

Virtual Reality and Gamification in Hospitality Education at Front Desk

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Abstract – Virtual reality (VR) is recognized as an intelligent and digital technology that has impacted numerous sectors and environments. VR in the classroom acts like a digital tool for the students and the teachers to achieve educational goals as it enhances understanding, critical thinking, visualization levels, and problem-solving skills. In addition, gamification as a motivational factor is integrated with VR. This study investigates the usage of VR and gamification in hospitality educational environment mainly at the front desk. This is to be beneficial to an individual's knowledge and abilities, which should be prioritized in the future, and that earlier experience should be given credit for future employability and education quality.

Keywords – Virtual reality, gamification, hospitality, education, front desk.

1. Introduction

With the outbreak of COVID-19, the Malaysian government announced the implementation of Movement Control Order (MCO) to help curb the spread of the virus.

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Many hotels were forced to decide on their current operations, including closure, to minimize losses [1]. Due to hotel closures, there are students who have difficulty completing their internships after their company or employer had to limit or stop operations. Notwithstanding the high risk of exposing students to the virus, it is important to halt internships. Therefore, hospitality students' internships are interrupted [2]. Similarly, the practical sessions needed in higher education, such as in tourism and hospitality, are seriously affected [3]. Significantly, the future of the hospitality industry remains uncertain [4]. There is no certainty as to whether or when hospitality students can complete their internship, even if they choose to defer their studies.

Bilsland *et al.* [4] discuss the importance of internships as a bridge between student life and the working world. During an internship, students learn and grow to be more prepared for the real world. Some researchers have proposed the use of innovative learning to support hospitality students [5]. On the other hand, many authors suggest that to postpone the internship for hospitality students [6]. Nevertheless, Park and Jones [7] propose the use of a virtual internship using Zoom and emails. However, having this type of interaction is not as engaging as the real-world experience. With this in mind, using virtual reality (VR) technology, hospitality students may be able to learn better.

VR technology is not new to the hospitality industry. VR has been used to promote tourism with the use of virtual tours [4]. Similarly, Casillo *et al.* [8] developed a modern e-tourist guide, which is an innovative solution that helps tourists by giving them tailor made answers. In terms of practicality, virtual reality can be embedded in a web application using Web3D technology [9].

However, apart from a VR environment, to motivate and engage students, the concept of gamification will also be incorporated in this product [10]. Students will be provided with a leaderboard to keep them from losing interest.

Therefore, in this study, an innovative product which is associated with VR and gamification to simulate front desk department will be developed to produce an experiential working environment for hospitality students to do their internship via an e-learning platform. The product can be used as part of internship training for hospitality students during COVID-19 pandemic and later on as a pre-training model for students about to embark on their internship.

The remainder of the paper is organized as follows: Section 2 discusses VR and gamification. Section 3 presents the methodology of developing VR. In addition, Section 4, the integration between virtual reality and gamification in hospitality education at front desk and gamification. Finally, Section 5 concludes the paper.

2. Literature Review

This review will provide an overview of the present state of research on virtual reality in tourism by mapping existing knowledge. The literature review, from the articles published in tourism and hospitality journals, is to meet the following aims:

- 1) To develop an innovative product with VR to simulate a front desk department.
- 2) To identify the effectiveness of using gamification in this innovative solution.
- 3) To identify the user experience of using this innovative solution.

2.1. Virtual Reality

VR is widely regarded as the pinnacle of twenty-first-century technologies that are reshaping the world. The human brain is tricked into temporarily accepting these experiences as a real form of reality by simulating immersive experiences for our senses with computer-generated visuals or motions. The success of VR is dependent on the creation of compelling 3D interactive immersive images [11].

Using VR in creating such experiences could be the key to establish a completely new agenda for the global tourism and hospitality industries. This method greatly simplifies displaying tourist spots and attractions on-site without requiring guests to travel.

Using powerful computers, such virtual simulations can show any person the site in an immersive setting, making them feel as though they are in that place [12].

Several studies on virtual experiences have been linked to a variety of outcomes. These include attitude responses toward experience, general behavioural intentions, and use intentions. Table 1 depicted below reflects that some of the researchers agreed to employ VR as it revealed positive outcomes for the correspondence.

