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Freight Forwarding Training with Online Scenarios on Moodle: A Pilot Study

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ABSTRACT

Based on job descriptions, this study aims to create a scenario that accurately represents real work in the labor market for freight forwarding maritime export operations. A shortage of qualified personnel is a problem in the labor market. Education must provide students with real-life skills. One way to address this issue is from the standpoint of market orientation. A single-group pretest/posttest design was chosen. The scenario was generated with Moodle's quiz functionality. The scenario is implemented for students in the logistics department of a vocational school, and the means are compared. The scenario's validity is verified through expert opinion and comparison with the job advertisement. A significant statistical difference was found between the scores obtained in the pre-test and post-test ($p < 0.05$). The power of the study was evaluated through power analysis ($1- \beta \geq 0.8$). The findings of this study demonstrate that materials designed based on real-life scenarios possess the capacity to equip students with practical skills applicable in real-world contexts.

Keywords: Market Orientation; Theory/Practice Divide; Logistics Education; Moodle; Freight Forwarding

Moodle' da Çevrimiçi Senaryolarla Freight Forvarder Eğitimi: Bir Pilot Çalışma

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ÖZET

Bu çalışma, iş tanımlarına uygun olarak, işgücü piyasasında gerçek bir işi temsil eden bir freight forvarder deniz ihracat operasyonları senaryosu oluşturmayı amaçlamaktadır. İşgücü piyasasında kalifiye personel eksikliği bir problemdir. Eğitimin öğrencilere gerçek yaşam tecrübesi sağlaması gerekir. Bu sorunu ele almanın bir yolu, konuyu pazar odaklılık bağlamında ele almaktır. Araştırmada tek grup öntest/sontest desen tercih edilmiştir. Senaryo, Moodle' ın kısa sınav özelliği ile oluşturulmuştur. Senaryo, bir meslek yüksekokulunun lojistik bölümündeki öğrencilere uygulanmıştır ve ortalamalar karşılaştırılmıştır. Geçerlik, senaryonun iş ilanları ile karşılaştırılması ve uzman görüşü yoluyla sağlanmıştır. Öntest ve sontest puanları arasında istatiksel olarak anlamlı fark bulunmuştur ($p <0,05$). Çalışmanın gücü, güç analizi ile değerlendirilmiştir ($1- \beta \geq 0,8$). Bu çalışmanın bulguları gerçek hayata dayalı olarak tasarlanan materyallerin gerçek dünya bağlamında uygulanabilir pratik becerileri öğrencilere kazandırma kapasitesine sahip olduğunu göstermektedir.

Anahtar Kelimeler: Pazar Odaklılık; Teori/Pratik Ayrımı; Lojistik Eğitimi, Moodle; Freight Forwarding

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1. Introduction

This research aims to impart real-life skills. A scenario about real life was developed to reach the aim. The real-life experience has been aimed since the day business simulation games first emerged [1]. The material cannot be classified as a game as games have conditions such as “goal, rules, feedback system, and voluntary participation” [2].

Literature [3] presents a clear distinction between theory and practice. Researchers contend that students view lectures as primarily theoretical [4]. Researchers develop business simulation games to address this issue [5]. Games are utilized for educational purposes in the field of logistics [3, 6, 7]. One of the most renowned games in this category is THE BEER GAME [8]. Researchers propose their games as a remedy for a certain issue or assert that their game is designed with this objective in mind [3, 6].

A FOB ocean export scenario is developed on Moodle to solve the problem. Researchers’ personal experience is utilized to develop the scenario. Validity of the scenario was checked by comparing job advertisements and interviews that are made with two different professionals. The scenario was revised through the professionals’ feedback and implemented in four hours. The means of test points (pretest-posttest) obtained by the learning management system were compared. It has been observed difference between pretest and posttest is statistically significant, despite the small sample size due to the online education implemented nationwide.

2. Literature review

This section provides a concise overview of the literature on the technology utilized in the study (Moodle), the problem that the researchers have identified, the publications that pertain to the study of market orientation in education, and the concepts of power analysis that were employed to evaluate the power in the research.

