. Excessive saving by a population hurts the economy because saved money is stagnant and cannot stimulate economic growth.
12. During a period of economic woe (bust), the government should engage in deficit spending.
13. During periods of economic recession or depression, economies do not stabilize themselves very quickly and require government intervention in markets.
14. The Federal Reserve has too much economic power since it controls the money supply in the economy.
15. Government economic policies have unintended consequences.
16. The government should control all means of production and distribution of goods in a society.
17. During a period of rapid economic growth (boom), the government should increase taxes or cut spending.
18. The government is in a better position than market forces to help create a robust economy.
19. Free markets operate better than government regulated economies.
20. The economic goal of a society should be to dispel class distinctions.
21. Markets should be free from government interventions.
22. Capitalism is based on oppression of the lower class.
23. Strong economies are based on free trade, smaller government and a slow, steady increase of the money supply in a growing economy.
24. Government intervention during economic woes is not needed because in the long run the economy will work itself out.
25. Government intervention during economic woes is needed because in the long run we all will be dead.
26. Government intervention in the markets is needed for a strong economy.
27. Government failures can be as bad, or worse, than market failures.
28. Spending from one consumer becomes income for another worker, who in turn spends that income to create a cycle of economic growth.
29. Deficit spending is bad for the economy.
30. When a wealthy minority maintains control of industry, wages for the working class are driven down.
31. Voluntary interactions between consumers and businesses often produce superior results to crafted government decrees.
32. An injection of government spending eventually leads to added business activity and even more spending, thus helping the economy.
33. Unregulated markets lead to strong economies.

Q Pedagogy Step 4: Construct the Q Sort and Administer It to Students

A Q sort consists of the following elements: 1) the statements identified in step 3; 2) a carefully designed grid that contains as many cells as there are statements; and 3) a guiding prompt for how to do the sort, known as the *Condition of Instruction*. The grid used in our Q sort on the role of the federal government in the American economy is shown in Figure 1. Students are tasked with sorting the statements into the grid. The statements for which they hold their strongest opinions are placed at either edge of the grid. This grid shape forces students to prioritize their views. For example, only two of the 33 statements can be chosen as the ones students most agree with using the grid in Figure 1. The same is true for those statements for which they most disagree. Statements for which students hold a more neutral position would be placed near the center. Each statement is assigned a score equal to the column's numerical heading.

It is almost certain that students have never completed a Q sort before, so it is also important to orient students to the Q sort activity. During the first class session, the Q sort activity was introduced by having the students complete a sample Q sort on the fun topic of favorite sports using a digital software application. The goal of this first Q sort was only to orient the students to what a Q sort is and how to complete it. At the end of the first class session, students were given the task of completing the Q sort on the role of government in economics described above as a homework assignment This Q sort consisted of 33 statements, as shown in Table 1. Students completed this Q sort in preparation for the second class session. The second class session was held two days after the first class session.

Q Pedagogy Step 5: Conduct a Factor Analysis of the Q Sorts

For most instructors new to Q methodology, this step may appear the most daunting. Fortunately, there is freely available computer software available to run the analysis. Although the statistics required to understand factor analysis should not be underestimated, only a rudimentary understanding of factor analysis is needed to run and understand the analysis results. A sufficient understanding of factor analysis can be obtained in a workshop. In short, a factor analysis is based on the correlations of all of the students' Q sorts. These correlations are compared in several cycles to reveal which Q sorts – and hence which students - cluster together. Each cluster is a factor. There are typically somewhere between two and five clusters in a classroom of students. Despite the highly quantitative nature of factor analysis, many qualitative decisions are needed during the analysis. For example, the number of factors to select in the final analysis is largely a qualitative decision. For Q pedagogy, the final number of factors chosen will largely depend on which factor solution includes the most students. In our Q sort on the role of government in economics we settled on four factors.

Q Pedagogy Step 6: Interpret the Q Factor Analysis

In a Q study, it is up to the researchers to interpret the Q sort results. In Q pedagogy, this task is largely given to students and is one of the approach's most powerful features. The second class session began with a general overview of the results of the Q sort activity on the role of the government in American economics. Students were told we found four factors, which we called affinity groups during the class. The students were all given a handout with a summary of the results consisting of a composite Q sort for each group, an example of which is shown in Figure 2. A composite Q sort is a visual representation of the factor array (see Table 2). A factor array

can be defined as "a single Q sort configured to represent the viewpoint of a particular factor" (Watts & Stenner, 2012, p. 143). Factor arrays are based on the z scores of each statement in the Q sort. In Q methodology, factor arrays serve as the basis of factor interpretation. A factor array can be understood as a weighted average of all the Q sorts that loaded onto that factor. The composite Q sort provided each group with an overall snapshot of their group's viewpoint by showing where in the grid the group generally ranked each of the statements. The class was then divided into small break-out discussion groups comprised of the students in that factor. They were given the task of discussing and then describing their collective viewpoint by generating a group name or slogan for their "team." They also needed to be ready to explain and defend their slogan later during a whole class discussion.

