



The AI–Think-Pair-Share (AI-TPS) Framework: Using Generative AI for Active Learning in Principles of Economics¹

In economics education, a persistent challenge is the high opportunity cost associated with instructor preparation time for developing active learning exercises. This paper introduces the AI-Generated Think-Pair-Share (AI-TPS) framework, a method that uses generative AI to help instructors efficiently create customized and up-to-date in-class activities. By using AI as a tool for instructor augmentation, the framework reduces the cost of creating engaging learning materials and makes evidence-based pedagogy more feasible and scalable in economics classrooms.

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1. Introduction

Think-Pair-Share (TPS), first articulated by Lyman (1981), is a potent active learning strategy because of its elegant simplicity and its foundation in the principles of peer instruction. In a TPS activity, the instructor poses a question to their students. The students then think about it individually, pair up to discuss their reasoning, and, finally, share their conclusions with the whole class. Pioneered by Mazur (1997) in physics education, peer instruction is based on the insight that the act of explaining a concept to a peer is a powerful learning tool, forcing students to move from vague recognition to precise articulation. The empirical case for such active learning is overwhelming. A landmark meta-analysis by Freeman et al. (2014) found that it increases student performance in STEM courses by nearly half a standard deviation, and that students in traditional lectures are 1.5 times more likely to fail. Subsequent work shows students in active classrooms learn more even when they feel they have learned less, a perception gap that helps explain persistent resistance to these methods (Deslauriers et al., 2019). Within economics, a discipline that has historically relied on the lecture format, national surveys show that “chalk and talk” still dominates the discipline even as the call for more interactive methods has grown consistently louder (Watts & Schaur, 2011; Hettler, 2015). Furthermore, when students in a pair disagree, the resulting productive disagreement encourages them to defend their reasoning with evidence from the course material, an approach shown to promote collaboration and inclusion within economics classrooms (Cagliesi & Ghanei, 2022).

While the pedagogical benefits of moving beyond a traditional lecture format are well-documented (Freeman et al., 2014; Hardman, 2016) and widely accepted, significant barriers to the consistent and deep implementation of active learning persist (Allgood, Walstad, & Siegfried, 2015). Many economics instructors have successfully incorporated valuable techniques such as flipped classrooms (Lage, Platt, & Treglia, 2000), in-class polling (Elliott, 2003), and complex economic experiments (Dickie, 2006). However, these methods often carry a high opportunity cost in terms of instructor preparation time. Flipped classrooms, for instance, require a substantial upfront investment. Producing a full suite of video lectures while designing novel and engaging case studies or in-class problems for each topic demands a significant ongoing commitment of time and creative energy. For many educators, this high cost of preparation, relative to other teaching and research duties, remains a primary obstacle to moving beyond simple polling and toward more substantive, collaborative exercises. Surveyed Principles instructors frequently report retaining the lecture not because it teaches best, but because it is cost-effective in preparation time (Goffe & Kauper, 2014).

This time-cost tradeoff is particularly acute in economics because the discipline's pedagogical goal extends beyond mere content recall. A central aim of a Principles of Economics course is to teach students how to “think like an economist,” a process that involves applying theoretical models to complex real-world scenarios, evaluating tradeoffs, and understanding systems of interdependence (Siegfried et al., 1991). This type of analytical skill is not effectively developed through passive listening; it requires active practice. Substantive problem-solving activities that ask students to grapple with realistic case studies are therefore not just a supplement to the lecture, but a core component of effective economic education. Yet these high-impact activities are the most resource-intensive for instructors to create on a consistent basis.

The recent emergence of generative AI introduces a new variable that can directly address this time-cost dilemma. This presents a classic pedagogical challenge within the broader economic discussion concerning whether technology will primarily automate and substitute for human labor, or augment human capabilities (Acemoglu & Johnson, 2023; Brynjolfsson, 2023; Korinek, 2023). This paper argues for a deliberate focus on the augmentation path within

the context of instruction. I contend that the most immediate and valuable application of AI in education is not as an automated teacher, but as a powerful efficiency tool that augments the human instructor. By significantly lowering the time-cost of creating bespoke educational content, AI can make the adoption of evidence-based teaching practices, like active learning, more feasible.