2.1 Theory/Practice Divide and Business Simulation Games

Business simulation games have been created for a wide range of objectives over many years [1, 7, 8]. Researchers frequently opt to create business simulation games as a means of addressing the challenge of effectively transferring skills from school to real-world contexts [3, 5]. Logistics education has incorporated business simulation games across several domains [3, 6-9]. THE BEER GAME is a renowned business simulation game that is commonly described in literature as a simulation of the distribution channel [8]. THE BEER GAME is presented as an illustration of the Bullwhip Effect, as described by Lee et al. [10].

Researchers [11] observed that the traditional way of understanding supply chain was ineffective. Students can acquire a comprehensive understanding of the actual supply chain only via firsthand experience. According to Shovityakool et al. [11], a business game is regarded as an alternate method that offers students practical experience.

Simulation and gaming refer to a learning environment in which individuals engage in experiments, simulations, developmental situations, and roleplay [12]. Participants have the opportunity to commit errors in this setting. Andlinger [1] defines "Business Gaming" or "Operational Gaming" as a simulation. These games have been utilized for training for an extended period, as evidenced by the works of Andlinger [1], Wenzler and Chartier [13], and Shovityakool et al. [11]. Touzet and Corbeil [14] propose that Vital Rox is a trailblazer who advocated for the incorporation of games in business education.

2.2 Market Orientation & Problem in Labor Market

Marketing has various uses in non-profit organizations [15]. An area where marketing can be utilized is education [16]. There is ongoing discussion in this field on the utilization of the term "customer" [17]. Bruce [17] suggests using the term "beneficiary" instead of "customer". The literature refers to the process of identifying and satisfying “service recipients” needs as a marketing activity [18]. The literature indicates that there are publications specifically addressing the topic of students within the framework of customer orientation [19, 20]. These publications reflect the students' need for individualized and high-quality education [20]. Studies done in Türkiye have highlighted the significance employers place on vocational training, emphasizing the need for practical training [21]. Research has been carried out to compare various educational approaches in marketing education within non-profit organizations [22]. The researchers in these studies discuss a disparity that exists between industry and education [23]. According to certain researchers, there is a discrepancy between the skills needed in the labor market and the education provided [24].

Non-profit organizations are characterized by their organization focused and the belief that the services they offer are in high demand [25, 26]. A study conducted by Pavičić et al. [27] revealed that the market focus of higher education in Croatia is inadequate. According to Narver and Slater [28], the three components of market orientation are “customer orientation, competitor orientation, and inter-functional coordination”.

During times of elevated unemployment rates, there can still be a shortage of skilled personnel in the labor market [29]. This discrepancy between the skills required by employers and the skills taught to students in educational institutions makes it challenging for employers to find personnel with the necessary qualifications [24, 30]. Various publications in the literature suggest that training programs should be tailored to meet the specific needs of employers [31].

2.3 Freight Forwarders

Freight forwarders are individuals that specialize in foreign trade and logistics [32]. According to Keskin [33] for a business to be classified as a logistics company, it is necessary for it to effectively handle a minimum of three distinct logistics operations. According to Keskin [33], companies that exclusively engage in transportation are referred to as transportation companies. Freight forwarders are proficient in logistics and can provide a range of services. These services encompass a wide range of activities, including transportation, warehousing, customs clearance, and insurance [34]. By being able to provide these services, companies are able to offer all-encompassing logistical solutions to their customers. Forwarders have been categorized in multiple ways in literature. The classifications encompass asset-based and non-asset-based categories. Simultaneously, forwarders are also categorized based on their services. The mentioned classifications offer a comprehensive comprehension of the functions and specialized areas of knowledge of forwarders [34, 35]. Within the context of multimodal transportation, forwarders have the ability to assume the responsibility of multimodal transport operator [36]. They have the ability to efficiently arrange and synchronize the movement of a cargo utilizing several transportation methods. Forwarders provide customers with a comprehensive and efficient transportation solution by producing a single bill of lading for all forms of transportation.