After the class sessions ended, the authors conducted a separate review of the Q sort results to determine the degree to which the students' identity statements were consistent with the Q sort data. To do this, we analyzed each group's composite Q sort data shown in the factor array in Table 2 and compared it with the slogan generated by each group. Next, we present that analysis in some detail cross-referencing the statement number shown with a pound sign (#) followed by the score or scores from the factor array table.

Figure 2. Example of a completed Q sort on the topic of the role of the government in American economics.

Most Disagree Most Agree

-4	-3	-2	-1	0	1	2	3	4
16. The government should control all means of production and	26. Government intervention in the markets is needed for a strong economy.	10. During a period of economic woe (bust), the government	12. During a period of economic woe (bust), the government	29. Deficit spending is bad for the economy.	15. Government economic policies have unintended consequences.	31. Voluntary interactions between consumers and businesses	7. Government regulations hurt the economy.	23. Strong economies are based on free trade, smaller government and
22. Capitalism is based on oppression of the lower class.	20. The economic goal of a society should be to dispel class	17. During a period of rapid economic growth (boom), the government	2. Workers need to spend, not save, any extra income in order to grow the	6. Low interest rates stimulate the economy.	1. Judge policies by their results, not their intentions.	3. The Federal Reserve should be independent of Congress and the Executive	27. Government failures can be as bad, or worse, than market	19. Free markets operate better than government regulated
	18. The government is in a better position than market forces	13. During periods of economic recession or depression,	14. The Federal Reserve has too much economic power since it controls the	30. When a wealthy minority maintains control of	33. Unregulated markets lead to strong economies.	4. Government bureaucrats cannot control the economy.	21. Markets should be free from government interventions.	
		25. Government intervention during economic woes is needed because in the	32. An injection of government spending eventually	8. The natural cycle of economics is rapid economic growth and	24. Government intervention during economic woes is not needed because	5. Governments should not intervene in economic matters.		
			11. Excessive saving by a population hurts the economy because	9. The Federal Reserve should not raise interest rates to correct for	28. Spending from one consumer becomes income for another			

(Note: The statements are cropped after the first seven or so words due to space limitations.)

Group 1's student-defined team name: Team Free Market. Students in this group were in strong in agreement with the idea that free markets operate better than government regulated economies (#1: +4). They also strongly believed that strong economies are based on free trade, smaller government, and a slow, steady increase of the money supply in a growing economy

(#23: +4). In comparison to the other three teams, they more strongly believed that markets should be free from government interventions (#21: +3) and that governments should not intervene in economic matters (#5: +2).

Group 1 most strongly disagreed with the idea that the government should control all means of production and distribution of goods in a society (#16: -4). Interestingly, all four groups shared this opinion (#16: -4, -3, -4, -4). Likewise, they strongly rejected the premise that capitalism is based on oppression of the lower class (#22: -4). In comparison to the other three teams, they more strongly disagreed with the strategy that during a period of economic woe (bust), the government should spend more money to stimulate economic activity (#10: -2), or that the government is in a better position than market forces to help create a robust economy (#18: -3). They also disagreed more than the other three groups that government intervention in the markets is needed for a strong economy (#26: -3) and with the premise that during periods of economic recession or depression, economies do not stabilize themselves very quickly and require government intervention in markets (#13: -2).

Our conclusion is that "Team Free Market" aptly describes the position held by this group.

Group 2: Team Interventionist, or We Hate Laissez-Faire. Students in this group were in strong agreement with the idea that the Federal Reserve should be independent of Congress and the Executive branch of government (#3: +4) and that policies should be judged by their results, not their intentions (#3: +4). They also strongly believed that governments should intervene in economic matters (#26: +3; complement of 5: -4). In comparison to the other groups, they more strongly believed the economic goal of a society should be to dispel class distinctions (#20: +3) and similarly when a wealthy minority maintains control of industry, wages for the working class are driven down (#30: +3). They were more in agreement than the other three groups that an injection of government spending eventually leads to added business activity and even more spending, thus helping the economy. (#32: +2). And they were slightly in more agreement that the other three groups that during a period of economic woe (bust), the government should engage in deficit spending (#12: +1).

