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The Development and Preliminary Evaluation of an Educational Game for Online Flight Reservation Services That Involves Real Person-NPCs

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Abstract: In the midst of the COVID-19 pandemic, distant learning has become a norm. In this study, a situated learning game "Ticketing Expert" was designed, combining the real person-NPC mechanism to provide a highly realistic travel agency environment and atmosphere. In the game, the real person-NPCs play the customer, which allow the learners to be immersed in the travel agency's ticketing department and simulate the interaction between the ticketing staffs and customers for enhancing learners' ticketing and communication capabilities. The preliminary study investigated the learners' flow state and their acceptance of the game. The results showed that the game-based learning mechanism could effectively enhance the flow of the learners, enabling them to be highly concentrated. And the learners highly agreed with the idea of using the game to help them learn in the ticketing field.

Keywords: Real person-NPCs, educational game, situated learning, Flight reservation services

1. Introduction

As the COVID-19 outbreak that erupted in early 2020 spread around the world, to ensure that learning was not interrupted, education institutions have been forced to adopt distance learning. If an interactive mechanism and situational experience are missing in the design of distance learning, the learner may lack concentration and context, resulting in insufficient learning motivation and anxiety, thus reducing the effectiveness of learning. Paudel (2021) believes that most distance learning leans towards the development of knowledge-based awareness, which means the applied learning environment of practical operational skills is often overlooked. The study by Kailani, Newton, & Pedersen (2019) found that game-based learning develops the students' ability to solve problems and that it has a certain degree of impact on developing the learners' higher-level skills such as decision-making, critical thinking, problem-solving, and collaboration skills (An, 2018). A real person-NPC for game-based learning can provide players with more realistic verbal dialogues and behavioral interactions (Liu et al., 2021). Different from traditional distance learning software, Gather Town provides a platform where people can work, socialize, and learn (McClure and Williams, 2021) and real-world context could serve as situated learning to foster knowledge and learning transfer (Hou & Keng, 2021). This study used Gather Town to develop a flight reservation service educational game (Figure 1), which enabling learners to discuss and interact in a virtual space through the context of customers' pre-booking of flights. The game features video, voice, and messaging for understanding the customer's thoughts and feelings, eventually helping them complete flight ticket reservations. "Ticketing Expert" is an online game designed to present a travel agency's ticketing department on the Gather Town platform for situational flight reservations. In the activity, learners were provided with relevant ticketing service knowledge as a scaffold, and three real person-NPCs with different socio-economic statuses played the role of customers. Learners must look for the most suitable flights according to the requirements of the customers and help customers pre-book special needs (e.g., seat selection or special meals) (Figure 2). According to the responses exchanged in the

process of the activity, customers give feedback and encouragement to the learner after the flight booking is completed to reduce the learner's anxiety.

Figure 1 Online Situational Flight Reservation Game

Figure 2 Online Simultaneous Discussion on Collaborative Ticketing

2. Method

After a preliminary test of case analysis was carried out, the participants in this study were six students (1 male and 5 females) from a university in Taiwan. Teams were formed by online registration, with three people in each team Each participant used a personal computer and participated in the flight reservation service activity in their own separate space. The Kiili Flow Scale (2006) translated and revised by Hou & Li (2014) was referred to in this study. The flow scale includes two dimensions: Flow prerequisites and flow experience. All scales were scored according to the Likert scale. The reliability of the flow questionnaire (Cronbach's alpha=0.855) indicated a high degree of internal consistency. In terms of the acceptance of the game by the learner, the technology acceptance scale proposed by Davis (1989) modified by this study was used, which included three dimensions: perceived usefulness, perceived ease-of-use, and game design elements, and the Likert scale was used. The reliability of the game acceptance scale is (Cronbach's alpha=0.967), which has credibility. The learning activity process began with an activity explanation (10 minutes), a pre-test (20 minutes), game tasks (50 minutes), followed by a post-test (20 minutes), and a flow questionnaire (10 minutes).

3. Results and Discussions

"Ticketing Expert" learning objectives are ticketing and communication skills. Table 1 shows the descriptive statistical analysis of the learner's flow state after completing a task that allowing us to know that the learner is proactively engaged in the game. Overall flow (M=3.94, SD=0.36) was significantly above the median of 3 (t=6.42, p<0.001). The average values of all dimensions of flow prerequisites and flow experience were above the median of 3.00. Among these, the average values of the five dimensions of clear goals, action-awareness merging, concentration on the task at hand, loss of sense of time, the transformation of time, and autotelic experience reached 4.00. This indicates that the overall game design mechanism enables the learner to clearly understand the game's objective of the activity and is proactively engaged in the game to complete tasks, achieving a high level of flow experience, further improving the effectiveness of online learning. Table 2 shows the descriptive statistical analysis of the learner's acceptance of the overall acceptance of the game (M=4.56, SD=0.63), (t=6.10, p<0.01). Perceived usefulness, perceived ease-of-use, and game design elements were all significantly above the median of 3. The results indicate that the learner has a highly accepted acceptance of the game design and that the game was not only easy to operate, and it also improved learners' knowledge and application in ticketing.

Table 2. *Descriptive Statistical Analysis of Game Acceptance*

Dimension	***M***	***SD***	***t***	***p***	***ES***
Overall Flow	3.94	0.35	6.415***	0.001	2.62
Flow Prerequisites	3.90	0.45	4.834**	0.005	1.97
Challenge-skill balance	3.75	0.52	3.503**	0.017	1.43
Goals of an activity	4.08	0.58	4.540**	0.006	1.85
Unambiguous Feedback	3.75	0.61	3.000*	0.030	1.22
Sense of Control	3.92	0.66	3.379*	0.020	1.38
Action-awareness Merging	4.00	0.71	3.464*	0.018	1.41

Flow Experience	3.97	0.35	6.761***	0.001	2.76
Concentration	4.08	0.72	3.692*	0.014	1.51
Time distortion	4.17	0.68	4.183**	0.009	1.71
Autotelic experience	4.00	0.79	3.098*	0.027	1.26
Loss of self-consciousness	3.50	0.48	2.739*	0.041	1.12

*p <0.05 · **p <0.01 · ***p <0.001

Table 2. *Descriptive Statistical Analysis of Game Acceptance*

Dimension	***M***	***SD***	***t***	***p***	***ES***
Overall Acceptance	4.56	0.63	6.096**	0.002	2.49
Perceived Usefulness	4.71	0.40	10.448***	0.000	4.26
Perceived Ease-of-use	4.50	0.75	4.881**	0.005	1.99
Game Design Elements	4.47	0.76	4.756**	0.005	1.94

*p <0.05 · **p <0.01 · ***p <0.001

4. Conclusion

This study developed an online functional training game "Ticketing Expert" based on the operations of a travel agency. The game combines real person-NPCs, situational learning, and cognitive design, allowing learners to complete tasks using online collaboration on the then Gather Town platform. In the game, three real person-NPCs playing the role of customers gave the learner different ticketing information and the real person-NPC's ticketing supervisors played the role of senior employees to help and interact with the learner. Although the learner was playing an online game, they felt as if they were helping customers book their flights at a travel agency. To summarize the above data, the learner flow performance was significantly higher than the median of 3, indicating that the design of this study combined with real person-NPCs enhanced the flow of online learners in the learning process. The acceptance of the game reached higher than 4, while the perceived ease-of-use reached 4.71, showing that the learners highly agree that the game is helpful in the learning of ticketing knowledge. In the future, this study will be carried out in a quasi-experiment design manner, continuing to explore learners' effectiveness compared to the control group (traditional teaching).

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