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Review of ChatGPT, an Artificial Intelligence-Based Robot, Creating a Case Study in the Context of Cost Accounting Course

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Abstract: In this study, ChatGPT was instructed to produce a case study aligned with the learning outcomes defined in the course information package for the cost accounting course, and subsequent prompts were developed based on the created case. The main research question of the study is to investigate the level of effectiveness and the pedagogical effects of using ChatGPT, an artificial intelligence-supported learning tools, in cost accounting education. The research followed a qualitative design grounded in a case study approach reflecting the learning process in the cost accounting course. Findings show that ChatGPT's responses were effective, and future studies could broaden the research process. This study demonstrates how ChatGPT can be integrated into traditional cost accounting education and highlights the pedagogical potential of AI-supported case study design. The findings indicate that cost accounting education extends beyond numerical data to include critical thinking as well as ethical and empathetic dimensions.

Keywords: *cost accounting education; artificial intelligence; ChatGPT.*

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1. Introduction

Along with artificial intelligence, technological developments such as artificial neural networks, augmented reality, big data, the Internet of Things, blockchain technology, and AI-based chatbots are also being used in various sectors. Artificial intelligence has a wide range of applications in everyday life, including image processing, speech processing, text processing, data processing, autonomous driving support systems, virtual assistants, and big data analysis (Presidency of the Republic of Türkiye Digital Transformation Office, 2024).

ChatGPT is an AI-based virtual assistant. ChatGPT is an AI chatbot developed by the AI research company OpenAI, trained on a vast amount of data, and quickly reaching millions of users (Keskin, 2023). Artificial intelligence has also introduced new approaches to the learning process in accounting education through the adoption of next-generation methods. In this study, ChatGPT (Chatbot Generative Pre-trained Transformer), an AI-based chatbot, was used in the context of a cost accounting course. The contribution of integrating artificial intelligence-based modern technological tools into traditional cost accounting education is explained in this study. In addition, cost accounting education is evaluated not merely in terms of numerical aspects, but also through the pedagogical dimensions of cognition, ethics, and empathy associated with the acquired knowledge. These dimensions underscore the originality of the study.

2. Related Works

Artificial intelligence (AI) interacts with humans primarily through conversational agents such as chatbots, including ChatGPT. By leveraging natural language processing and machine learning techniques, AI systems are capable of performing a wide range of cognitive tasks. Despite ongoing concerns related to data security and ethical risks, public trust in information produced through artificial intelligence is increasing (Koçyiğit & Darı, 2023).

Recent studies have examined the performance of ChatGPT in professional and academic contexts. Eulerich et al. (2024) evaluated ChatGPT on several professional accounting examinations, including the Certified Public Accountant (CPA), Certified Management Accountant (CMA), Certified Internal Auditor (CIA), and Enrolled Agent (EA) exams. Their findings indicate that while the ChatGPT-3.5 model failed these examinations, the ChatGPT-4 model achieved an average score of 85.1%, demonstrating a substantial improvement in performance. This result suggests that newer AI models may possess capabilities comparable to professional-level knowledge in accounting-related domains.

The adoption of ChatGPT in higher education, particularly in accounting and finance, has also been widely documented. Based on empirical research involving university students, Ziemba et al. (2024) reported that the use of ChatGPT among accounting and finance students is highly prevalent. Similarly, Tharapos et al. (2025) examined the integration of ChatGPT in undergraduate accounting programs and concluded that it serves as an effective tool for developing foundational knowledge and skills that support higher-level learning outcomes.

In addition to knowledge acquisition, several studies have focused on the cognitive and behavioral effects of ChatGPT use. Leitner-Hanetseder et al. (2025) found that although the accuracy rate of a digital assistant responding to specific commands reached 77%, expert supervision remains critically important. Urban et al. (2024), who experimentally tested the problem-solving skills of university students using ChatGPT, observed that the tool influenced students' self-assessment judgments when solving problems. Furthermore, a large-scale study involving 2,240 students from Arab countries emphasized ChatGPT's potential to create educational value when used appropriately and purposefully (Abdaljaleel et al., 2024).

