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Evaluation of Learning in Applied Economics: An Approach Based on the Use of ChatGPT

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Abstract

This study evaluates the integration of ChatGPT as a complementary tool in applied economics courses, aiming to enhance student learning and skill acquisition. Over two academic years, three student groups were analyzed: a traditional group, an AI group using ChatGPT without guidance, and a combined group receiving both instructor guidance and ChatGPT training. Results from the 2023-2024 academic year revealed significant challenges, including poor performance in the AI group due to insufficient training and unfamiliarity with international databases. In contrast, the 2024-2025 combined group demonstrated improved outcomes, with 100% participation and pass rates, alongside positive student feedback on ChatGPT's utility for tasks and comprehension. The findings suggest that guided integration of AI tools, coupled with proper training, can significantly enhance learning outcomes, advocating for a hybrid model in higher education.

Keywords: *ChatGPT; artificial intelligence; applied economics; higher education; learning outcomes; hybrid learning.*

1. Introduction

Generative artificial intelligence is here to stay, and its applications in personal and professional spheres are countless, including, of course, higher education teaching (Crompton & Burke, 2023; Luckin et al., 2016). Promoting its use in the classroom presents at least two potential benefits. First, AI is a tool that can enhance and complement the teaching-learning process of the specific content and skills of each subject (Holmes, 2019; Zawacki-Richter et al., 2019). Second, it encourages the proper and responsible use of this powerful tool among students (U.S. Department of Education, Office of Educational Technology, 2023). Additionally, it has been shown that students who use an AI tutor learn more than twice as much in less time, while also feeling more motivated and engaged in the educational process (Miller et al., 2024).

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Editorial Universitat Politècnica de València

In applied economics courses, students are expected to acquire key professional competencies, such as identifying and managing relevant databases, using software for data processing and analysis, applying the principles of economic analysis to diagnose and solve problems, and developing critical thinking. These skills are essential for students' future employability, and their effective acquisition is therefore a central goal of our teaching approach.

Thus, the main objective is to evaluate the potential complementary role of artificial intelligence (ChatGPT) alongside the lecturer in the teaching-learning process for skill acquisition. Specifically, the aim is to assess how artificial intelligence can assist students in developing the competencies required in applied economics courses, such as identifying and managing relevant databases, using software like Excel, preparing and presenting documents in economic report formats, and fostering critical thinking (Williamson and Eynon, 2020).

To achieve our objective, students completed a final practical exercise focused on managing and critically analyzing economic data. This analysis compared three distinct groups:

1. Traditional Group: Students who followed conventional teaching with the guidance of the professor throughout the course.
2. AI Group: Students who did not receive specific guidance from the professor on completing the exercise but were allowed to use ChatGPT on the day of the final practical exercise.
3. Combined Group: Students who received guidance from the professor during the course, both on how to complete the exercise and how to effectively use ChatGPT.

2. Framework

The study was conducted during the 2023-2024 and 2024-2025 academic years in the course *Economía Española*, part of the Economics degree program, and in *Economía de la Unión Europea*, included in the double degree program in Business Administration and Law. Both courses are mandatory and taught in the third year. However, *Economía Española* is offered in the second semester, while *Economía de la Unión Europea* is taught in the first semester.

In the second semester of the 2023-2024 academic year, the study was carried out in two groups within the Economía Española course: one labeled the "Traditional Group" and the other the "AI Group." In the first semester of the 2024-2025 academic year, the study was conducted with one group, referred to as the "Combined Group." During the 2023-2024 academic year, ChatGPT version 3.5 was available, while version 4.0 was used in the 2024-2025 academic year.

The Traditional Group consisted of 49 students, with instruction provided in Valencian during morning hours, and 71% of students were enrolled for the first time. The AI Group included 44 students, also taught in Valencian, but during afternoon hours, with 61% enrolled for the first

time. Lastly, the Combined Group comprised 32 students, taught in Valencian during morning hours, with 97% of the students enrolled for the first time.

