Artificial Intelligence and Economics Education

Michael Enz,
Virginia Polytechnic Institute and State University

The release of ChatGPT (a large language model–based chatbot) in November 2022 created some panic for educators. The primary concern being that students will use ChatGPT to cheat, which would negatively impact the level of student learning by offering a path to course completion without undergoing the learning process. Instructors can make course design decisions that can decrease the pressure to cheat.

Lang (2013) provides four features of a learning environment that may increase the likelihood that individuals cheat: an emphasis on performance, high stakes, an extrinsic motivation for success, and a low expectation of success. Given that these features can cause pressure to cheat, Lang outlines four course design approaches to decrease that pressure. To decrease the emphasis on performance, instructors can design courses with assessments that allow students to show growth or approach mastery over time rather than the performance on a one-time assessment. To decrease the stakes for a particular assessment, instructors can create many low-stakes assessments rather than a few high-stakes assessments. To increase intrinsic motivation, instructors can inform

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students of the relevance of class material and importance of learning, or they can allow some choice within assessments to encourage a sense of ownership of the work product—for example, allowing the student to pursue a topic of interest rather than responding to a specific prompt. To increase student self-efficacy, instructors can provide informative, timely feedback and appropriate levels of scaffolding so students see the possibilities for success.

While educators are concerned about students using ChatGPT or other generative artificial intelligence systems to cheat, cheating can largely be addressed through course design changes. Artificial intelligence is rapidly improving, and hopefully our students will learn how to use artificial intelligence as a complement (such as critiquing the quality of a response generated by ChatGPT or providing a counterargument to a position) rather than a substitute for the learning process.

To learn more about this topic, attend the session titled “Cheating in the Era of ChatGPT: Implications for Economics Instruction and Assessment” at the 2024 ASSA meeting in San Antonio on Friday, January 5, at 8:00 AM.

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**ARTIFICIAL INTELLIGENCE, from p. 1**

**Reference**


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**DIVERSITY, EQUITY, INCLUSION, AND BELONGING**

**What Did UWE Do for Economics Education?**

Tatyana Avilova, 
Boudoin College

Claudia Goldin, 
Harvard University

We began the *Undergraduate Women in Economics (UWE) Challenge*, a randomized controlled trial (RCT), in 2015 with the purpose of narrowing the gender gap among economics majors. We have written about the reasons for creating UWE, its implementation, and the many offshoots of the program, which we term “RCTs within the RCT” (Avilova and Goldin 2018, 2020; Goldin 2015). Now that many of the undergraduate cohorts treated by these low-cost interventions have graduated, we can provide an assessment of how well our “light-touch” program functioned to attract more women to major in economics.

The bottom line is that UWE was effective in increasing the fraction of female BAs who majored in economics relative to men in liberal arts colleges (Avilova and Goldin 2023). Large universities did not show an impact of the treatment. The sheer size of these institutions likely meant that the light-touch interventions could not reach enough undergraduates. In some cases, enrollment capacity limitations and constraints on faculty and teaching staff may have prevented departments from recruiting more students. However, among the large universities, those that implemented their own experiments did show modest success in encouraging more women to major in economics (even if some of the individual RCTs showed limited impact). Their moderate success may have been because implementation of an “RCT within the RCT” led to greater awareness of and involvement in the UWE RCT among faculty and staff (Antman, Skoy, and Flores 2022; Bedard, Dodd, and Lundberg 2021; Halim, Powers, and Thornton 2022; Li 2018; Patnaik et al. 2023; Porter and Serra 2020).

Most RCTs have specific treatments. But one size would not fit all UWE Challenge treatment institutions, which varied by size, resources, faculty commitment, and the relative use of instructors and adjuncts. Instead, various light-touch and low-cost treatments in three (somewhat overlapping) areas were assembled and treatment schools were requested to use several of them.

**1) Better Information.** Many potential majors did not know that the field of economics addresses subjects such as development, health, education, and inequality and thought that economics was primarily the study of financial markets. Providing more accurate information about economics and career paths open to majors can attract students with diverse interests. Some treatment schools successfully engaged female students at academic fairs with informative fliers and by staffing tables with upper-class women, advisers, and professors.