Table 1. Positive outcome towards VR

Authors	Outcome
Tussyadiah <i>et al.</i> [13] Lo & Cheng [14] Rejón-Guardia <i>et al.</i> [15] Leung <i>et al.</i> [16]	Attitude responses toward experience
Huang <i>et al.</i> [17] Huang <i>et al.</i> [18] Lee <i>et al.</i> [19]	General behavioural intentions
Kim & Hall [20]	Continue use

2.2. Gamification

The opportunities offered by the gamification of education are gaining acceptance at every education level. The softening has been accomplished by the widespread adoption of gaming by individuals of various ages and backgrounds. When applied to education, gaming may enhance the engagement and motivation of learning materials [21], [22]. Similar approaches employed in these instances are being employed in virtual classrooms [23].

Several studies have been found to several of outcomes related to penetration of gamification into educational platform. Gamification of education increases student involvement in the classroom, particularly if the game components utilized in gamification have well defined objectives and incentives. On top of that, it has been seen in higher education that when a topic is gamified, student participation and engagement grow tremendously, and as a result, their academic performance increases. Additionally, in scientific disciplines, gamification has also been proved effective, leading to increased student motivation and learning. While in Science, Technology, Engineering, Art, and Math (STEM) abilities, gamification tends to be a useful method for teaching environmental responsibility to young kids. Table 2 reveals the attitude of the correspondents towards gamification in their learning style.

Table 2. Positive outcome towards gamification

Authors	Outcome
Beemer <i>et al.</i> [24] Fernandez-Rio <i>et al.</i> [25] Castañeda-Vázquez <i>et al.</i> [26]	Academic performance improves
Tsai, Lin and Liu [27] Diez, Bañeres & Serra [28] Garcia-Cabot <i>et al.</i> [29] Kyewski & Krämer [30]	Motivation
Nurmi <i>et al.</i> [31] Sipone <i>et al.</i> [32] Gatti, Ulrich & Seele [33] Campillo-Ferrer, Miralles-Martínez & Sánchez-Ibáñez [34] Mahmud, Husnin & Tuan Soh [35]	Positive, empathy of building young generation character

2.3. Challenges and Benefits of VR

VR is a kind of hazard. Due to the fact that VR makes it feasible to replicate surroundings exactly, the students may no longer choose to be in real situation after seeing it digitally. Obviously, the genuine experience cannot be compared to the virtual one. In VR, the students are attached to a certain scenario to handle the situation. These scenarios may differ in real-time. Consequently, they may have lack of natural interaction [36].

A further obstacle would be the negative influence on the job sectors and revenue. The whole supply chain would be impacted, with dire repercussions for the global economy as a whole. This would include the hospitality industry as well as the country's economy. Obviously, this has an effect on the hospitality industry business [37]. It is unknown how the technology may develop over the next several years, posing an additional difficulty. Sight and hearing are highly developed, but the other three senses, smell, taste, and touch, are not at all included in the technology. They are crucial for enhancing the situation's realism and creating the sensation of being in the real place. In addition, there is a lack of collaboration between the students and the customer, who are frequently the essence of the situation. There is no opportunity to remember the experience [38].

On the other side, there are several advantages to VR technology. VR might be an effective marketing tool for the hospitality industry. This can let the students imagine their future situation before a real working environment, allowing for any required revisions. Another advantage is that it provides an alternative to the current situation and may be regarded an environmentally friendly. In addition, the problem of student internship placement in locations may be avoided through the use of VR [37]. Due to the fact that one simply has to purchase VR equipment, it is also less expensive than the actual situation, as no hassle is required. There is no need to

spend time at multiple institutions, such as hotels, or offices, to arrange a document, and one is immediately at the situation without incurring any additional costs. In addition, it is a safe way if the Coronavirus pandemic is taken into account, as there is no need to leave the area and there are no limits or laws to follow. In addition, it allows those who are unable to experience the same things as everyone else. For example, people with disabilities, individuals, and elderly people with restricted travel options. This would make feasible something that would have been impossible otherwise.