From a professional perspective, ChatGPT offers continuous learning opportunities for accounting practitioners. However, concerns related to data security, privacy breaches, ethical implications, and legal and cybersecurity risks necessitate the verification and confirmation of information generated by AI systems (Azaltun et al., 2024). While artificial intelligence presents significant benefits, it also entails notable risks. Consequently, the literature consistently emphasizes

that artificial intelligence can make positive contributions to human life only when it is implemented in a controlled, transparent, and responsible manner.

3. Research Method

The research methodology was structured around three main components: Educational Context, Sample/Course, and Validation and Instruction Design.

Educational Context

This study was conducted within the framework of the cost accounting course and focuses on the use of artificial intelligence-supported learning tools in higher education. Specifically, the research examines the pedagogical effectiveness of ChatGPT-4, an artificial intelligence-based system, in supporting learning outcomes in cost accounting education.

Sample / Course

The research sample consists of the cost accounting course offered in the sixth semester of the accredited Business Administration Department at the Faculty of Economics and Administrative Sciences, Uşak University. The course was selected on 22 April 2024. As the basis of the research process, the following learning outcome stated in the course information package published on the university's official website was used: *"By the end of the course, students will have mastered the theoretical knowledge related to cost accounting."*

Procedure

Within the scope of the research process, ChatGPT-4 was instructed to generate case studies and related materials based on a set of predefined statements aligned with the specified learning outcome. The responses produced by ChatGPT were then systematically examined. The main research question guiding the study is to investigate the level of effectiveness and the pedagogical implications of using ChatGPT, as an artificial intelligence-supported learning tool, in cost accounting education.

The guidelines governing the research process were adapted to the cost accounting course by drawing on the framework proposed by Ol and Kabapınar (2025). Based on this framework, a series of instructions were provided to ChatGPT, as detailed below.

Validation and Instruction Design

The statements included in the instructions were reviewed and verified through expert evaluation to ensure their relevance and pedagogical appropriateness. The validated instructions provided to ChatGPT were as follows:

- Instruction 1:
I will provide you with a learning outcome for the cost accounting course in the sixth semester of the Business Administration Department at the Faculty of Economics and Administrative Sciences. The learning outcome is as follows: "By the end of the course, students will have mastered the theoretical knowledge related to cost accounting." I would like you to write a case study.
- Instruction 2:
I want you to summarise the case study text you created and add elements that will leave students with dilemmas. When students read the text, they should experience confusion about which choice is correct, and the case study should capture their interest.
- Instruction 3:
For the last case study you created, I want you to prepare questions that will make students think and leave them in a dilemma in terms of intellectual, moral, and empathetic dimensions. Prepare a total of ten questions according to the categories I specified.

- Instruction 4:

If you wanted to illustrate the intellectual, moral, and empathetic elements in the case study you created, as well as the dilemma inherent in the case study, using three images, how would you do it? I want you to illustrate it using three separate images.

The responses generated by ChatGPT in accordance with these instructions are presented and analysed in the Results section.

4. Results

Based on the learning outcome of the cost accounting course, “Students will master theoretical knowledge related to cost accounting by the end of the course,” instructions were sent to ChatGPT. The responses to these instructions are presented in this section.. The research findings are discussed in the discussion section.

- (Instruction 1) ChatGPT Response:

Case Study: “Determining Costs at ABC Furniture Ltd.”

Description of the Situation: ABC Furniture Ltd. is a medium-sized company that manufactures office furniture. The company produces three main products:

1. Work Desk
2. Office Chair
3. Cabinet

Company management has recently noticed a decline in profit margins and suspects that product costs are not being calculated correctly. Therefore, it has requested that the cost accounting unit recalculate the unit costs of the products.

Data:

The monthly production data are as follows, as presented in the table below (see Table 1)

Table 1. The monthly production data of ABC Furniture Ltd.

Product	Quantity Produced (units)	Direct Materials (TL)	Direct Labour (TL)	Machine-Hours (hours)
Work Desk	500	250.000	100.000	1.000
Office Chair	1000	300.000	150.000	1.500
Cabinet	300	180.000	90.000	900

Total general production expenses are 270,000 TL. Machine hours will be used as the basis for allocating these expenses.

Task:

1. Calculate the total and unit costs for each product.
2. Allocate general production expenses based on machine hours.
3. Interpret your results and indicate which product has the highest cost.