The exercise assigned to the students involved using a dataset from an international database (Eurostat) and utilizing Excel to conduct relevant statistical analyses and create graphical representations of the data. Finally, based on the information collected and analyzed, and supported by a news article, they were required to perform a critical evaluation of an economic event related to the course content.

During both academic years, the final exercise was part of the continuous assessment. Although continuous assessment accounted for 20% of the final grade in both cases, in the 2023-2024 academic year, this exercise made up only 5% of the final grade in the *Economía Española* course, while in the *Economía de la Unión Europea* course in the 2024-2025 academic year, it accounted for 10%.

3. Results

3.1. Academic Year 2023-2024: *Economía Española* – AI Group and Traditional Group

During the 2023-2024 academic year, a notable difference in participation and performance was observed between the two groups analyzed. In the traditional group, participation was 82%, whereas in the group that used artificial intelligence (AI), this figure dropped to 48%. Regarding academic performance, the traditional group achieved an average grade of 9, in contrast to the AI group, which obtained an average grade of 2.4. Additionally, the pass rate was 100% in the traditional group, while only 10% of students in the AI group managed to pass.

However, during this first year, both the limitations of ChatGPT and the challenges these types of exercises posed for students became evident.

Regarding ChatGPT, one of the main difficulties identified was its limitation in handling international databases. This significantly impacted the poor performance of the group using this tool, as it was unable to retrieve the required information from Eurostat to complete the task.

Likewise, we were able to identify the challenges of the exercise for the students (especially in the AI group). These were:

- Lack of familiarity with international databases: The students, particularly those in the AI group, showed a significant lack of knowledge about the use and access to international databases, which limited their ability to complete tasks requiring these types of resources.

- Lack of application of theoretical concepts: Despite having received training in class, the students were unable to adequately apply the concepts covered, which was reflected in their poor performance.
- Lack of training in the use of ChatGPT: The students were not sufficiently prepared to use ChatGPT effectively, which likely contributed to their poor performance.

In conclusion, these results allowed us to identify the need to strengthen training in the use of AI tools, such as ChatGPT, and to improve students' familiarity with international databases.

3.2. Academic Year 2024-2025: *Economía de la Unión Europea* – Combined Group

During the second course, in European Union Economics, we have incorporated training in the use of ChatGPT as an integral part of the learning process. Throughout the course, students not only practiced weekly to prepare for the final exercise but also used ChatGPT as a support tool. At the beginning of each class, the lecturer presents examples of how to formulate effective queries to ChatGPT related to the exercise to be carried out in that session. Furthermore, while working on the exercise, students are encouraged to ask questions about how to use ChatGPT to address any doubts that may arise.

In this course, participation was 100%, and the pass rate was also 100%. The average grade was 8.8. However, the most significant aspect of this course was the final questionnaire that students were able to complete regarding the inclusion of ChatGPT in class activities. This questionnaire was answered by 81% of the class.

In the questionnaire, we compared how students used ChatGPT before and after the course. Additionally, we assessed their opinions on the use of ChatGPT in the subject. Finally, we were able to identify the limitations they perceive in its use.

From this questionnaire, we can draw the following conclusions:

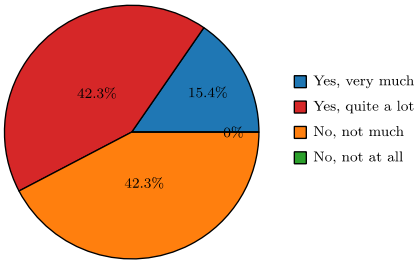

Figure 1. Responses to the question: "Has your use of ChatGPT increased after this course?". Source: Authors' calculations.

1. Although 100% of the students used ChatGPT before the course, approximately 60% have increased their usage after the course, as can be seen in Figure 1.
2. The vast majority of students affirm that the introduction of ChatGPT in the course has been beneficial both for completing the practical exercises and for better understanding the course material.