**2) Mentoring and Role Models.** Fostering networks among students and showing support for their choice of major can help students persevere in economics. Many treatment schools initiated “Undergraduate Women in Economics” clubs that either...
focused on recruiting women to economics or opened membership to all students but made promoting diversity in economics a central mission. The clubs were resource-intensive but appeared to be useful at both the larger departments and the liberal arts colleges. The UWE Challenge sponsored several student regional conferences. Treatment schools were enabled to invite female speakers for seminars and career panels.

(3) Instructional Content and Presentation Style. Departments can demonstrate the relevance of economics by expanding course curriculum and incorporating inclusive teaching practices (Hockings 2010). Several treatment schools created well-subscribed courses that showed the wide range of topics studied in economics and its concern with individual well-being.

Crucial first steps for treatment schools were to learn about the scope of the problem (e.g., size of the economics gender gap at their institution) and to identify sources of potential “leaks” of students from the major (e.g., from principles to intermediate courses). Presenting data and concrete areas to target can help incentivize faculty to participate. Faculty and staff at the treatment schools used our suggestions and tailored interventions to fit their institutions.

We are gratified that nontreatment schools learned from our low-cost, light-touch program (which we made available on our website) and implemented their own diversity initiatives. Because some of those schools were our “controls,” their programs may have reduced the statistical significance of our RCT but their adoption of our initiatives demonstrates its relevance. Other departments can also use our suggested interventions as a starting point for their own initiatives to attract a wider range of students to a major that is intellectually fulfilling, extremely useful, and demanded by a wide range of employers (see Avilova and Goldin, n.d. for a list of the “interventions”).

The authors thank the Alfred P. Sloan Foundation for funding and Danny Goroff for encouragement. We are also grateful to faculty members at the UWE treatment schools and the members of the UWE Board of Experts who helped set up the UWE Challenge.

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**WHAT WE KNOW ABOUT…**

**Classifying Economics as STEM**

**Anthony Underwood, Dickinson College**

Over the past few decades, the number of students pursuing higher education degrees outside their home countries has more than doubled and the share of US undergraduate degrees conferred to international students has increased from 3 percent to 5 percent (Bound et al. 2021). This is particularly true in economics where between 2000 and 2021, the share of US undergraduate degrees conferred to international students more than doubled from 9 percent to 21 percent (Marshall and Underwood 2020, 2022). To capture a larger share of this growing international student population, many economics departments are reclassifying their existing major(s) or adding new majors that are STEM-designated degree programs. In 2012, only 25 institutions (of around 700 institutions conferring economics degrees) classified their undergraduate economics degree as STEM and these degrees made up only around 1 percent of all undergraduate economics degrees conferred. By 2021, 138 institutions were doing so, comprising 36 percent of all undergraduate economics degrees conferred in

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**References**


the United States (Marshall and Underwood 2020). Among other factors, Mahon (2022) finds that institutions with larger international student enrollments are more likely to (re)classify as STEM. Based on a survey of (re)classifying institutions, Marshall and Underwood (2022) find that providing more favorable postgraduation residency options for international students is one of the most-cited motivations for (re)classification.

All academic degree programs are cataloged using six-digit classification of instructional program (CIP) codes by the National Center for Education Statistics (NCES). Since 1992, international students in the United States enrolled full time for more than one academic year are eligible to apply for optional practical training (OPT), allowing them to secure a visa to work in the United States for one year postgraduation in their field of study. Beginning in 2008, students graduating with a STEM-designated degree became eligible for a 17-month (or 29-month total) OPT extension. This policy was revised in 2016 to allow graduates a 24-month STEM OPT extension (or 36-month total) (Marshall and Underwood 2020, 2022). The list of STEM-designated degrees, based on CIP codes, has been expanded several times over the past decade to include additional fields, including behavioral and social sciences. In 2012, “econometrics and quantitative economics” (CIP code 45.0603) was added, indicating a STEM-designated economics degree. Postgraduation visas are an important stepping-stone for international students participating in the US labor market, so changes to visa policy and the availability of H-1B opportunities may affect decisions about where, how, and if international students study in the United States (Amuedo-Dorantes and Furtado 2019; Bound et al. 2021; Amuedo-Dorantes, Furtado, and Xu 2019; Demirci 2019).