Expected Learning Outcomes:

By the end of this case study, students should be able to:

- Identify cost types (direct materials, direct labour, overhead costs).
- Understand how allocation keys (e.g., machine hours) are used in cost calculations.
- Calculate the unit cost of a product.
- Understand the importance of cost accounting in decision-making processes.

If you would like, I can turn this example into an application question and show you the solution step by step.

That way, students can put their theoretical knowledge into practice. Would this be acceptable to you?

- (Instruction 2) ChatGPT Response

Case Study: “What is the True Cost at ABC Furniture?”

ABC Furniture Ltd. manufactures three main products: work desks, office chairs, and cabinets.

In recent months, the company's profits have declined, and management is unsure whether product prices are set correctly.

Production manager Ali argues that general production costs should be allocated based on machine hours.

In his view, the most significant factor in determining cost is the amount of machine usage in the production processes.

However, the accounting manager, Ms. Zeynep, claims that this method overstates the cost of some products and understates the cost of others.

Ms. Zeynep states, "Labour costs are high in desk production, while machine usage is low. Allocating overhead costs solely on the basis of machine hours may lead to distorted cost information." She suggests using direct labour hours as the allocation key.

Management cannot decide which method is more accurate.

Moreover, the sales team will determine which product's price to increase next month based on this outcome.

Task:

1. Evaluate Ali Bey's proposed machine-hour-based method and Zeynep Hanım's proposed direct labour-hour-based method from a theoretical perspective.
2. Which method would you argue is more accurate?
3. Discuss the potential effects of your chosen method on the company's profitability and pricing policy.

Expected Learning Outcomes:

Students will:

- Analyse how different allocation keys used in cost distribution can affect results,
- Apply theoretical knowledge to real-world business dilemmas,
- Analyse how different accounting approaches influence management decisions.

If considered appropriate, this example may be developed into a class discussion or a mini-exam scenario and supported by concise quantitative data (e.g., three products and two alternative allocation methods). In this way, students would be able to both perform the necessary calculations and critically interpret the implications of their methodological choices.

● (Instruction 3) ChatGPT Response

Cognitive Dimension – (4 Questions)

Objective: To enable students to use their cost accounting knowledge at the analysis, comparison, and evaluation levels.

1. When you theoretically compare the methods proposed by Mr. Ali (machine hour-based) and Ms. Zeynep (labour hour-based), which one ensures a more accurate distribution of costs? Why?
2. If an incorrect allocation key is selected, does this only affect accounting records, or can it also distort the company's strategic decisions? Explain.
3. When you applied both methods, you noticed that the cost differences for some products were quite large. In this case, what criteria would you use to decide which method is "more accurate"?
4. In cost accounting, does "accuracy" always mean "profitability"? If a method is more accurate but leads the business to a loss in the short term, would it be preferred?

2. Ethical Dimension – (3 Questions)

Objective: To encourage students to discuss the ethical consequences of accounting decisions within the framework of integrity and accountability principles.

5. If management asked you to “fudge the cost calculations a little so that losses don't appear,” how would you respond to this request?
6. Ms. Zeynep's method shows low profits, while Mr. Ali's method shows a higher profit margin. Which method would you choose, and what would be the ethical justification for your choice?
7. When adhering to ethical principles in cost accounting conflicts with business interests, how should a balance be struck? In this situation, who is “right”: the manager who prioritises the company's interests, or the accountant who adheres to accounting principles?

3. Empathetic (Emotional/Social) Dimension – (3 Questions)

Objective: To help students understand the feelings and perspectives of the individuals involved in the incident (Mr. Ali, Ms. Zeynep, management, employees).

8. If you were in Ms. Zeynep's place, how would you feel in an environment where your ideas are constantly rejected, and how would you maintain your professional attitude?
9. Mr. Ali has been working at the company for years and is a manager who has earned the respect of the production team. Openly disagreeing with him could jeopardize Ms. Zeynep's career. Do you think Ms. Zeynep should have defended her approach anyway?
10. If the wrong cost method is chosen, this situation could affect not only managers but also workers, customers, and suppliers. Who do you think would feel this chain reaction the most, and why?