While the potential of AI in education has generated a wave of scholarly interest, the literature has so far concentrated on AI as a student-facing Socratic tutor (Favero et al., 2025), or on the challenges it poses to academic integrity (Cotton, Cotton, & Shipway, 2024). More recently, some studies have begun to explore hands-on classroom applications. The valuable approach proposed by Beck and Brodersen (2025) has students engaging directly with generative AI in class, and critically evaluating its output to develop AI literacy. While such a method is powerful for advanced students, the framework presented here addresses a different challenge: the requirements of introductory-level courses where assessing a potentially flawed AI response can be cognitively overwhelming for novice learners still developing fundamental economic intuition. I therefore introduce the AI-Generated Think-Pair-Share (AI-TPS) framework, a complementary, instructor-centric model that deliberately positions AI as a pre-class efficiency tool for the educator. This structured methodology automates the routine task of content creation, freeing instructor time for the non-routine, socially complex tasks of facilitating discussion and building community. The framework is explicitly designed to support the Relevance, Belonging, and Growth Mindset (RBG) framework (Bayer et al., 2020), aligning with broader efforts to empower instructors as innovators in leveraging AI for new learning opportunities (Mollick & Mollick, 2024).

The remainder of this paper is organized as follows: Section II details the replicable methodology, outlining the key steps for both pre-class design and in-class implementation; Section III provides a concrete example of an AI-generated activity for a Principles of Microeconomics course; Section IV analyzes how the framework intentionally centers the human instructor and peer-to-peer interaction; and Section V concludes with a discussion of its implications, limitations, and opportunities for future research.

2. The AI-TPS Framework

This section provides a formal, replicable methodology for implementing the AI-TPS framework in two phases: pre-class design and in-class implementation.

A. Phase 1: Pre-Class Design - The Prompt

A well-designed prompt is not a simple question; it is a detailed set of instructions that constrains the AI's output to align with specific pedagogical goals. Table 1 shows a four-step blueprint for effective prompts. The blueprint is best understood as a low-stakes scaffold rather than a precise script. Current frontier models understand small differences in wording, so instructors should treat it as a starting point and adapt it freely (Beck & Brodersen, 2025). Specifying the course textbook in the prompt is worthwhile, because it aligns the AI's terminology and notation with what students see in their readings. The examples below use the principles and the vocabulary of Milligan et al. (2023).

Table 1. A four-step blueprint for an AI-TPS prompt.

Step	Description	Example
1. Define the Persona and Goal	Clearly state who the AI should be and what you want to achieve. A well-defined persona and goal help the AI adopt the correct tone, style, and expertise for the task.	Persona: "Act as an economics professor..." Goal: "...your goal is to create an engaging in-class activity for university business students."
2. Provide Specific Context and Constraints	Provide the AI with essential context to tailor its response. This includes the target audience, topic, timing, and any limitations. The more relevant context you provide, the more calibrated and appropriate the output will be.	Context: "This is for a first week Principles of Microeconomics class for business students with no prerequisite knowledge." Constraints: "Design a 10-minute interactive assessment."
3. Give Explicit Content Instructions	Tell the AI exactly what to include in the response. Vague instructions lead to generic answers. Provide clear instructions on the subject matter, key elements to include, and the desired narrative or scenario.	Content: "The activity must test the Cost-Benefit, Opportunity Cost, Marginal, and Interdependence principles." Scenario: "Use a relatable scenario that requires critical thinking."
4. Specify the Output Format	Define the exact structure you want for the response. Requesting a specific format with clear sections, headings, or bullet points ensures the output is well-organized, easy to understand, and ready to use.	Format: "Structure the output into three sections: 1. A relatable Student Scenario, 2. 4-5 Questions applying the principles, and 3. Answers and key insights for a professor's debrief."

Note: The blueprint is a practical scaffold, not a fixed script; instructors should adapt the wording to their course and topic.

B. Phase 2: In-Class Implementation

The in-class portion of the framework is a structured, device-free activity designed to maximize student focus and collaborative learning. The activity works best when students put away laptops and phones, forcing them to grapple with the problems without digital distractions. In total, a typical activity takes 25–35 minutes and works best as a wrap-up after a topic or chapter has been covered.² Because it is self-contained, the activity adapts to a range of class formats. It occupies a substantial share of a single 50-minute meeting, fits comfortably within a 75 or 90-minute session, and slots easily into longer blocks. The suggested timings for each stage below are flexible and can be adapted to suit various course schedules.