Recent causal evidence suggests that OPT policy changes, especially the increase in the OPT extension to a total of 36 months in 2016, increase the likelihood that U.S. institutions offer STEM-designated programs, the matriculation of international students in U.S. undergraduate programs, the likelihood that international students choose to major in STEM-designated programs, and the likelihood that these students choose to use their OPT period and remain in the U.S. upon graduation (Kim 2022; Amuedo-Dorantes, Shih, & Xu 2023; Amuedo-Dorantes, Furtado, & Xu 2019; Demirci 2019).

The implications of (re)classification on the economics discipline remain unclear. Given recent evidence suggesting substantial impacts of OPT policy changes on the decisions of both institutions and international students, the effects are likely more widespread and currently underresearched. It is also unclear what impact this may have on both undergraduate economics curricula, pedagogies, and diversity in the economics discipline.

### References


### Economic Education Resources from the Philadelphia Fed

**Andrew Hill, Philadelphia Federal Reserve Bank**


Five History of Central Banking Publications provide overviews of Benjamin Franklin’s observations on the use of paper money in colonial America, the First and Second Banks of the United States, the state and national banking eras, and the first 100 years of the Federal Reserve System. Available as digital downloads and in print copies, they offer an easy way to integrate the teaching of US history into high school and undergraduate courses. The Federal Reserve and You is a series of 70 short video clips educators can integrate in many ways into their teaching. The series includes interview...
Active Learning Pedagogies: Cooperative Learning

KimMarie McGoldrick,
University of Richmond

Cooperative learning involves carefully designed use of small groups to enhance outcomes. Cooperative learning entails more than putting students into working groups; it requires careful planning. Successful cooperative learning activities are grounded in attention to structures associated with the preparation, setup, monitoring, concluding, and evaluating activities. While perspectives differ somewhat, a number of key structural elements consistently surface: positive interdependence (achieved when individual and group learning gains are positively correlated), individual and group accountability (evaluation occurs at both levels), equal participation (every group member participates in the activity), and simultaneous interaction (more than one student is active at a time). McGoldrick et al. (2010) provide detailed descriptions and methods for developing these structures.

Learning objectives associated with a class period or an entire course can guide instructors in their choice of a cooperative learning technique category and subsequent choice of one of the many associated exercise formats. Barkley, Major, and Cross (2014) organize cooperative learning exercises in this manner, offering the following classification:

- **Discussion** (generate ideas, practice communication and listening): think-pair-share, round robin, buzz groups, talking chips, three-step interview, critical debate
- **Reciprocal Teaching** (test comprehension, receive feedback, develop alternative explanations): note-taking pairs, learning cell, fishbowl, role-play, jigsaw, test-taking teams
- **Problem-solving** (apply concepts, analyze scenarios, evaluate solutions): think-aloud pair problem-solving, send-a-problem, case study structured problem-solving, analytical teams, group investigation
- **Graphic Organizers** (discover patterns and relationships, organize and classify information): affinity grouping, group grid, team matrix, sequence chains, word webs
- **Writing** (practice communication, organization, and synthesis): dialogue journals, round table, dyadic essays, peer editing, collaborative writing, team anthologies, paper seminar

While most instructors have some familiarity with the think-pair-share format, others listed may be less known. Consider, for example, the send-a-problem exercise. This cooperative learning activity begins when each group is provided instructions and a different problem prompt attached to the outside of an envelope. Groups work on a solution during the allotted time, after which each group places its answer inside their envelope. Envelopes are passed, and groups repeat the problem-solving process without looking at the solution created by another group. Additional rounds of the exercise continue.