This group strongly disagreed with the premise that the Federal Reserve has too much economic power since it controls the money supply in the economy (#14: -4). In comparison to the other three groups, they disagreed that unregulated markets lead to strong economies (#33: -3). Interestingly, as already mentioned, although they disagreed with the idea of the government controlling all means of production and distribution of goods in a society. (#16: -3), the other three groups disagreed even more.

Our conclusion is that "Team Interventionist, or We Hate Laissez-Faire" is a good description of the position held by this group, though we wonder if this group really hates the policy of Laissez-Faire or is just very suspicious of it.

Group 3: Team Spend Your Money. Students in this group were in strong agreement with the idea that voluntary interactions between consumers and businesses often produce superior results to crafted government decrees (#31: +4). Similarly, they agreed more than the other groups that workers need to spend, not save, any extra income in order to grow the economy (#2: +2) and that excessive saving by a population hurts the economy because saved money is stagnant and cannot stimulate economic growth (#11: +2). They also strongly believed that spending from one consumer becomes income for another worker, who in turn spends that

income to create a cycle of economic growth (#29: +4). Similar to group 4, they accept that government economic policies sometimes have unintended consequences (#15: +3). In comparison to the other groups, they agreed more with the idea that the natural cycle of economics is rapid economic growth and economic woe (aka boom and bust) (#8: +3) and that during a period of economic woe (bust), the government should spend more money to stimulate economic activity (#10: +2).

Similar to group 1, this group also strongly disagreed with the idea that capitalism is based on oppression of the lower class (#22: -4). And, just like all the groups and particularly groups 1 and 4, they strongly disagreed with the idea government should control all means of production and distribution of goods in a society (#16: -4). In comparison to the other groups, they disagreed more with the idea that government bureaucrats cannot control the economy (#4: -2).

Our conclusion is that "Team Spend Your Money" is a very appropriate description of the point of view held by this group.

Group 4: Team Some Government over No Government. This group believed that there was a role for government intervention in the economy, but with very strict limits. For example, they agreed with the idea that the Federal Reserve should be independent of Congress and the Executive branch of government (#3: +4), but they also believed, similar to group 3, that government economic policies have unintended consequences (#15: +4). In comparison to the other groups, they agreed more with the strategy that during a period of rapid economic growth (boom), the government should increase taxes or cut spending (#17: +2) and that the government is in a better position than market forces to help create a robust economy (#18: +1).

This group shared the perspective with group 3 that spending on the part of the consumer is very important to a healthy economy (#28: 3), though sometimes the government needs to intervene (#5: -3). Although their description of "Team Some Government over No Government" is appropriate, perhaps another way to describe their position is "sometimes trust the consumer and other times trust the government."

Overall Summary of the Four Groups: Each team's description of themselves very appropriately captured the essence of the students' combined views for the team. The views of each group were distinguished from one another in many distinct ways. However, consensus was reached by all four groups on several statements. For example, all four groups agreed with the premise that government failures can be as bad, or worse, than market failures (#27: +3, +2, +3, +3). In contrast, they all disagreed strongly that the government should control all means of production and distribution of goods in a society (#16: -4, -3, -4, -4). It is likely that the word "all" in this statement is at least partly the reason. All four groups also somewhat disagreed with the idea that "government intervention during economic woes is needed because in the long run we all will be dead" (#25: -2, -1, -2, -1). Finally, all four groups were ambivalent about the strategy of deficit spending, as evidenced by their neutral ratings for these statements: During a period of economic woe (bust), the government should engage in deficit spending (#12: -1, 1, -1, 0); and deficit spending is bad for the economy (#29: 0, -1, 0, -1).