- **Individual Work (“Think”) (10 minutes):** The instructor distributes the printed learning activity. The critical first step is instructing all students to put away electronic devices. This ensures they engage in focused individual thinking and resist the urge to look up answers before attempting to solve the problem themselves.
- **Peer Discussion (“Pair”) (5–10 minutes):** Students form pairs or small groups to discuss their answers and reasoning. The instructor circles the classroom to facilitate, observe, and identify common sticking points. This stage is crucial for social learning. Students teach and learn from one another, clarifying their own understanding in the process.
- **Collective Synthesis (“Share”) (10–15 minutes):** The instructor leads a whole-class discussion, calling on groups to explain their reasoning. This makes student thinking visible and allows the instructor to correct misconceptions at a class-wide level, ensuring all students leave with a clear understanding.

3. The AI-TPS Framework in Practice: An Illustrative Example

To move from theory to application, consider a complete activity designed for the first week of a Principles of Microeconomics course. An instructor would use a prompt structured according to the four-step approach in Table 1, asking the AI to act as an economics professor and design a ten-minute activity covering the four core principles from the first chapter of Milligan et al. (2023): cost-benefit, opportunity cost, the marginal principle (marginal analysis), and interdependence. To keep the scenario current, the instructor can ask the model to build the activity around a recent news article (either one the model is directed to find and link, or one the instructor already has on hand and supplies for the model to work from), so the activity is genuinely topical rather than reused term after term.

A key feature of generative AI is its ability to produce a unique scenario each time the same prompt is used, which significantly reduces the cost and effort of creating learning activities. If an instructor is not satisfied with the initial output, they can simply reset the conversation and reuse the original prompt, or add further instructions to achieve a more specific outcome. Furthermore, the same prompt can be used each term to create fresh versions of the activity, ensuring ongoing relevance and engagement. The full prompt and a complete AI-generated activity (reviewed and edited by the instructor, then used in a Principles of Microeconomics class after covering the first chapter) are provided in Appendix A.

² In my own course, which met weekly in a single three-hour session, I ran the activity at the end of each meeting after covering the main content (usually a full chapter). Instructors on other schedules can include it wherever a chapter or major topic concludes.

4. Keeping the Instructor at the Center

Beyond saving time, the framework aims to bridge the “RBG gap” by enhancing Relevance, Belonging, and a Growth Mindset (Bayer et al., 2020). It supercharges relevance by dramatically lowering the cost of creating hyper-customized and timely content. While any instructor can write a relevant problem, the AI allows on-the-fly generation of activities tied to that day’s news or tailored to specific student interests. For instance, a supply and demand problem framed for nursing majors versus one for finance majors. For belonging, an instructor can easily prompt the AI to use names from diverse cultural backgrounds, or to frame problems around protagonists from non-traditional economic settings, helping more students see themselves represented in the discipline (Lopez & Wandschneider, 2024). Finally, the framework promotes a growth mindset by enabling a virtually infinite supply of low-stakes practice. Because the AI can generate endless variations of a problem, it shifts the focus from getting the one right answer, to a process of continuous improvement, reframing mistakes as data points in a larger learning journey.

This division of labor reflects a clear model of human-AI complementarity. While the AI can produce a relevant scenario, it is the instructor who transforms that relevance into resonance. The instructor, for example, makes a connection to a comment a student made last week, which prompts the student’s peer to share a similar lived experience. The AI provides the topic, but humans provide the context and connection. As Selwyn (2016) argues, technology struggles to replicate the nuanced, empathetic, and motivational roles of a human teacher, and a singular focus on individual tutoring ignores Vygotsky’s (1978) insight that learning is fundamentally social, in that students construct knowledge together in what Vygotsky termed the “zone of proximal development.” Ultimately, while AI can help structure an activity, it cannot create a community. The “Pair” and “Share” stages are live, synchronous, social events that forge the interpersonal bonds that are the bedrock of belonging. In this model, the instructor’s role evolves into that of an expert curator and “pedagogical prompt engineer” (Mollick & Mollick, 2023).