2.4 Moodle

Moodle is a freely available learning management system that facilitates the development of online courses [37]. During the development of the curriculum for green logistics training, a study conducted interviews with over 150 companies [38]. Moodle, an educational platform, has the capability to track and assess the advancement of training [39]. In addition, Moodle has been utilized to provide interactive exercises pertaining to simulation training [40]. Research has been conducted on the

utilization of YouTube videos in conjunction with Moodle, particularly in the instruction of business students [41].

2.5 Power Analysis

According to the Kang [42] too large samples might result in resource wastage, whereas excessively small samples can lead to erroneous forecasts and an inability to deliver responses to research questions. The studies employ samples consisting of nine or ten participants [43, 44]. Furthermore, it is argued that studies lacking sufficient statistical power to detect an impact are seen wasteful of resources [45]. Additionally, research conducted without considering the possibility of no effect may lack the necessary sensitivity to identify the specific effect being investigated. Hence, the significance of sample size holds paramount importance in this particular situation [42, 45]. G Power is a software utilized for sample size determination [42]. The calculation of sample size can be performed using two distinct ways, namely a priori and post hoc analysis [42]. However, the a priori analysis is considered the optimal approach. When determining the sample size, the impact size is computed based on prior research or a preliminary study [42]. The post hoc method is a research approach in which the hypothesis is determined after the data has been collected, potentially leading to biased results [45]. The minimum acceptable power of the test should be 0.8, as specified in psychological research [45].

Table 1: Pilot studies with similar sample sizes

Authors	**N**	**Statistical Tests**	**Journals**	**Indexes Quartiles**
Kim et al. [46]	9	Wilcoxon signed-rank test	Geriatric Nursing	SSCI Q1
Escalante-Gonzalbo et al. [47]	9	Wilcoxon signed-rank test	Rehabilitation Process	ESCI Q1
Hines et al. [43]	10	paired samples t test	Nursing Forum	ESCI Q1
Aggar et al. [48]	9	paired samples t test	Collegian	SSCI Q2

Table 1 summarizes pilot studies that had comparable sample sizes. Kim et al. [46] and Escalante-Gonzalbo et al. [47] used the Wilcoxon signed-rank test on a sample of nine participants. Similarly, Aggar et al. [48] conducted a paired samples t test on a sample size of nine. Hines et al. [43] used a paired samples t-test with a slightly larger sample size of ten.

3. Material and Method

Verbal informed consent for participation in the study was obtained, and the study was conducted with the approval of the Dokuz Eylul University Social and Human Sciences Scientific Research and Publication Ethics Committee (number: E-87347630-659-58). For this study, students were instructed to complete a Moodle-based assessment designed to evaluate their existing knowledge and proficiency levels before beginning their coursework. The content in question is the scenario of exporting goods by sea and was created utilizing Moodle's quiz functionality. Students were given a lecture on the operations of forwarders. This presentation provides an overview of fundamental concepts such as the forwarders, multimodal transportation, INCOTERMS, and MBL-HBL, without delving into the specifics of the ocean export operation. It is essential for students to comprehend these principles in order to be prepared for the situation they will encounter. However, the practical execution of the operation is not explained to them. Following the presentation, the students addressed the scenario. This study utilized the Moodle quiz tool to assess the proficiency of students in maritime export procedures.

The measurement instrument was developed concurrently with the scenario, and students successfully completed the scenario, which also served as a quiz. Next, the students received instructions on how to carry out maritime export activities using the same scenario. The given scenario was transformed into a presentation by taking screenshots. The presentation was delivered in person to students in the classroom, and a video recording of the presentation was also uploaded on the online education platform. Following the presentation, students were directed to practice the same scenario once more. The scores computed by Moodle were utilized in the study. The duration of the application and lectures was four class hours in total. In addition, students were requested to assess the efficacy of the training.