Table 2. Factor Array: The score in each of the group rows shows the weighted average rating for each statement for that group.
(Scale: most disagree -4 to +4 most agree)

Statement		Group			
		1	2	3	4
1	Judge policies by their results, not their intentions.	1	4	-1	-1
2	Workers need to spend, not save, any extra income in order to grow the economy.	-1	-1	2	-3
3	The Federal Reserve should be independent of Congress and the Executive branch of government.	2	4	1	4
4	Government bureaucrats cannot control the economy.	2	1	-2	1
5	Governments should not intervene in economic matters.	2	-4	-3	-3
6	Low interest rates stimulate the economy.	0	2	0	2
7	Government regulations hurt the economy.	3	-3	-3	-2
8	The natural cycle of economics is rapid economic growth and economic woe (aka boom and bust).	0	0	3	1
9	The Federal Reserve should not raise interest rates to correct for inflation because higher interest rates will cause a recession.	0	-2	0	-2
10	During a period of economic woe (bust), the government should spend more money to stimulate economic activity.	-2	0	2	1
11	Excessive saving by a population hurts the economy because saved money is stagnant and cannot stimulate economic growth.	-1	-2	2	-2
12	During a period of economic woe (bust), the government should engage in deficit spending.	-1	1	-1	0
13	During periods of economic recession or depression, economies do not stabilize themselves very quickly and require government intervention in markets.	-2	2	1	2
14	The Federal Reserve has too much economic power since it controls the money supply in the economy.	-1	-4	-2	-3
15	Government economic policies have unintended consequences.	1	1	3	4
16	The government should control all means of production and distribution of goods in a society.	-4	-3	-4	-4
17	During a period of rapid economic growth (boom), the government should increase taxes or cut spending.	-2	-1	0	2

18	The government is in a better position than market forces to help create a robust economy.	-3	0	-1	1
19	Free markets operate better than government regulated economies.	4	-1	0	0
20	The economic goal of a society should be to dispel class distinctions.	-3	3	-3	0
21	Markets should be free from government interventions.	3	-2	-1	-2
22	Capitalism is based on oppression of the lower class.	-4	1	-4	1
23	Strong economies are based on free trade, smaller government and a slow, steady increase of the money supply in a growing economy.	4	0	1	0
24	Government intervention during economic woes is not needed because in the long run the economy will work itself out.	1	-2	-2	-1
25	Government intervention during economic woes is needed because in the long run we all will be dead.	-2	-1	-2	-1
26	Government intervention in the markets is needed for a strong economy.	-3	3	2	2
27	Government failures can be as bad, or worse, than market failures.	3	2	3	3
28	Spending from one consumer becomes income for another worker, who in turn spends that income to create a cycle of economic growth.	1	1	4	3
29	Deficit spending is bad for the economy.	0	-1	0	-1
30	When a wealthy minority maintains control of industry, wages for the working class are driven down.	0	3	1	-4
31	Voluntary interactions between consumers and businesses often produce superior results to crafted government decrees.	2	0	4	3
32	An injection of government spending eventually leads to added business activity and even more spending, thus helping the economy.	-1	2	1	0
33	Unregulated markets lead to strong economies.	1	-3	-1	-1

Student Survey Results of Q Pedagogy. A follow-up survey was administered to the students asking for their opinion of Q sort class activity. As shown in Table 3, the 11 participants who completed the survey felt strongly that the activity and its various elements were worthwhile

and represented a good approach to learn about the economics topic. They also reported enjoying the activity.

Our own observations of the class were consistent with the survey data. Students appeared interested and engaged for the orientation during the first class. Students subsequently completed the economics Q sort on time and with apparent care. During the second class, the students appeared very interested in the Q sort results and were engaged in both the small- and large-group discussions. Although we did not attempt to collect any formal data during the discussions, each group presented their viewpoint thoughtfully and with alignment with the data in the composite Q sort. During the large group discussion, many students participated in follow-up questions. Most notable was an exchange between students in two of the groups. Each group challenged the other to support their views.

Table 3. Summary of student responses to a class survey at the conclusion of the project. (N=11)

Survey Question	Frequency	Mean (SD)
Please rate how much you enjoyed participating in this sorting activity: (5-High enjoyment; 4-Some enjoyment; 3-Neutral; 2-Little enjoyment; 1-No enjoyment)	5: 7 4: 4 3: 0 2: 0 1: 0	4.64 (0.48)
Please rate your opinion of this sorting activity as a way to learn about the topic of the activity: (5-Excellent; 4-Very good; 3-Ok; 2-Not very good; 1-Poor)	5: 8 4: 3 3: 0 2: 0 1: 0	4.73 (0.45)
The sorting activities were part of an overall instructional strategy. Please rate the importance of each of the strategy components separately. (5-Very important; 4-Important; 3-Neutral; 2-Somewhat important; 1-Not important)		
The sorting activity itself. That is, the actual act of using the sorting software tool and sorting the statements provided:	5: 9 4: 2 3: 0 2: 0 1: 0	4.82 (0.39)
Participating in a class discussion of the topic after the sorting activity responses were submitted by all class members:	5: 9 4: 2 3: 0 2: 0 1: 0	4.82 (0.39)
Any final discussion, wrap-up comments, or review of the sorting activity results provided by the instructor to put closure on the topic of the sorting activity:	5: 9 4: 2 3: 0 2: 0 1: 0	4.82 (0.39)

