



Learning Incoterms with Gamification Method

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ABSTRACT: This study examines the effectiveness of gamification strategies in enhancing logistics students' understanding of Incoterms concepts. Traditional teaching methods may be insufficient in facilitating students' comprehension and application of Incoterms, highlighting the need for alternative instructional strategies. In this context, a total of 65 students enrolled at Trakya University Ipsala Vocational School were randomly assigned to experimental (n=32) and control (n=33) groups. The study employed a pre-test post-test experimental design with a control group, and participants were administered a multiple-choice test to assess their knowledge of Incoterms. While the experimental group received instruction through gamification methods, the control group was taught using traditional lecture-based methods. At the end of the process, students were re-administered the same test, and their achievement levels were compared. The findings revealed that students who received instruction through gamification demonstrated significantly higher performance. The post-test mean scores of the experimental group were statistically significantly higher compared to the control group. T-test and ANOVA analyses confirmed that gamification enhances students' comprehension of Incoterms and is a more effective teaching strategy than traditional methods. These results suggest that innovative instructional approaches, such as gamification, play a crucial role in improving students' ability to relate theoretical knowledge to practical scenarios in logistics and international trade education.

KEYWORDS: Foreign Trade, Incoterms, Gamification, Learning

I. INTRODUCTION

Integrated global economy, possessing a comprehensive understanding of international trade regulations is a critical necessity for future business leaders, particularly those aspiring to build careers in logistics and supply chain management. In this context, the International Commercial Terms, commonly known as Incoterms, define the rights and obligations between buyers and sellers in international trade, ensuring that global transactions are conducted more transparently and smoothly[1, 2]. However, associate degree students often struggle to comprehend and internalize these essential concepts due to the abstract and theoretical nature of traditional teaching approaches. This article focuses on the use of gamification strategies in logistics and international trade education, aiming to enhance awareness and understanding of Incoterms among associate degree students. Additionally, it explores how such innovative instructional techniques improve students' ability to connect theoretical knowledge with real-world scenarios, ultimately contributing to their future professional success[3].

This study will explore the integration of gamification strategies into Incoterms education, assessing various aspects such as its potential to enhance students' problem-solving abilities, support critical thinking skills, and positively contribute to decision-making processes. Within this framework, it is believed that students aiming for careers in logistics and international trade can develop their professional competencies more effectively through gamification-assisted education, ultimately contributing to their future professional success.

II. LITERATURE

Incoterms are standardized rules established by the International Chamber of Commerce (ICC) to define the responsibilities of sellers and buyers in international sales contracts based on the terms of delivery. These rules are designed to ensure the fair distribution of costs and risks that may arise during the delivery process and



to eliminate potential interpretational discrepancies. The latest version came into effect on January 1, 2020 [4].

Gamification refers to the adaptation of game-design elements to various contexts to encourage experiences familiar from games and support different activities [5]. This approach, which gained popularity in the early 2010s, continues to attract interest in both industry and academia. Particularly in the field of education, there has been significant interest in gamification. The concept of gamification in education has a long history and is conceptually easy to comprehend, as game design and learning theories are largely based on the same psychological foundations. The acceleration of digitalization and technological advancements driven by video games have made learning processes more engaging and immersive. These technological developments contribute to the growing trend of gamification in education [6].

Studies integrating Incoterms and gamification remain limited. A summary of some relevant studies is provided below:

The study conducted by Omar et al. examines the impact of innovative teaching strategies such as gamification, case-based learning, creative expression, and virtual simulations to enhance the effectiveness of International Commercial Terms (Incoterms) education. An intervention-based study involving 30 logistics students incorporated interactive teaching methods such as exams, games, and hands-on activities, demonstrating a significant improvement in students' engagement and understanding of Incoterms [7].

The research by Zvarych et al. experimentally investigates the effectiveness of simulations incorporating gamification elements in student education. A simulation named the Coffee Import-Export Procedure was developed to evaluate students' engagement in the learning process through competition and collaboration, increased interest and motivation, cognitive attention, and feedback mechanisms.

The simulation was found to enhance students' motivation, cognitive skills, and self-learning competencies [8].

The study by Ashraf et al. focuses on procurement and supply management education, including Incoterms. To align with the learning preferences of Generation Z, the study emphasizes the importance of using films and games in lessons as part of the edutainment approach. Conducted at two universities in the United States, the research

found that a film-based activity supported the development of cultural awareness [9].