2.4. Challenges and Benefits of Gamification

Gamification provides a variety of solutions for addressing a variety of applications with the potential for enhanced accessibility [39]. Individuals or teams can play this game to measure their knowledge and cooperation abilities. As the gamification aspect appeals to the learners' competitive inclination, it may be utilised to "test" the team's collaboration abilities. A random team-allocation may encourage the development of collaborative abilities among residents and fellows, however a "blind" subject allocation (i.e., just seconds before the start of the game) may inhibit strategic learning of the tested content. While some statistics exist to guide the best design of these game-based learning platforms, as noted before, there is a significant knowledge gap about the ideal method in neurology education, whether at the undergraduate or graduate level.

In flipped classroom method, core concepts may be easier to assess using a gamification strategy [40], [41]. An educational alignment between the learning goals and the games must be developed in advance [42]. This is true for both knowledge and skill acquisition. Sharing this logic with students might enhance their educational experience. As seen by the aforementioned uses, technology is not a mandatory need; nonetheless, it may be employed if permitted by the resources available in a particular instructional situation.

Several of characteristics are shared by active learning strategies, including the flipped classroom paradigm [43]. Game-based education can help the design and use of systems that enable the delivery of instructional information in time-restricted educational contexts and/or be linked with tactics that minimise training expenses. On the part of the learners, noncompliance with expected obligations and greater preparation time may pose possible obstacles. While the gamification component is intended to engage students, its adaptability and learner-centered nature may reduce the already limited amount of free time residents and fellows have.

The potential negative repercussions of wasted personal time may contribute to medical burnout. Ways to mitigate these effects, whether through innovative design to minimize time demands, rewards for completion that "reimburse" time, or curricular designs that incorporate time for completing learning assignments into the workday, must be sought and, ultimately, their efficacy must be investigated. In addition, course directors, programme directors, and educational working groups must identify content that may be more suited for game-based strategies, as well as scenarios where traditional models may be more fit, mostly due to external constraints.

3. Methodology

VR is commonly recognized as a very promising alternative for industrial training, as it permits the simulation of hands-on tasks in a safe, regulated environment. This research utilizes the characteristics highlighted in this description of virtual reality. At the outset of the project, a significant focus is on developing the most realistic simulation environment possible.

3.1. VR Development

The continuous operations to create a methodology and processes related with the use of virtual reality in the processes of training students' soft skills and the establishment of a methodology for teaching students' communication skills using virtual reality tools occur into 5 phases.

Phase 1 - Problem Identification

In this phase, determining the purpose of the virtual reality application is the most crucial step and should be performed first. Hence, the client and the developer collaboration. Precisely, the implementation of this phase should be carried out with the utmost care. Every consideration must be taken into account, as it serves as the foundation for subsequent work. The developer must critically understand the conceptual framework underlying the virtual reality.

Phase 2 - Objective and Solution

The subsequent stage is to draught the scenario. The client of the virtual reality project specifies the virtual world's narrative, tasks, and surroundings. Additionally, the operational cost related to hardware is included in this phase. The client must know the hardware will be utilised or must specify limitations depending on the hardware that is available. Consequently, defining the virtual environment differs significantly based on whether it is meant for children, adults, or for students.

Phase 3 - Design and Development

This phase involves designing, modelling, testing and programming stage. Normally, this phase initiate collaboration to generate blueprints, schematics, and specifications for their construction project.

Phase 4 - Demonstration

Students are introduced to the virtual environment and training settings within the virtual training itself. As an illustration of a particular circumstance, we will use the issue of guest accommodations at the reception at the time of certain epidemiological measurements in relation to the COVID-19 pandemic. A technique for training in a virtual Front Desk covers the stages of training and addresses significant aspects of the development of communication skills in an immersive environment among the target audience.

Phase 5 - Evaluation Phase

After completion, the project is yet to be closed. The developers should be able to monitor the virtual environment and collect data for further troubleshooting. A completed project provides a plethora of knowledge. Therefore, a collaboration is scheduled between the developers and the consumers to discuss the project's outcome.

The methodology will aid in the formulation of research challenges and research areas. This is depicted in Figure 1 as study framework. The method in which these skills may be given via suitable training, awarding credit earned through experience, and utilizing technology.