Discussion

Teaching undergraduate economics is difficult. It involves a blending of interdisciplinary content and techniques from many content areas, such as history, mathematics, statistics, philosophy, and psychology (Allgood, Walstad, & Siegfried, 2015). In addition, economics requires students to confront how their own beliefs align with the principles they are learning in class. As Hennessey (2014, p. 225) points out, “Students are often challenged when trying to integrate the theoretical tools of economics with their beliefs about how the world works and what the role of government in the economy should be.” There is a need to help students to move beyond just answering questions based on what they read in textbooks. Similarly, instructors need to support students to take a stand and express what are their own beliefs and not just repeat

the sides of an argument presented in their texts and readings (Hennessey, 2014). An objective of this project was to address this challenge by integrating an adaptation of Q methodology into the teaching of economics.

This project examined the role of Q pedagogy in an upper-level, undergraduate economics class. The results indicated that students in the class held four distinct viewpoints about the role of the government in American economics. The students were able to critically analyze a list of 33 statements on this topic in relation to their own viewpoint. Then, in small groups comprised of those students holding each of the four viewpoints, the students were able to articulate a summary of their viewpoint as evidenced by the group name or slogan they generated. Not only is this a demonstration of the value of Q pedagogy in supporting a learning environment in which students felt safe to engage in an open dialog, but it also demonstrated a unique type of critical thinking on the part of the students.

Siegfried and Colander (2022, p. 74) "considers various interpretations of critical thinking and distinguishes 'big think' from 'little think' critical thinking, arguing that both are necessary. Teaching 'little think' critical thought involves teaching the tools, models, and methods that economists use in understanding some aspect of economics, while teaching big think critical thought involves teaching textbook economic models' applicability to the real world and how value judgements are integrated with scientific evidence to reach supportable policy positions." Examples of 'little think' would be "chains of reasoning in conjunction with simplified models such as (1) supply and demand, (2) marginal analysis, (3) benefit-cost analysis, and (4) comparative advantage (Siegfried & Colander, 2022, p. 74)".

Students need opportunities as part of their coursework to explore 'big think' questions and accept that such questions have no definitive answers. There is a need to help students to move beyond just answering questions based on what they read in textbooks. Similarly, instructors need to support students to take a stand and express what are their own beliefs and not just repeat the sides of an argument presented in their texts and readings. As Hennessey (2014, pp. 226-227) reminds us, "…when we explore these difficult questions in class, it is important to help students to come to their own answers rather than just acknowledge the variety of possibilities that could exist."

'Big think,' for example, would recognize "that good economic thinking includes understanding the limitations of analysis. For the right types of goods, markets are great; for others, they are problematic. For example, markets work much better in allocating goods that have become commodities than they do in allocating spouses; health care, or education, where the assumptions for achieving allocative efficiency through markets do not fit the real-world situation or the goals of individuals or society. Markets work less well in cases where agents' information is poor and where ethical issues and distributional goals are important" (Siegfried & Colander, 2022, p. 82).

The results of this project offer preliminary evidence of Q pedagogy promoting 'big think' critical thinking by college students in economics. Using Perry's (1970) framework for developing critical thinking discussed earlier, the results from this project show preliminary evidence of the students advancing beyond dualism and into multiplicity based on the students' expressing different viewpoints and engaging in conversation about those viewpoints instead of only the points addressed in their readings.

Although Q has been used to assess student attitudes in college courses (e.g., Ramlo, 2015, 2017; Schumacher & Montgomery, 2013), the goal of these studies was to conduct research, not to support or enhance pedagogy. That is, there was no attempt to use Q as an

integral instructional activity. A likely reason for this is the standard use of print-based materials in the implementation of Q sorts. The time it would take to produce enough materials for even a small class would be impractical. In contrast, this project used a custom-made software application–made freely available to others–to implement and collect the Q sort data (Rieber, 2020a).

The goal of Q pedagogy is to use the viewpoints that result from factor analysis of the Q sort as the basis for student interaction and reflection. The focus of student interactions in the field work done to date has been small- and large-group class discussions. Q pedagogy is based on several foundational assumptions, as described by Rieber (2023, p. 88):

- "Students develop subjective opinions on topics they learn in school, whether teachers realize it or not."
- "The subjective opinions students form influence their learning of the course content."
- "Most students would share their opinions if they felt safe in the learning environment."
- "There are educational and social benefits to students when they are guided to understand their opinions on a topic, followed by listening to and understanding the opinions of others."