Urquiaga et al. explore the Learning-by-Doing approach, which integrates modern teaching methodologies in engineering education. Techniques such as Problem-Based Learning, Flipped Classroom, Gamification, and Collaborative Learning are highlighted for their contributions to skill development among professionals. The study was implemented in Industrial Engineering courses at universities in Cuba, Ecuador, and Colombia, covering topics including international transportation and Incoterms. The findings indicate that students improved competencies in self-learning, technology usage, teamwork, leadership, and interpersonal skills [10].

The study by Marcucci et al. theoretically and practically examines freight transport pricing across road, rail, air, and maritime transportation. The research addresses sectoral differences, geographical dimensions, and intermodal relationships in pricing, emphasizing the interconnected nature of transportation and logistics elements. The study highlights the need to evaluate stakeholders' decisions within the broader logistics framework and analyzes the role of gamification design in encouraging stakeholder participation and behavioral change [11].

The most relevant study addressing Incoterms education through gamification is that of Omar et al. [7]. This study employed gamification for teaching Incoterms and concluded that learning was more effective through gameplay. The following section will elaborate on the methodology, experimental process, and obtained results. Subsequently, conclusions and recommendations for future research will be presented.

III. METHODS

This study aims to examine the effectiveness of gamification strategies in increasing student engagement and facilitating the learning of Incoterms within the scope of the "Foreign Trade Transactions" course. A pre-test post-test experimental research design with a control group was employed. This experimental method involves administering a pre-test to both the control and experimental groups before the intervention or experimental application. Following the intervention, a post-test is conducted for both groups to measure the effects of the treatment. The control group does not undergo the experimental intervention and serves as a baseline for comparison



with the experimental group receiving the intervention. This approach enables researchers to assess the impact of the intervention by comparing the post-test scores of both groups while controlling for pre-existing differences [12].

The target population of this study consists of logistics students at Ipsala Vocational School. The primary reason for selecting this group is to provide them with a practical understanding of Incoterms before they begin their applied training. This knowledge is also a crucial component of their professional development, preparing them for job opportunities in the global logistics industry.

The questions in the pre-test and post-test were designed to assess students' knowledge of each of the 11 Incoterms. For example:

"Question 1: Where does the seller's responsibility end under the EXW delivery term?

- a) When the goods reach the buyer's warehouse
- b) When the goods are made available to the buyer at the seller's premises
- c) When the goods are cleared through customs
- d) When the goods are loaded onto the ship
- e) When the customs clearance process is completed"

"Question 2: Under the CIF delivery term, which party is responsible for insurance costs?

- a) Buyer
- b) Seller
- c) Carrier
- d) Customs officer
- e) Logistics companies"

All questions were formulated based on expert opinions. Each correct answer was multiplied by five to calculate the total score.

The study process was structured into four steps. First, participants were asked whether they had prior knowledge of Incoterms; those who were already familiar with the terms were excluded, leaving 65 students who received an introduction to Incoterms. Next, participants answered the questions included in the pre-test. In the following step, students were randomly assigned to either the experimental group (32 students) or the control group (33 students). The experimental group participated in a gamification-based learning activity, while the control group received detailed instruction using the traditional lecture method. In the final step, participants were asked to respond to the same test items again, allowing for the collection

of post-test scores. The study process is summarized in Table 1.

Table 1: Working Process

Process	Group 1 (experiment)	Group 2 (control)
Step 1	Incoterms knowledge was measured and participants with previous knowledge were eliminated. Each of the remaining participants was given information about Incoterms.	
Step 2	A pre-test was applied, questions were asked about each Incoterms term and answers were collected.	
Step 3	The Incoterms board game was played.	One-way detailed information transfer was made through the presentation.
Step 4	A post-test was applied.	

Introduction of the Game Applied to the Experimental Group

The Incoterms Board Game is designed to teach the delivery terms used in international trade in an engaging and interactive manner. Players take on the role of exporters, managing trade processes while striving to progress as quickly as possible with minimal costs. The key components of the game include a game board, countries, an Incoterms comparison table, a responsibility cost chart, chance cards, dice, currency, and a referee.