5. Discussion and Conclusion

This paper offers a pragmatic approach for integrating generative AI into economics education. By focusing on AI as an efficiency tool for the instructor, I move beyond the debate over automation and toward a model of augmentation. The primary contribution of the AI-TPS framework is that it directly addresses the resource constraint—instructor preparation time—that so often hinders the adoption of high-impact, active learning practices. It improves the efficiency of the production process for creating high-quality, customized educational materials.

Of course, this approach is not without its limitations. The quality of the AI’s output is dependent on the quality of the instructor’s prompt, and, more importantly, instructors must remain the final arbiters of content, carefully vetting all AI-generated material for accuracy and potential bias. The human-in-the-loop is essential for responsible implementation (Beck & Brodersen, 2025). The evidence offered here is also preliminary. In my own application of the framework, the time required to create a new in-class activity fell from approximately two hours to under twenty minutes, including time for refinement and editing. Student engagement during the “Pair” and “Share” stages appeared notably high, with lively discussions centered on the relatable AI-generated scenarios. While not a formal empirical assessment, these initial observations suggest the framework is effective in both reducing instructor preparation costs and fostering an active, engaging learning environment.

Future research should move toward empirical validation, measuring the impact of the AI-TPS framework on student learning outcomes, engagement, and self-reported measures of RBG compared to control groups, as well as its effect on instructor preparation time and qualitative experience. In conclusion, the arrival of generative AI can be viewed as a technological shock that enables a new, more efficient method of producing pedagogical materials. The AI-TPS framework provides one concrete model for how to leverage this shock, demonstrating that the future of teaching lies not in resisting technology, but in harnessing it with wisdom, intention, and a steadfast focus on student learning.

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Appendix A: Prompt and Example Activity

This appendix contains the complete prompt and the full AI-generated activity, reviewed and edited by the instructor, used in a first week Principles of Microeconomics class after the opening chapter of Milligan et al. (2023).

A1. The Pedagogical Prompt

Persona: Act as an economics professor creating engaging, relevant activities for first-year university students.

Task: Design a 10-minute interactive, formative assessment for a first week Principles of Microeconomics class. Students work individually, then in groups.

Context: Test four core principles (cost-benefit, opportunity cost, the marginal principle or marginal analysis, and interdependence) using the terminology of Milligan et al. (2023). Use a relatable scenario for business students that requires critical thinking but no prerequisite economic knowledge. Base the scenario on a recent news article (either one you locate and link, or the article provided below) and reference it in the question.

Format: Three sections: (1) a relatable scenario for analysis, (2) 4–5 questions applying the principles, and (3) answers with key insights for the professor's debrief.

A2. Example AI-Generated Activity (Reviewed and Edited by the Instructor)

ECON 111: Principles of Microeconomics

In-Class Activity: Applying the Core Principles

Objective: This activity applies the four core principles from Chapter 1 to a relatable scenario. The goal is to build a strong foundation in economic reasoning and problem-solving.

Scenario:

A Capilano University student is deciding what to do this summer. They have two main options:

- **Option A: Co-op Job.** Accept a full-time co-op position that pays \$8,000 for the summer.
- **Option B: Summer School.** Take summer courses to finish their degree faster.

Part 1: The Core Decision (Cost-Benefit & Opportunity Cost)

1. The explicit (out-of-pocket) costs for summer school are \$3,000 for tuition and \$500 for textbooks. The student's next best alternative to summer school is the co-op job. What is the **total opportunity** cost of choosing summer school?

2. **Cost-Benefit Principle:** The student estimates that finishing their degree early is worth \$12,000 to them in terms of future earnings and peace of mind. Based on your answer above, should they choose summer school? Calculate their **economic surplus** from making the correct decision.

Part 2: The “How Many” Decision (The Marginal Principle)

After deciding on summer school, the student must choose how many courses to take.

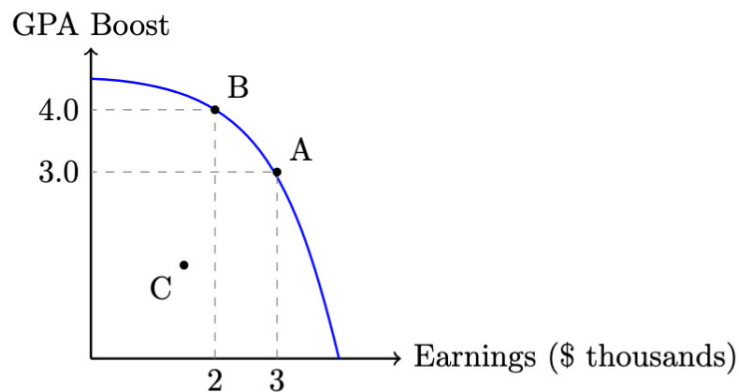
3. The student evaluates the benefit and cost of each *additional* course. Using the **Marginal Principle** and the **Rational Rule**, what is the optimal number of courses for the student to take? Explain why they should not take one more course after that point.