As these foundational assumptions demonstrate, the value of Q pedagogy is on harnessing the opinions that students inevitably bring to their coursework to add value to what they are studying. This added value begins with explicitly acknowledging the diverse opinions students have about the course content. Q pedagogy then offers instructors with opportunities for students to express their opinions in a safe and respectful space along with opportunities to have students understand the opinions of others. Q pedagogy had been shown to be a viable instructional strategy in other field tests of the approach using different knowledge domains, such as instructional design, educational research methods (Rieber, 2020b, 2023), social studies education (Dinkelman, Rieber, & Johnson, 2024), and environmental science (Rieber, Zimeri, & Li, 2022).

Q pedagogy provides students with a safe space for sharing their opinion. It does so in several ways. First, the statements in a Q sort activity provide students with language and vocabulary that captures the diversity of the topic in question. This is important because students likely have not had opportunities to either formulate or rehearse the language or vocabulary needed to convey an opinion on a complex and controversial topic. The act of completing the Q sort helps the student to understand their own point of view by the way they are forced to contrast one statement from another. Second, the factor analysis usually reveals that their opinion, in general, is shared at least by a few others. This gives each student a sense that their viewpoint is valued by others. This, in turn, gives them a sense of belonging to a group with like-minded views. Third, Q pedagogy provides an opportunity for students to practice listening to the viewpoints of others and to understand and respect those viewpoints. Q methodology makes no judgement about the relative importance of one viewpoint over the other. It merely reveals what are the distinct viewpoints held by members within a group.

Of the possible directions for future research, one is based on our encouraging anecdotal observations of the small- and large-group discussions. Students seemed interested, engaged, and on-task throughout the week. Of course, one reason for the enthusiasm might just have been due to novelty given that the Q sort activity was something none of the participants had ever experienced. That aside, one promising area for future research with Q pedagogy is the nature and content of class discussions. For many instructors, just getting students to speak up during class is enough to consider the class discussion to be successful. However, mere participation,

though a necessary condition for a successful class discussion, is far from sufficient. Some preliminary work in this area has been done by Todd Dinkelman (Dinkelman et al., 2024) using Q sorts in a college-level social studies education class. That research used a model developed by Dinkelman to critique class discussions on the basis of six aims based on the educational philosophy of John Dewey (1916): participation, topicality, deliberation, diversity, meaning-making, and mutuality. In addition to participation the most successful classroom discussions, according to Dinkelman, must be on topic and deliberate in their focus. The range of ideas should be diverse with the goal of each participant deriving meaning from the discussion. Finally, the aim of mutuality is where students develop a sense of shared investment in ensuring that all students in the class develop and extend their learning. Mutuality is particularly important to Q pedagogy because mutuality resists having "winners and losers" in a discussion, as is the risk with other classroom discussion strategies, such as debates. Future researchers are encouraged to evaluate the effectiveness of student discussions in their classes on the basis of these six aims.

An interesting question is whether the results presented here are convincing enough to persuade economics instructors who teach primarily through lecture to try out Q pedagogy in their teaching. Interestingly, Allgood et al. (2015) present several rationales for and against faculty adopting any new teaching pedagogy based on economic theory. For example, adopting any new teaching approach incurs a variety of fixed costs for faculty such as the time and effort required to learn the approach and how to incorporate it into their teaching style. Similarly, any faculty who are hesitant to accept any risks in their teaching will have less incentive to try a new pedagogy given the potential that it will not work, and it may lower their teaching evaluations. They point out "because benefits of a teaching innovation are usually uncertain and adoption costs are undoubtedly positive and often substantial, adoption benefit-cost calculations favor the traditional lecture as the steady state" (Allgood et al., 2015, p. 304).

In contrast, Allgood et al. (2015) think a convincing argument for moving away from lecture is to find ways to increase student study time and effort because they see a direct link between these sorts of student behaviors and student learning. Although the results presented here are preliminary, they provide some evidence that Q pedagogy offers students a motivating reason to engage with the course content in a personal way that they value. Whether this would ultimately lead to increased and sustained study time and effort over the duration of the course remains to be determined.

In closing, this project provides economic instructors with insights on the views held by students on the government's role in American economics. This project also offers instructors an approach for student reflection, critical thinking, and civil discourse using an adaptation of Q methodology we call Q pedagogy.