The Starting Point pedagogic portal, elsewhere described in this newsletter, includes a cooperative learning module with a series of ready to use examples.
generate multiple solutions within each envelope. The final stage of the exercise directs groups to evaluate these solutions or use them to develop a model answer. Literature on cooperative learning in economics includes both descriptive narratives and efficacy studies. Descriptive sources provide detailed guidance on implementation and offer examples associated with specific courses or topics (see, for example, Bartlett 1995; Maier and Keenan 1994; Maier, McGoldrick, and Simkins 2010; McGoldrick et al. 2010). The Starting Point pedagogic portal, elsewhere described in this newsletter, includes a cooperative learning module with a series of ready to use examples. A growing body of research provides evidence on the efficacy of this technique. Like much of the active learning research, cooperative learning studies often measure learning gains in comparison to lecture. Marburger (2005) provides mixed evidence of gains for students who participated in cooperative learning activities with no significant difference in average scores on the multiple-choice questions on exams but higher learning gains on questions that required analysis. Yamarik (2007) finds that students in a cooperative learning section of intermediate macroeconomics had higher exam scores overall. Baumgardner (2015) reports higher mean grades on cooperative learning exercises in comparison to assignments that the same students completed individually. In contrast, Emerson, English, and McGoldrick (2015, 2018) utilize control/treatment course sections to study the structured problem-solving nature of cooperative learning think-pair-share exercises in contrast to the same problems solved independently. Their findings indicate no significant differences in performance (Test of College Understanding or on overall course scores) and attitudes toward or interest in economics for students engaging in think-pair-share exercises. However, they find that lower achievement and lower level of satisfaction associated with large enrollment sections is partially mitigated by the structured problem-solving.

**References**


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**CENTER DIRECTOR’S CORNER**

**Eastern Kentucky University Center for Economic Education**

Under the direction of Dr. Cynthia Harter, the Eastern Kentucky University Center for Economic Education works to improve decision-making and understanding of economics by equipping students as well as K–12 teachers with knowledge, resources, and networks that help them understand and teach economics, personal finance, and entrepreneurship. The EKU Center is part of the Coalition for Financial Literacy in the Commonwealth, a regional partnership among central Kentucky economic educators. This group collaborates with local banks annually to offer a free professional development conference for K–12 teachers in economics and personal finance. Teachers are provided with content and resources that are aligned with Kentucky Department of Education Academic Standards in these content areas. The Kentucky Master Teacher of Personal Finance Program was developed and launched in partnership with the Federal Reserve Bank of St. Louis to prepare middle school and high school teachers to meet an unfunded mandate to provide financial literacy as a graduation requirement. This intensive hybrid program is provided annually at no cost to Kentucky teachers during the summer and is aligned with state standards. Opportunities are provided for participants to stay connected after completing the program.

The EKU Center for Economic Education offers a campuswide annual Financial Literacy Fair to increase awareness of the importance of financial literacy and to improve knowledge of personal finance content among college students. We also work with education professors to provide workshops designed for undergraduate education methods classes to increase future teachers’ knowledge of economics content and how to teach it at various grade levels.
STARTING POINT is an online economics pedagogical portal that provides economists with information and materials supporting the adoption of innovative and effective teaching strategies. Supported by the National Science Foundation (DUE 0817382), STARTING POINT project directors were assisted by a team of educators from economics and other disciplines. STARTING POINT includes modules covering the following teaching strategies: Teaching with cases, Classroom experiments, Classroom response systems, Teaching with computer simulations, Context-rich problems, Cooperative learning, Documented problem-solving, Interactive lectures, Interactive lecture demonstrations, Interdisciplinary approaches to teaching, Just-in-time teaching, Quantitative writing, Service learning, Teaching with spreadsheets, Team-based learning, Undergraduate student research.

Using media to enhance teaching and learning
Instructors can access the teaching modules [here](#).

Each STARTING POINT module is intentionally structured to help instructors learn about a specific pedagogical technique by answering the following three questions: What is it? Why is it effective? How can it best be used? In addition, each module has a searchable library of ready-to-use or easily modifiable examples illustrating the use of the pedagogical technique in an economics course. Each example includes a set of teaching materials and suggestions for use, including handouts and instructions.