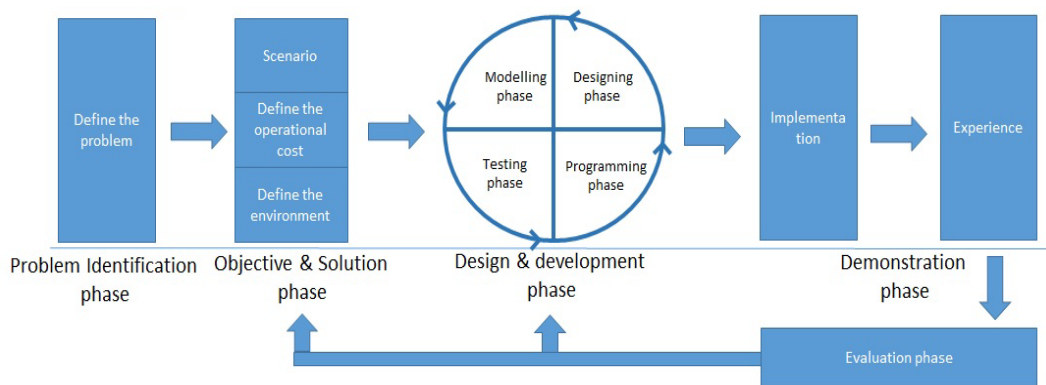


Figure 1. Methodology used for VR and gamification of Front Desk Department

3.2. VR Integrating Business

For adopting and integrating VR in business, seven steps are required as illustrated in Figure 2. These steps are detailed below.

1) VR Strategy for the Brand

The term VR refers to an environment that has been created by a computer and features sights and objects that give the impression that they are genuine. This gives the user the impression that they are completely immersed in their surroundings.

	Virtual Reality Strategy for the Brand
	Experience Design Requirements Analysis & Storyboarding
	3D Asset Creation
	Virtual Reality Development
	Testing & Deployment
	End-User Demonstration & Training
	Support & Enhancements

Figure 2. Virtual reality software development steps

2) Experience Design Requirements Analysis & Storyboarding

A storyboard in VR serves various purposes. These include the initial ideation and concept, sharing within the team, and pitching a concept to stakeholders or clients.

At the first ideation and concept stage, the developer comes up with a short idea based on the scene being worked on. Following that, each scene and main storyboard panel are detailed from various angles. Finally, a detailed storyboard complete with transitions, effects, and audio and visual cue interactions will be presented to the main stakeholders.

3) 3D Asset Creation

A digital asset is any digital material that contributes in some way to the value of the business. These assets should ideally be grouped in a way that makes them easy to distribute and easy to access quickly.

4) VR Development

VR required skills applicable to a variety of industries, including cinema, media, television, entertainment, and video games. Hence, utilised in a variety of corporate, educational, medical, and other settings.

5) Testing and Deployment

One of the important performance metrics in VR testing and deployment is usability. Usability is to ensure the quality of the interfaces and ease-of-use during the design process. Significantly, VR applications have been able to be established in the global market and meet our needs in daily lives.

6) End-user Demonstration and Training

The VR application, which is run in a 3D environment, allows users to explore and interact with a virtual world that closely resembles reality as perceived by their senses. At this stage, the trainer may be able to gain an improvement of 35% to 45% in confidence in action after the training.

7) Support and Enhancements

Finally, the support and enhancements create immersive experiences that the virtual world is the real world and the sensation of "being" in the virtual environment.

4. The Integration Between Virtual Reality and Gamification in Hospitality Education at Front Desk

Virtual reality enriches the training by giving the trainees the opportunity to practice critical job skills in a realistic environment. On the other hand, the main benefit of gamification in training is to achieve trainees' engagement. Hence, the integration between virtual reality and gamification enables Trainee's engagement in practicing critical job skills in realistic environment. This integration between virtual reality and gamification is shown in Figure 3.