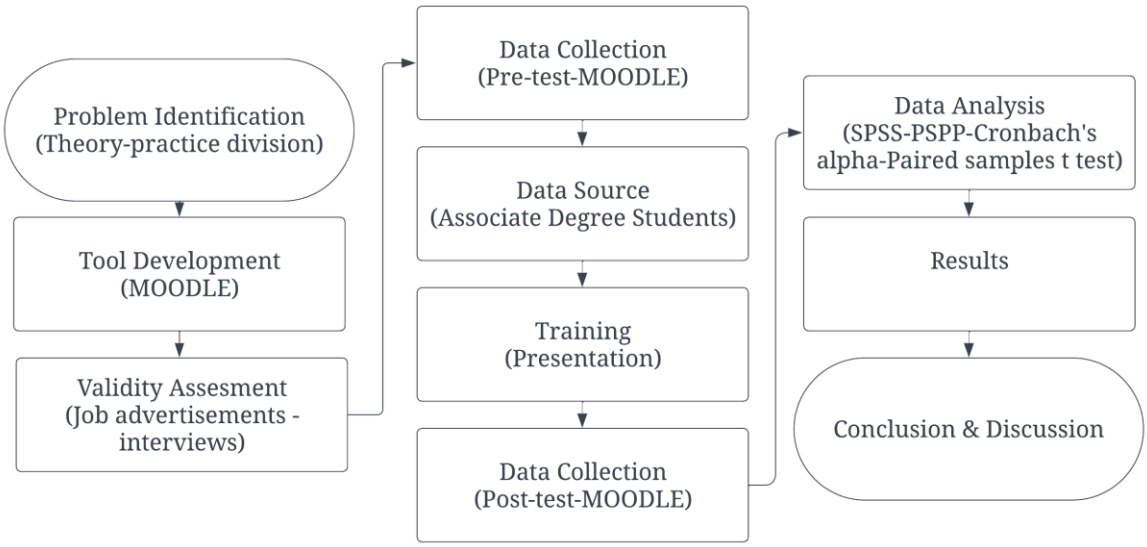

Figure 1: Methodology flowchart

Due to the limited number of subjects and the early nature of the research, the one group pre-test post-test design was chosen. The literature review revealed an impact size of 1.42 when assessing the efficacy of online education [49]. Upon conducting an a priori analysis with the reference research, it is found that the Wilcoxon test necessitates a minimum sample size of 8, whereas the paired samples t test requires a minimum sample size of 7. The data utilized in this study were analyzed using G Power and the post hoc analysis method. The computed 1-beta value was 0.83 for the paired samples t-test and 0.76 for the Wilcoxon test, with an alpha level of 0.05 and a sample size of 9. The Wilcoxon test was used to confirm the results of the paired samples t test in the study. In addition, students were requested to assess the efficacy of the training. The pre-test and post-test results of the students from the quizzes were examined using paired samples t-test, utilizing the material that was presented in both lecture and measurement.

3.1 Research Hypotheses

The literature highlights a distinction between logistics education and industry. Business simulation games are designed to offer students practical experience and essential competencies. The study formulated the following hypotheses, positing that the students' scores would vary if the course was taught using the generated content.

- H0: The scores students receive will be the same after training.
- H1: After training, the scores students receive will be different.

3.2 Validity

Expert opinions were utilized to assess the validity. The scenario presented on Moodle was systematically examined by specialists. Following the advice of experts, the scenario was revised, and the scenario, which originally had 22 questions, was expanded to include 27 questions. Two specialists were interviewed to ascertain the validity of the scenario, and the congruence of the scenario with actual tasks was assessed. Simultaneously, the scenario was compared with the job descriptions in job advertisements. By means of these verification procedures, the scenario has been assessed on a firm foundation as both valid and realistic.

3.3 Reliability

The reliability of the pre-test was assessed using Cronbach's Alpha coefficient. The pre-test's Cronbach's Alpha value was determined as 0.69, according to the findings. The low value can be attributed to several factors, including the limited number of items and small sample size, as well as the diversity in students' knowledge and ability levels.