References

Abrami, P. C., Bernard, R. M., Borokhovski, E., Waddington, D. I., Wade, C. A., & Persson, T. (2015). Strategies for Teaching Students to Think Critically: A Meta-Analysis. *Review of Educational Research, 85*(2), 275-314.

Al-Bahrani, A., Apostolova-Mihaylova, M., & Marshall, E. C. (2022). Helping some and harming others: Homework frequency and tradeoffs in student performance. *The Journal of Economic Education, 53*(3), 197-209. doi:10.1080/00220485.2022.2075506

Allgood, S., Walstad, W. B., & Siegfried, J. J. (2015). Research on Teaching Economics to Undergraduates. *Journal of Economic Literature, 53*(2), 285-325. doi:10.1257/jel.53.2.285

Asarta, C., J. (2024). Student Engagement and Interaction in the Economics Classroom: Essentials for the Novice Economic Educator. *Journal of Economic Education, 55*(1), 54-62. doi:10.1080/00220485.2023.2269142

Asarta, C. J., Chambers, R. G., & Harter, C. (2021). Teaching Methods in Undergraduate Introductory Economics Courses: Results From a Sixth National Quinquennial Survey. *The American Economist*, *66*(1), 18-28.

Barreto, H. (2015). Why Excel? *The Journal of Economic Education, 46*(3), 300-309.

Bonwell, C. C., & Eison, J. A. (1991). Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports. ERIC Accession Number: ED336049

Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Brown, S. R. (1980). *Political subjectivity: Applications of Q methodology in political science*. New Haven, CT: Yale University Press.

Brown, S. R. (1993). A Primer on Q Methodology. *Operant Subjectivity, 16*(3/4), 91-138. doi:https://doi.org/10.22488/okstate.93.100504

Busom, I., Lopez-Mayan, C., & Panadés, J. (2017). Students' persistent preconceptions and learning economic principles. *Journal of Economic Education, 48*(2), 74-92. doi:10.1080/00220485.2017.1285735

Cook, N. P. S., & Pantuosco, A. (2022). International trade with heterogeneous firms: An interactive classroom simulation. *Journal of Economic Education*, *53*, 31-42.

Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. New York: Macmillan.

Dinkelman, T., Rieber, L., & Johnson, G. (2024). Discussions on another spectrum: Q pedagogy and high-quality discussions. Theory & Research in Social Education. *Theory & Research in Social Education*, 1-47. doi:https://doi.org/10.1080/00933104.2024.2388154

Dissanayake, S. T. M., & Jacobson, S. A. (2021, 2021/01/01/). *Money growing on trees: A classroom game about payments for ecosystem services and tropical deforestation*, United States.

Facione, P. A. (1990). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction*. Millbrae, CA: The California Academic Press.

Frank, R. H. (2007). *The economic naturalist : in search of explanations for everyday enigmas*: Basic Books.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences of the United States of America, 111*(23), 8410-8415.

Glaser, E. M. (1941). *An experiment in the development of critical thinking*: [AMS Press].

Harter, C., Chambers, R. G., & Asarta, C. J. (2022). Assessing Learning in College Economics: A Sixth National Quinquennial Survey. *Eastern Economic Journal*, *48*, 251-266.

Hennessey, J. (2014). Motivating a Productive Discussion of Normative Issues Through Debates. *Journal of Economic Education, 45*(3), 225-239. doi:10.1080/00220485.2014.917567

Hoyt, G. M., & McGoldrick, K. (2019). 50 years of economic instruction in the Journal of Economic Education. *Journal of Economic Education, 50*(2), 168-195. doi:10.1080/00220485.2019.1582388

Mallory, A., Jane, C., Christian, D. S., & Katherine, W. (2024). Improving Introductory Economics Course Content and Delivery Improves Outcomes for Women. *Journal of Economic Education, 55*(3), 216-231. doi:10.1080/00220485.2024.2334041

McCann, M. (2017). Constructive Alignment in Economics Teaching: A Reflection on Effective Implementation. *Teaching in Higher Education, 22*(3), 336-348. doi:10.1080/13562517.2016.1248387

Nelson, C. E. (1989). Skewered on the Unicorn's Horn: The illusion of tragic tradeoff between content and critical thinking in the teaching of science. In L. Crow (Ed.), *Inquiry: Critical Thinking across the Disciplines* (pp. 17-27). Washington, DC: Society of College Science Teachers.