Upon arriving in each country, players must establish a new Incoterms agreement. The same agreement cannot be used again within the same round. Progress in the game is determined by rolling dice, and chance cards contain instructions that can alter a player's situation. Each player starts with 1,000,000 TIK (a virtual logistics currency) and receives two cards from each Incoterms group (E, F, C, D). To begin the game, all players roll the dice, and the player with the highest roll starts first. As players move between countries, they must make strategic decisions based on Incoterms agreements and responsibility costs. The game is recommended for 4 to 6 players. The objective is to complete three rounds in the shortest time and with the lowest cost. At the end of the game, the remaining balance determines each player's final score, and the player with the highest amount of money wins.

This game not only enhances knowledge of Incoterms but also helps develop strategic thinking, financial management, and decision-making skills.

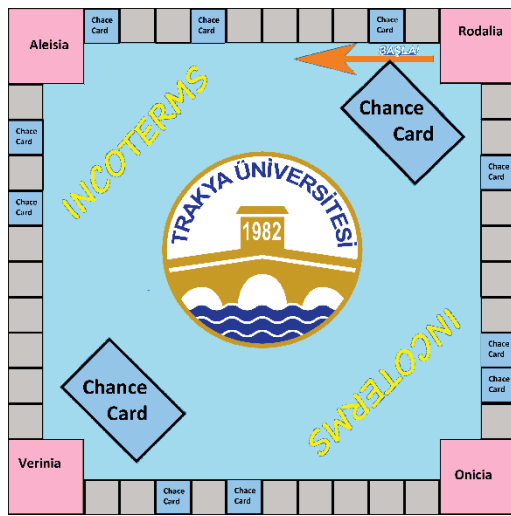


Figure 1: Incoterms Board Game Floor

Presentation Content for the Control Group

The traditional teaching method of "providing information through presentations" is a widely applied approach in various social sciences. Detailed information about Incoterms can also be conveyed through presentations. In the present study, the key topics covered in the presentation include:

- The meaning and expansion of each Incoterm,
- The respective responsibilities of exporters and importers for each Incoterm,
- A comparative analysis of different delivery terms,
- The distinctions between delivery terms based on modes of transportation.

IV. RESULT

For the analysis of the collected data, the SPSS 23.0 statistical software was utilized. This study adopted a pre-test post-test control group experimental design, also known as a two-factor (2x2) experimental model. To assess the impact of the experimental intervention, an independent samples t-test was conducted to determine the significance of the difference between the mean difference scores.

Table 2 presents the pre-test and post-test scores of participants, along with the difference scores used for subsequent analyses.

Table 2: Students' Post-test, Pre-test and Difference Scores

	Pre-test Score			Post-test Score			Post-test Score Difference		Pre-test
Experimental group (32 students)	30	40	30	50	35	55	20,00	-5,00	25,00
	20	65	30	45	75	40	25,00	10,00	10,00
	25	40	20	55	40	50	30,00	,00	30,00
	35	25	25	35	25	60	,00	,00	35,00
	30	30	45	60	45	70	30,00	15,00	25,00
	40	20	40	65	35	40	25,00	15,00	,00
	35	10	10	55	40	30	20,00	30,00	20,00
	15	20	15	30	35	30	15,00	15,00	15,00
	35	40	5	35	40	25	,00	,00	20,00
	60	25	50	65	45	60	5,00	20,00	10,00
	15	55		50	70			35,00	15,00
Control group (33 students)	40	55	25	50	50	35	10,00	-5,00	10,00
	25	35	20	30	30	25	5,00	-5,00	5,00
	25	20	20	25	30	20	,00	10,00	,00
	30	40	60	30	50	60	,00	10,00	,00
	20	45	50	25	55	55	5,00	10,00	5,00
	50	30	25	50	40	30	,00	10,00	5,00
	30	30	25	35	35	30	5,00	5,00	5,00
	20	45	35	30	60	40	10,00	15,00	5,00
	40	20	35	40	30	45	,00	10,00	10,00
	45	10	20	40	40	35	-5,00	30,00	15,00
	30	15	40	25	40	40	-5,00	25,00	,00

Significance of Difference Scores – t-Test Analysis

To analyze the difference scores, post-test scores were subtracted from pre-test scores for both the experimental and control groups. The difference in the mean scores was then tested using an independent samples t-test.