According to Garren [50], the widely acknowledged consensus in the research is that the Cronbach's Alpha coefficient is typically higher than 0.7. Nevertheless, according to Kalaycı [51], coefficients exceeding 0.6 are deemed acceptable for utilization. It has been found that Cronbach Alpha values of 0.5 or 0.6 are satisfactory for achievement assessment in schools [52]. The Cronbach Alpha value calculated for the post-test was 0.93. The standardization of students' knowledge and skill levels following the training resulted in a significant improvement in the Alpha coefficient. Nevertheless, the inadequate Cronbach Alpha value observed in the pre-test suggests that enhancing the reliability of the measurement requires augmenting the sample size and number of questions.

3.4 Sample

The study involved a total of nine logistics students who were in their first year of undergraduate studies. Some of the participants have prior internship experience in related roles, such as liner agency. Some of them pursued studies in the field of logistics during their high school education. The data of one student was excluded from the analysis since she had an incomplete quiz. Participation was voluntary. Due to the online nature of the training during the implementation period and its optional nature, participation levels remained low and fell below the anticipated rate of participation.

3.5 Data

The dataset consists of data collected from a total of nine students. All students executed the scenario on a website that was equipped with Moodle. The scenario was created utilizing Moodle's quiz feature. The data consists of the scores obtained by students in response to questions related to a real-life job scenario. Students receive points for providing correct answers. Moodle provides results for each question as well as an overall score at the end of each practice. The scores were measured on two practices, once prior the presentation and once afterwards. The material can be used for both practice and measuring purposes. For instance, there are several questions related to the procedure of sending a shipment instruction. Students receive points for providing correct answers.

3.6 Data Collection

The research involved the scores obtained from the pre-test and post-test, as provided by Moodle. A 27-question scenario replicating a maritime export activity was generated using the quiz tool in Moodle. The scenario was utilized in both the lecture and the assessment-evaluation process, as the

scenario employed is also a quiz. The scenario was implemented by a group of nine students pursuing an associate degree.

Prior to the implementation of the scenario, a presentation was delivered to the students regarding forwarders, multimodal transportation, and INCOTERMS. Nevertheless, this presentation doesn't include maritime export operation details. Students were instructed to independently carry out the process once. Next, the process of conducting maritime export operations is explained, utilizing the scenario employed for measurement and assessment.

Following the presentation on the process of maritime export operations, the students were instructed to repeat the scenario. The research involved comparing the mean of quiz scores calculated by Moodle in the first and second applications.

3.7 Data Analysis

The data was analyzed using the PSPP and SPSS 21 statistical software packages, as well as the paired samples t-test. The normal distribution was confirmed by analyzing the skewness and kurtosis. Data is said to possess a normal distribution if the skewness and kurtosis values fall within the range of -1 and +1 [53]. Nevertheless, it is acknowledged that the distribution can be deemed normal when these values fall within the range of -2 and +2 [50].

4. Results

Table 2. Test results

Students	Pre-test	Post-test
1	3.88	4.79
2	4.08	6.37
3	5.9	9.59
4	4.31	6.3
5	6.23	8.06
6	4.93	4.42
7	3.44	9.78
8	5.47	10
9	1.95	2.45

Upon analyzing the pre-test and post-test results of the students, it was seen that the post-test scores of all students, with the exception of one student, showed improvement (Table 2). Furthermore, it was ascertained that while one student attained the highest possible score in the post-test, two students obtained a score near the maximum score (Table 2).

Table 3. Pre-test Post-test Skewness and Kurtosis Values

	Pre-test	**Post-test**
Skewness	-.518	-.266
Kurtosis	.153	-1.152

The pre-test's skewness and kurtosis values were calculated as -.513 and .153 respectively (Table 3). The post-test's skewness and kurtosis values were reported as -.266 and -1.152, respectively (Table 3). Given that the skewness and kurtosis values fall within the range of reference values mentioned in the literature, it may be inferred that the data follows a normal distribution [50, 53].