Owings-Edwards, S. (2021). A Class Competition that Combats Economics Students' Proclivity Toward Self-Interested Behavior. Journal of Economics Teaching, 6(1), 40-52. doi:10.58311/jeconteach/4f005944bdd767d6d1be38baddd597b95b4e87e6

Pernecky, M. (1997). Debate for the Economics Class—and Others. *College Teaching*, *45*(4), 136-138. doi:10.1080/87567559709596215

Perry, W. G., Jr. (1970). *Forms of intellectual and ethical development in the college years; a scheme*: Holt, Rinehart and Winston.

Ramlo, S. (2015). Student views about a flipped physics course: A tool for program evaluation and improvement. *Research in the Schools, 22*(1), 44-59.

Ramlo, S. (2017). Student views regarding online freshmen physics courses. *Research in Science & Technological Education, 35*(4), 461-476. doi:dx.doi.org/10.1080/02635143.2017.1353961

Rieber, L. P. (2020a). Building a Software Tool to Explore Subjectivity in the Classroom: A Design Case. *International Journal of Designs for Learning, 11*(140-150). doi:https://doi.org/10.14434/ijdl.v11i1.26471

Rieber, L. P. (2020b). Q Methodology in Learning, Design, and Technology: An Introduction. *Educational Technology Research & Development, 68*(5), 2529–2549. doi:https://doi.org/10.1007/s11423-020-09777-2

Rieber, L. P. (2023). Q Pedagogy: Bringing Students' Subjectivity into the Design of Instruction. *International Journal of Designs for Learning, 14*(2), 87-97. doi:https://doi.org/10.14434/ijdl.v14i2.34715

Rieber, L. P., Zimeri, A. M., & Li, T. (2022). All Opinions Matter: Q Pedagogy in an Environmental Health Science Class. *Journal of the Scholarship of Teaching and Learning, 22*(3), 21-33. doi:https://doi.org/10.14434/josotl.v22i3.31778

Ruder, P., Maier, M. H., & Simkins, S. P. (2021, 2021/01/01/). *Getting started with team-based learning (TBL): An introduction*, United States.

Schumacher, K. S., & Montgomery, D. (2013). Using Identity Indicators to Describe Graduate Students' Views of Statistics Courses in the Context of Major-Specific Courses=. *Operant Subjectivity, 36*(4), 320-334.

Siegfried, J., & Colander, D. (2022). What does critical thinking mean in teaching economics?: The big and the little of it. *Journal of Economic Education, 53*(1), 71-84. doi:10.1080/00220485.2021.2004278

Stephenson, W. (1953). *The study of behavior: Q-technique and its methodology*. Chicago: University of Chicago Press.
Stephenson, W. (1978). Concourse theory of communication. *Communication, 3*, 21-40.
Stephenson, W. (1986). Protoconcursus: The concourse theory of communication. *Operant Subjectivity, 9*(3), 73-96.
Stephenson, W. (2014). General Theory of Communication. *Operant Subjectivity, 37*(3), 38-56. doi:10.15133/j.os.2014.011
Thoma, G. A. (1993). The Perry Framework and Tactics for Teaching Critical Thinking in Economics. *The Journal of Economic Education, 24*(2), 128-136. doi:10.2307/1183161
Treme, J. (2018). Classroom Debates: Using Speed Rounds To Encourage Greater Participation. *College Teaching*, *66*(2), 86-87. doi:10.1080/87567555.2017.1416330
Vo, H. X., & Morris, R. L. (2006). Debate as a Tool in Teaching Economics: Rationale, Technique, and Some Evidence. *Journal of Education for Business*, *81*(6), 315-320. doi:10.3200/JOEB.81.6.315-320
Watts, M., & Schaur, G. (2011). Teaching and Assessment Methods in Undergraduate Economics: A Fourth National Quinquennial Survey. *Journal of Economic Education, 42*(3), 294-309. doi:10.1080/00220485.2011.581956
Watts, S., & Stenner, P. (2012). *Doing Q methodological research: Theory, Method, and Interpretation*. Thousand Oaks, CA: SAGE Publications, Inc.
Wolla, S. A. (2018). Yours, Mine, and the Truth: Using a Structured Minimum Wage Debate in the Economics Classroom. *The American Economist*, *63*(2), 245-259. doi:10.1177/0569434517736241
Wozny, N., Balser, C., & Ives, D. (2018). Evaluating the flipped classroom: A randomized controlled trial. *Journal of Economic Education*, *49*, 115-129.