Suggested Use:

These questions can be used for:

- classroom discussion,
- group work, or
- individual reflection assignments.

If you wish, I can turn these ten questions into an assessment form (e.g., a 3-dimensional rubric) so that you can grade students' answers. Would this be acceptable to you?

- (Instruction 4) ChatGPT Response^{1**}



5. Conclusion and Discussion

This study examined the responses generated by the chatbot ChatGPT within the scope of the learning outcome stated in the course information package of the cost accounting course offered in the sixth semester of the Business Administration Department at the Faculty of Economics and

^{1**} First image from the left: cognitive dimension - second image from the left: ethical dimension - third image from the left: empathic dimension.

Administrative Sciences, Uşak University. The specified learning outcome aims to ensure that students acquire theoretical knowledge related to cost accounting. An examination of the examples generated by ChatGPT indicates that these examples largely align with the fundamental objectives of cost accounting education.

In the response generated in accordance with Instruction 1, a case study was presented involving a furniture manufacturing company producing three different products. This case was structured with three tasks and four expected learning outcomes. The analysis demonstrates that the example is appropriate for achieving the core objectives of cost accounting, namely determining product costs, supporting cost control, assisting planning activities, and facilitating specific managerial decision-making. In this respect, the example can be considered pedagogically meaningful and consistent with cost accounting principles. An evaluation of the responses generated under Instruction 2 reveals that Response 1, in particular, offers a dilemma-based statement designed to stimulate critical thinking. The construction of the response around the case study and its support through a thought-provoking title present a structure capable of increasing students' active engagement in the learning process. The analysis indicates that the response focuses on the selection of the most appropriate allocation key for manufacturing overhead costs, a matter of central importance in cost accounting decision-making processes. In accordance with Instruction 3, ChatGPT generated ten dilemma-based questions intended to promote inquiry at the cognitive (intellectual), moral (ethical), and empathetic (emotional-social) levels. These questions address the outcomes that may arise from applying different cost accounting approaches and the ethical implications of such applications. Furthermore, the questions emphasize that individuals working in the accounting profession are not merely technical agents who record numerical data, but professionals whose emotional and human dimensions also influence decision-making processes. The examination of the visuals generated under Instruction 4 further supports these findings. In the visual addressing intellectual inquiry, the state of thinking is represented through a question mark symbol. In the visual representing the moral dimension, the scales symbolizing balance and fairness are particularly prominent. In the visual related to empathetic elements, the broken heart symbol draws attention. In addition, it was observed that the facial expressions of the individuals depicted in the visuals were adjusted in accordance with the emotional context being represented.

Overall, the findings suggest that the examples generated by ChatGPT guide students away from rote learning and encourage inquiry, interpretation, and critical thinking. This indicates the necessity of reconsidering assessment and evaluation methods in cost accounting courses to ensure alignment with intended learning outcomes. The study also demonstrates that cost accounting should not be regarded merely as a traditional bookkeeping activity, but rather as a decision-support and financial consulting process that directly affects business profitability and efficiency.

Moreover, the study reveals that cost accounting is closely related to other accounting disciplines, such as financial accounting and management accounting, as well as to various business functions including management, marketing, finance, production, and human resources. Another noteworthy finding is that inappropriate cost accounting approaches may lead to balance sheet manipulation and the generation of fictitious profits. In this context, the principle of social responsibility, which is among the fundamental concepts of accounting, emerges as particularly significant. The study has certain limitations. First, the research is limited to a single course and a single institutional context, which restricts the generalizability of the findings. Second, the analysis is based on a limited number of AI-generated examples. Therefore, future studies are encouraged to expand this framework by including different courses, institutions, and AI-based tools.

In conclusion, integrating AI-based learning tools into cost accounting education has the potential to make a significant contribution to the improvement of learning outcomes, provided that pedagogical balance is maintained. However, as noted by Altun (2024), the excessive use of artificial intelligence applications may also give rise to pedagogical risks, such as a decline in cognitive skills, insufficient digital literacy, and superficial learning. Accordingly, AI-supported instructional practices should be implemented in a conscious and controlled manner. This study

serves as a reference for future research that seeks to enhance accounting education through a multidimensional perspective.

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