Table 3: T test Result for Difference Scores

Group	N	Mean	Std. deviation	df	t	Sig. (p)
Experiment	32	15,93	11,53	63	-4,043	,000
Control	33	6,06	7,88			

As shown in Table 3, there is a statistically significant difference between the mean difference scores of the experimental and control groups ($p < .05$). The results indicate that students who received gamified Incoterms training achieved significantly higher scores ($X=15.93$) compared to those who were taught using traditional lecture-based methods ($X=6.06$). These findings suggest that the observed changes in student performance can be attributed to the experimental intervention (gamification).



Significance of Difference Scores – One-Way ANOVA Analysis

The significance of the difference between the mean difference scores of the groups was further tested using one-way analysis of variance (ANOVA)[13]. The results are presented in Table 4.

Table 4: Anova Result

	Sum of squares	df	Mean square F	p
Between group	32,050	1	1584,862	16,34 ,000
Within group	57,700	63	96,980	
Total	89,750	64		

As observed in Table 4, a statistically significant difference exists between the difference scores of the experimental and control groups ($p < .05$). Consistent with the findings of the t-test, it was determined that students who learned Incoterms through gamification demonstrated greater improvement compared to those who received conventional lecture-based instruction.

V. CONCLUSION

The post-implementation data reveal that students' comprehension of Incoterms significantly improved. A comparison of pre-test and post-test results highlights a substantial increase in student achievement. The notable rise in the number of correct answers to previously challenging questions demonstrates the progress made in the learning process. A significant proportion of students in the experimental group exhibited a marked improvement in their ability to correctly and confidently respond to conceptual questions.

The gamification strategy employed in this study played a crucial role in this improvement. Initially, students found it difficult to distinguish between different delivery terms; however, following participation in gamified activities, they gained a deeper understanding and were able to apply their knowledge more effectively. The interactive and dynamic learning environment facilitated the retention of theoretical knowledge and enabled students to relate it to real-world commercial transactions.

Student feedback further supports the effectiveness of this method. Participants expressed that the game-based learning approach made the Incoterms learning process more engaging, comprehensible, and accessible. They also reported an improvement in their comprehension levels. The game allowed students to test their knowledge in a

competitive and interactive setting, thereby making the learning experience more stimulating.

Additionally, the game-based learning model fostered collaboration among students, creating a supportive social learning environment. Group interactions helped clarify misconceptions and reinforced individual learning, leading to a deeper understanding of the subject matter.

Overall, the findings of this study indicate that integrating gamification strategies into traditional teaching methods significantly enhances students' comprehension of Incoterms and their engagement with the course. These results suggest that gamification can serve as an effective pedagogical tool for equipping students with practical skills in international trade education.

VI. FUTERE SCOBE

The findings of this study confirm the effectiveness of gamification strategies in teaching Incoterms. However, to further enhance and expand learning processes, the following recommendations for future research are proposed:

- Future studies could investigate the effectiveness of gamification strategies across different academic levels, including undergraduate, graduate, and vocational training programs. Analyzing the responses of learners at various educational stages may help identify the most effective methods.
- Considering the growing role of technology in education, future research should explore the integration of digital games, virtual simulations, and augmented reality applications into the gamification process. Such digital solutions could enable students to learn Incoterms in a more interactive and applied manner.
- The impact of gamification could be examined in disciplines beyond logistics and international trade, such as law, business administration, and finance. This would provide comprehensive insights into how technical subjects like Incoterms can be effectively incorporated into different learning domains.
- While this study focused on short-term academic performance improvements, future research could explore how students apply their acquired knowledge in professional settings and examine the long-term impact of gamification on their career development.



- Further studies could investigate not only the effect of gamification on academic success but also its influence on student motivation, engagement levels, and attitudes toward learning. Identifying the most effective gamification elements would allow for the development of more refined educational strategies.
- Research could be conducted on the experiences of educators implementing gamification strategies, analyzing the challenges they encounter. This would facilitate the development of more informed and practical solutions to improve teaching methodologies.
- Comparative studies could explore how gamification strategies are perceived and implemented in different countries and cultural contexts. This would provide valuable insights into how gamification can be adapted on a global scale.

Future research in these areas would contribute to the advancement of gamification approaches in education and further enhance the effectiveness of teaching technical subjects like Incoterms.

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