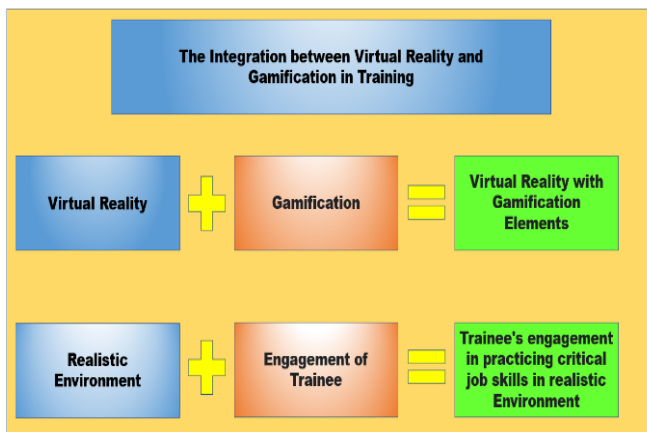


Figure 3. VR and gamification of front desk flow chart

A methodology for designing and modelling immersive game contents system for virtual reality technology had been proposed [44]. In this research, we adopt this methodology to develop a model for the integration between VR and gamification in hospitality education at front desk. The developed model is shown in Figure 4.

As the Figure 4, the model consists of:

- Trainee: the person who used the designed training system.
- VR devices: these devices enable the trainee to perceive the environment and interact with the model. These devices include the head mounted display (HMD) and the gesture. These devices enable the trainee to send the data input to the game manager and the intellectual environment and to receive both the game playing information and targeted information.

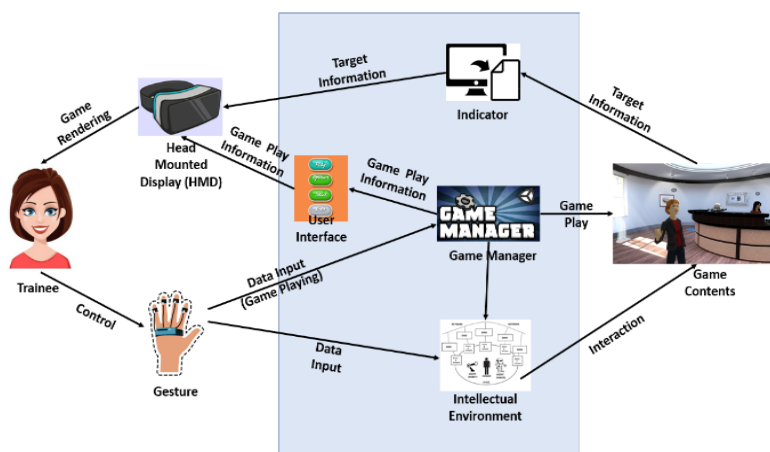


Figure 1. VR and gamification of front desk flow chart

- User Interface: allow trainee to perform the menu's selection, and to interact with virtual game objects, environments, or information on the virtual space.
- Intellectual Environment: This component aims to create a safe and enjoyable virtual environment. Hence, the learning process becomes better and faster.
- The Game Manager: This component oversees and controls all the major activities in the game.

For example, it manages scenes' loading or unloading.

- Indicator: aggregate the targeted information received from game contents and pass it to the HMD where trainee can see it.
- Game contents: it includes the virtual reality game contents including scenarios, storyboards rules, and options.

5. Conclusion

In conclusion, attitudes and behavioural intentions are introduced as the primary outcomes. VR experience in student contexts may influence the real-time image, perceived value, and many aspects of attitude loyalty. Confidence and skill are among the behavioural intentions impacted by virtual experience. Individual variables, such as age, gender, sociodemographic, personality traits, and past experience, modify the impact of quality factors, technological acceptance factors, information-related factors, and affective aspects on virtual experience, attitudes, and behavioural intentions.

In contrast to conventional and previously utilised staff training methods, virtual reality technology provides novel opportunities. These include the ability to realistically depict a variety of events, to replay situations and reactions to them, and, finally, to enter a scene from virtually any location. On the other hand, the inclusion of virtual reality training will necessitate the revision and modification of a front-desk operation. Whether it is established recruitment, training, and performance evaluation methods. In future, there will be the possibility to comprehend the benefits of new technologies, to approach them, and, most importantly, to enable the practical application of new features and procedures.

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