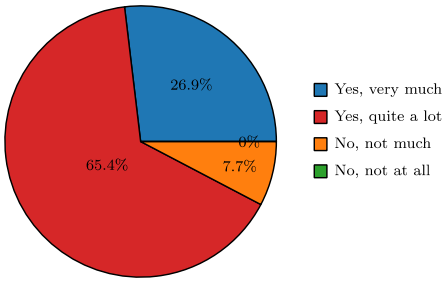

Figure 2. A Responses to the question: "Did ChatGPT help you complete the graded assignment for the course?". Source: Authors' calculations.

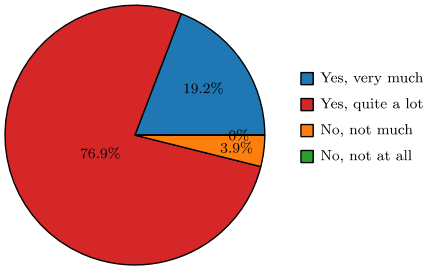

Figure 3. Responses to the question: "Did ChatGPT help you better understand the course content?". Source: Authors' calculations.

3. Based on the students' responses, a significant increase in the use of ChatGPT for various academic tasks is observed. The highest usage is recorded in text writing, which rose from 73.1% to 88.5%, and in extracting ideas from a text, which increased from 69.2% to 80.8%. The growth in the interpretation of tables or graphs also stands out, rising from 30.8% to 69.2%.
4. Students perceive several advantages in using ChatGPT for their studies, primarily highlighting its usefulness for saving time (84.6%) and aiding in the understanding of

concepts (88.5%). Additionally, they value its ability to quickly clarify doubts (76.9%) and generate ideas for assignments (53.8%). However, they also identify drawbacks, such as the possibility of receiving incorrect or confusing answers (73.1%) and excessive reliance on the tool (53.8%). Some students mention that it may reduce their critical thinking skills (34.6%) and hinder the development of their own abilities (38.5%).

4. Conclusion

Over the course of two academic years, we have been able to conduct an initial evaluation of the introduction of Artificial Intelligence (AI) in Applied Economics courses.

The results of this teaching innovation project highlight the importance of properly integrating artificial intelligence tools into applied economics courses. The initial experience during the 2023–2024 academic year revealed significant challenges related to students' lack of familiarity with both international databases and the effective use of ChatGPT, resulting in poor performance. Additionally, prior learning is of great relevance if one aims to avoid increasing inequality (Roldan, 2024).

In contrast, the redesigned 2024–2025 course, which included structured training in AI use and regular classroom practice, showed marked improvements in participation, performance, and student satisfaction. The data suggest that when AI is introduced in a guided and pedagogically sound manner, it can serve as a valuable complement to traditional teaching methods, enhancing student engagement and supporting the development of key academic skills. Nonetheless, the findings also underscore the need to address the limitations of AI tools and to foster their responsible use to avoid overdependence and ensure meaningful learning.

Based on the results obtained, several practical recommendations can be made to enhance the integration of artificial intelligence tools in applied economics education. First, it is essential to provide structured and continuous training in the use of AI tools, such as ChatGPT, from the beginning of the course. This training should include not only technical aspects (e.g., how to formulate effective prompts) but also guidance on their appropriate academic use. Second, exercises involving AI should be carefully designed to complement core learning objectives and include resources that are accessible to both students and AI tools—for instance, ensuring that datasets or data sources are compatible with the capabilities of the chosen AI system. Third, AI use should always be integrated within a broader pedagogical strategy that reinforces theoretical knowledge, critical thinking, and the independent development of skills. Finally, it is advisable to implement regular feedback mechanisms—such as surveys or reflection exercises—to monitor students' perceptions, adjust the instructional approach, and promote responsible and reflective use of AI.

This study suggests that the future of higher education could benefit significantly from a hybrid model that combines traditional instruction with guided use of AI (Luckin, 2017), provided that adequate training is offered both in the use of the tool and in the development of the critical thinking necessary for its effective use (Selwyn, 2019; Williamson and Eynon, 2020).

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