Courses	Marginal Benefit (Value of improved grades and progress toward degree)	Marginal Cost (Value of lost leisure time, increased stress, and tuition)
1st Course	\$4,000	\$2,000
2nd Course	\$3,500	\$2,500
3rd Course	\$3,000	\$3,000
4th Course	\$2,000	\$3,500

Part 3: Visualize the Tradeoff (Production Possibilities Frontier)

The student can split their summer hours between working at a part-time job and studying to improve their GPA. The PPF below shows their possible outcomes.

Figure 1.



4. What is the opportunity cost of increasing summer earnings from \$2,000 (Point B) to \$3,000 (Point A)?
5. A point inside the PPF (like Point C) is considered _____.

6. Suppose the student discovers a new AI-powered study tool that allows them to achieve a higher GPA for the same amount of study time. How would this change be illustrated on the graph?

Part 4: The Bigger Picture

7. Briefly explain how the student's best choice (Co-op vs. Summer School) might change if the university suddenly **doubled its tuition fees**. Which principle does this relate to?
8. Briefly explain how the student's choice might change if major tech companies in Vancouver announced a hiring freeze, making the co-op job market very competitive and uncertain. Which principle does this relate to?

SOLUTION KEY

Part 1 Solutions

1. The **Opportunity Cost Principle** reminds us that the true cost includes both explicit and implicit costs.
 - Explicit Costs = \$3,000 (Tuition) + \$500 (Textbooks) = \$3,500.
 - Implicit Cost = Forgone salary from the co-op job = \$8,000.
 - **Total Opportunity Cost** = Explicit Costs + Implicit Costs = \$3,500 + \$8,000 = **\$11,500.**
2. According to the **Cost-Benefit Principle**, you pursue a choice only if the benefits are at least as great as the costs.
 - Benefit of summer school = \$12,000.
 - Cost of summer school (the opportunity cost) = \$11,500.
 - Since Benefit > Cost, **the student should choose summer school.**
 - **Economic Surplus** = Benefits - Costs = \$12,000 - \$11,500 = **\$500.**

Part 2 Solutions

3. The **Rational Rule** says to keep doing something as long as the marginal benefit is greater than or equal to the marginal cost.
 - **1st Course:** MB (\$4,000) > MC (\$2,000) ⇒ Take it.
 - **2nd Course:** MB (\$3,500) > MC (\$2,500) ⇒ Take it.
 - **3rd Course:** MB (\$3,000) = MC (\$3,000) ⇒ Take it.
 - **4th Course:** MB (\$2,000) < MC (\$3,500) ⇒ **Stop.**

The optimal number of courses is **3**. The student should not take the 4th course because the additional cost (\$3,500) is greater than the additional benefit (\$2,000), meaning it would make them worse off.

Part 3 Solutions

4. To move from Point B to Point A, the student's earnings increase by \$1,000 (from \$2k to \$3k). In doing so, their GPA Boost falls from 4.0 to 3.0. **The opportunity cost is a 1.0 GPA Boost.**
5. A point inside the PPF is **inefficient**. This means the student is wasting resources (e.g., not studying or working effectively).

6. This represents an improvement in technology/productivity. It would cause the **Production Possibilities Frontier to shift outward**, allowing the student to achieve a higher GPA for any given level of earnings.

Part 4 Solutions

7. This relates to the **Cost-Benefit Principle**. If tuition doubled, the explicit cost would rise significantly, increasing the total opportunity cost of summer school. This would make the co-op job a much more attractive financial option, potentially changing the decision.
8. This relates to the **Interdependence Principle**. The student's choice depends on conditions in other markets (the labor market). A hiring freeze would lower the expected benefit or certainty of the co-op job, making the opportunity cost of choosing summer school lower. This would make summer school a more attractive option.