STARTING POINT continues to grow through the addition of new content modules and classroom examples to its library. Recent enhancements include the Team-Based Learning module supported by the National Science Foundation (DUE 1712295). That library alone includes over 200 examples, many adaptable to pedagogies beyond team-based learning. STARTING POINT is an ever-expanding project. Economic educators are invited to contribute to the example libraries using an online form. Example submissions are reviewed before being accepted for inclusion on the STARTING POINT site.
Canvas-supported workshop starting on Friday, May 31, and concluding on Sunday, June 2, 2024. The application portal will open in January 2024 with a rolling acceptance procedure that continues until all workshop slots are filled. Final decisions will be made by May 1. Participants should expect to develop the abilities to do the following:

- Apply the scientific process so as to choose between competing evidence-based teaching practices that might have disparate effects on those of different races, genders, and ethnicities
- Analyze and evaluate how classroom climate, pedagogy, and assessment impact student behaviors and outcomes, recognizing that these impacts are heterogeneous
- Teach students to learn economics using some of the quantitative approaches employed by economists
- Think critically about course goals and learning outcomes and their relationship to pedagogical choices and assessment, with special attention to enhancing diversity and inclusion
- Communicate motivations for, and outcomes of, teaching enhancement to diverse audiences

Workshop staff include Sam Allgood (University of Nebraska–Lincoln), Gerald Daniels (Howard University), Tisha Emerson (East Carolina University), Gail Hoyt (University of Kentucky), and KimMarie McGoldrick (University of Richmond).

This year’s National Economics Teaching Association (NETA) conference, held on November 2 and 3, 2023, in Charlotte, North Carolina, is themed “Innovate. Educate. Elevate.” It will include sessions on innovative pedagogy, new technology, and other teaching-enhancement activities.

The twentieth annual University of North Carolina Wilmington (UNCW) Teaching Workshop is devoted to the teaching of economics and focuses on applicable ideas and information that can quickly be put to use in the classroom. The one-day workshop will include presentation and networking sessions during lunch and a happy hour. The 2023 workshop will be held on Saturday, November 11. For more information, contact Dr. Brandon Brice at briceb@uncw.edu.

At the Southern Economic Association Ninety-Third Annual Meeting, held on November 18-20, 2023, in New Orleans, the Presidential Economic Education sessions will include topics such as pedagogy for microeconomics; updates in economic education; using data to teach economics; pedagogy to explore and address diversity; research in economic education; and student learning, engagement, and grading. Two panels will also be conducted on the experiences of non-tenure track faculty in economics and innovations in teaching CORE Econ.

The AEA-CEE is sponsoring seven sessions at the ASSA Annual Meeting on January 5-7, 2024, in San Antonio. This year, planned sessions include International Comparisons of the Status of Teaching Track Positions, Cheating in the Era of ChatGPT, Teaching Happiness in Your Dismal Science Courses, Developments in High School Economics, Unanswered Questions in Economic Education and Promising Studies Providing Answers, the Ancillaries of Undergraduate Economic Programs, and a poster session.

Submit ideas for EconEdNews content to the newsletter coordinator, Emily Marshall, at marshaem@dickinson.edu. Topics may include an overview of a particular area of economic education research; resources on diversity, equity, inclusion, and belonging; or other special features.

Do You Have a Feature Story Idea for EconEdNews?

ECONEVENTS, FROM p.7

ABOUT THE AEA-CEE

The Committee on Economic Education (AEA-CEE) is a standing committee of the American Economic Association that has been in existence in one form or another since 1955. The mission of the committee is to improve the quality of economics education at all levels: precollege, college, adult, and general education. The committee supports many activities of interest to the community of economic educators. It sponsors paper, panel, and poster sessions and workshops at the annual Allied Social Science Associations (ASSA) Meeting. The committee also organizes the annual CTREE conference and EDUCATE workshop. Resources supporting economic research and teaching are also housed on the committee site and include information about organizations that support economic education, academic journals publishing economic education research, and resources for changing course content or curriculum to appeal to a broad range of students.

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