Table 4. Pre-test and post-test scores

	Pre-test	**N**	**Std. Dev.**	**Std. Err. Mean**
Pre-test	4.46	9	1.33	.44
Post-test	6.86	9	2.68	.89

The mean pre-test score was 4.46, and the mean post-test score was 6.86 (Table 4). The exam had a maximum score of ten, and nine students took part in the study. The standard deviation for the pre-test was 1.33, and the post-test was 2.68.

Table 5. t-test results

	N	**t**	**p (2-tailed)**	**Mean Difference**	**Std. Err. Mean**
Pre-test & post-test	9	-3.365	0.010	-2.39667	0.71227

Table 5 presents the findings of a study involving nine students. The analysis revealed a significant difference between pre-test and post-test scores ($\alpha = 0.05$). A mean difference of 2.39 was observed, with a p-value < 0.05 indicating statistical significance.

Table 6. Wilcoxon test

	Negative Ranks	**Positive Ranks**	**Ties**	**Z**	**p**
Pre-test & Post-test	1	8	0	-2.43	0.015

Based on the Wilcoxon test, there is a statistically significant difference observed in the students' pre-test and post-test outcomes, as indicated in table 6. The difference seen in the paired samples t-test was further validated using the Wilcoxon test.

Table 5's t test results reveal a statistically significant difference between the means. The Wilcoxon test results also confirm that the difference is statistically significant (Table 6). Therefore, the null (H0) hypothesis has been rejected.

5. Discussion

Business simulation games are employed in literature to equip students with practical skills, as stated by Tomatir [5]. Nevertheless, not all studies provide controls, such as expert opinion or interviews, to assess their proximity to reality [3, 6]. Marinagi et al. [38] gathered the necessary skills for a course by conducting interviews with specialists. Relevant studies employing the same

methodology, design, and sample size as our study may be found in the literature [7, 38, 41, 43, 44, 46-48]. The flaws of our research stem from the design itself, as we employed a one group pretest-posttest design. Nevertheless, there is a statistically significant difference between the outcomes of the pre-test and post-test, and the existing literature contains research that employ methodologies and sample sizes [43, 44, 46-48].

The study was conducted on a sample size of only nine students. While some researchers may consider this sample size to be small, it is worth noting that there are studies in the literature that have utilized similar sample sizes [43, 44, 46-48]. The post hoc analysis conducted using G Power revealed that the statistical power (1-beta) of this study was determined to be 0.83 and 0.76 for the t test and the Wilcoxon test. The number exceed the commonly accepted minimum threshold for statistical power in the t-test [45]. Nevertheless, the statistical power of the study falls below the threshold of 0.8 for the Wilcoxon test. However, the results of the paired samples t-test were also confirmed using the Wilcoxon test. Thus, it was determined that there was a significant difference in the scores achieved by the students due to the material used in this study and the training provided, with a significance level of 0.05. Students are required to get scores close to the maximum; yet only three students have obtained scores above nine. Further research is required to ascertain the frequency of material usage and its impact on students' scores.

Individually examining each student's results (Table 2) reveals an increase in all but one student's scores. This situation suggests that the students possess knowledge of certain tasks, associated with freight forwarding and ocean export operations, as well as the general sequence of operations following their training. This result demonstrates that the material in question can facilitate the acquisition of skills in freight forwarding ocean export operations, but further studies are necessary to corroborate these findings.

Table 5 shows a difference of 2.39 points between the students' pre-test and post-test results. Results shows that after the course, the students' skill levels regarding freight forwarding ocean export operations increased in general.

The comparison of the students' pre-test and post-test averages reveals a statistically significant difference (Table 5). The Wilcoxon test results also show a statistically significant difference between the students’ scores (Table 6). In literature, researchers are developing business simulation games to bridge the gap between education and practice [11]. These games are considered beneficial for learning and teaching [8, 11]. This study did not use a game, but the statistical significance between the pre-test and post-test provides evidence consistent with other studies' findings that course materials developed for real-life experience can facilitate the acquisition of real-life skills.

This study aimed to construct a scenario by considering the job descriptions in job advertisements, the conducted interviews, and the researcher's personal experiences. The realism of the scenario was assessed based on the feedback provided by industry experts. The scenario was constructed with Moodle's quiz functionality in this study. This feature allows for the recording of both accurate and inaccurate responses from students. Nevertheless, scholarly sources frequently assert the existence of a difference between the industry and the education [5, 23]. In order to give students hands-on experience, a scenario was created to expose them to an authentic real-world operation. While this strategy has yielded significant gains in four class hours, further research is needed to assess the potential for students to get the highest possible score. Due to the small sample size and short course duration, it was not possible to establish a control group. Nevertheless, subsequent research should study the difference between the traditional approach and the method under examination by employing an experimental design that includes a control group.

It is vital to incorporate real business circumstances as training materials. The literature asserts that non-profit organizations are focused on their own organization and believe that the value propositions they provide are desired [25, 26]. The researchers [24] highlight the existence of a discrepancy between the labor market and schooling regarding skills. Marketing can be utilized in the field of education [16]. Hence, to ensure that the training is aligned with market demands and caters to

beneficiaries' requirements, it is crucial to provide materials that are rooted in real business scenarios and equip students with comprehensive competencies in this domain. These resources could potentially serve as an alternate method to address the difference observed between the job market and education [24], or the gap between theory and practice [3, 23]. This study demonstrates that the utilization of these course materials can enhance students' proficiency in real-world skills. However, further research is required to validate these findings through further studies.

According to Shovityakool et al. [11], business games serve as a means for students to acquire practical experience. "Students play the roles of wholesalers, manufacturers, and suppliers" in the Shovityakool et al. [11] game. In Dong and Boute's [3] game, "student teams play the role of a logistics manager of a beer brewery." Smith et al. [23] and Allden et al. [24] highlight a gap between industry expectations and logistics education. According to Göttlichová and Soukalova [31], the educational system should contribute to students' employability by coordinating "the output of the tertiary education sector with the needs and requirements of employers". This study uses MOODLE to simulate a real job in the labor market. As a result, students assume roles like those in the labor market. The results of this study demonstrate that students can acquire practical skills related to freight forwarding and ocean export operations in a classroom setting. However, further research is necessary to support these findings, given that the study is a pilot study and not suitable for generalization. The result of the study is aligned with other studies in literature about the materials used for providing hands-on experience for students, still, the tool in this study is not a game.

6. Conclusions

The research aimed to replicate a practical ocean export FOB operation using a simulated material on Moodle. Two specialists were consulted to check the material's validity. Experts indicated that the material closely resembled a typical procedure, and that life was atypical. While the content in question may meet some criteria, it may not adequately equip students with the necessary skills to solve possible challenges.

The literature reveals the development of numerous games for real-life experience and skill. In this study, researchers developed the course material by comparing it with a job description. Experts stated that the study reflected a standard export operation. Examining the pre-test and post-test means of the students revealed a mean increase of 2.39 points in their success. When comparing the pre-test and post-test means of the students, it was found that this difference was statistically significant ($p < 0.05$). Examining the individual scores of the students revealed an increase in scores, with the exception of one student. This result provides evidence that students can acquire some skills related to freight forwarding ocean export operations in a classroom environment. Since this scenario was compared with a real job description and verified by two different experts, it provides evidence that the job in question can be taught in a classroom environment, but the results of this study need to be supported by other studies.

Our study demonstrates that materials derived from real-life situations have the capacity to equip students with practical skills applicable to real-world scenarios. However, when the results were examined, it was seen that the maximum score of 10 was not reached except for one student. The findings of this study necessitate further research through more extensive studies with a greater number of subjects.

Conflict of interest

The writers affirm that they do not have any conflicting interests.

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