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Technology-Based Training: The Future of Using Virtual Reality Training in the Egyptian Hotel Sector

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Keywords

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Abstract

Virtual reality (VR) training in hospitality establishments offers a revolutionary approach to employee training and skill development. Traditional immersive technology creates realistic, interactive simulations that can enhance the training experience in a way that traditional methods cannot. This paper aims to explore the prospects related to the adoption of virtual reality training (VRT) in the Egyptian hotel sector. To complete this research primary data were collected through an exploratory study. The exploratory study was conducted using the Delphi technique which includes three rounds with (19) academic experts and hospitality industry experts. The results showed that most hospitality establishments in Egypt do not use virtual reality technology in training. The results also indicated that one of the prospects for training with virtual reality technology is that it will support multi-user interactions remotely, and technologies such as artificial intelligence (AI) and augmented reality (AR). The research recommends that the Egyptian hotel sector use virtual reality technology in training to improve staff performance, skills, and productivity.

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1. Introduction

Information and communication technology (ICT) significantly transformed the familiar way of life. Advancements and novel techniques in processing have facilitated the development of new methodologies and protocols for carrying out diverse tasks. It improved productivity and revealed new prospects (Dávideková *et al.*, 2017). Emerging Human Resources (HR) technologies rapidly introduce inventive features to the HR field. HR should actively participate in digital endeavors, such as virtual reality (VR), to acquire digital skills and facilitate change in the present digital age (Khandelwal and Upadhyay, 2021). Therefore, definition that Ke *et al.* (2019) VR is a simulated world generated by software and presented to the user in a way that allows the user to immerse themselves and fully perceive it as a natural environment.

According to Rami and Al-Tameemi (2021), VR is the latest and most crucial computer technology. It is a clever attempt to merge imagination with reality and the convergence of technology with the true-to-life world by creating a three-dimensional environment, that makes the user immersed in interacting and then moving, not just external observation and viewing and all achieved using special electronic equipment (Rami and Al-Tameemi, 2021). Therefore, Rolando *et al.*, (2018) suggested that each organization should seek virtual reality training (VRT) based on its specific needs and select which personnel within the organization will be trained. The VRT can be customized for different personnel with unique needs (e.g., Occupational safety and health team).

Within the hospitality industry, VR has become particularly important because of the amount of information that average customer needs before they book a hotel room. Instead of reading descriptions, which may or may not be trustworthy, it offers customers the chance to experience things for themselves. More specifically, the full potential of VR within the hotel industry has only recently been recognized (Revfine, 2022). Therefore, some hoteliers have implemented technology to entertain guests during their stay. Meanwhile, this technology is emerging as a staff training tool, as some brand companies use it to onboard new team members, as well as continuing education for experienced staff, all the way up to managers (Hoisington, 2019).

According to Dailly (2019), In the hotel industry, up to (70%) of the operators believe that virtual reality training will become mainstream in under (5) years. This shows a receptive posture that is likely to drive high adoption rates in the industry. Moreover, VR staff training in the hospitality or customer care sector also helps in refining problem resolution in staff through iterative simulations mimicking real-life customer interactions (Dailly, 2019). For example, BusinessOculus, 2022 stated that SweetRush developed VR scenarios for Hilton to help train hotel team members to better handle challenging interactions with guests. Wearing Oculus headsets, team members take on the role of guests in virtual scenarios that include interactions at a front desk, a meeting room setup, room service, breakfast service, and departure to see how it feels when interactions are poorly managed, resolved correctly, or handled in a way that goes beyond expectations.

Blaire Bhojwani, the Senior Director of Learning Innovation at Hilton, asserts that research demonstrates a positive correlation between the proximity of a learner to the actual work environment and their level of learning and retention. VR precisely accomplishes that. The future of learning is here. Hilton expects that the VR experience will reduce the duration of class training from four hours to just (20) minutes. In addition, despite initial hesitation from some individuals, (75%) of participants reported an enhancement in their problem resolution and customer service

abilities after using the VR headset. Furthermore, during the trial launch, (94%) of participants stated that it increased their team members' sense of empathy. Furthermore, (87%) of the individuals modified their behavior after VRT (BusinessOculus, 2022; Kover, 2020).

According to Maeda *et al.* (2018), VR techniques can improve learning outcomes by providing learners with a more comprehensive grasp of hands-on operation and practice abilities. Furthermore, VR training enables personnel to gain expertise and tackle intricate assignments by fully engaging them in a secure and regulated virtual environment (Radhakrishnan *et al.*, 2021). Furthermore, VR enhances the acquisition of knowledge and skills by enhancing situated learning and spatial comprehension (Thomsen *et al.*, 2019; Lee *et al.*, 2022).

Drigas *et al.* (2022) found that the utilization of VR enhances the process of acquiring and developing abilities. Previous research has demonstrated that virtual reality training environments benefit individuals, regardless of disabilities, in enhancing various skills. These skills encompass social and emotional abilities, metacognitive capabilities, vocational proficiencies, and 21st-century competencies such as problem solving, abilities, communication, critical thinking, digital literacy, and soft skills.

Wei (2019) confirmed that VRT in the hospitality industry is relatively recent. Given the fast development of technology advancements, research to predict future VR technology advancements is in dire need of providing more proactive guidance that would lead both scholars and practitioners rather than reactive suggestions in response to technology development.

The results of the study by Yung and Khoo-Lattimo (2017); Wei, (2019) indicated that the VR literature over the past two decades has been dominated by investigations of visitor experience management and marketing in cultural heritage tourism sites such as museums and palaces, tourism destinations, shopping centers, and other tourism attractions such as art galleries and theme parks. This finding has revealed an emphasis that the extant VR literature has placed on tourism establishments, thus, calling for more studies in hospitality establishments such as hotels, restaurants, resorts, and event settings, especially in educational and training contexts (Beck *et al.*, 2019). Therefore, Moro *et al.*, (2019) concluded that VR is still an emergent technology that requires further research to assess ongoing adoption in several hospitality establishments, such as hotels and restaurants.

Therefore, this research paper aims to explore the prospects related to the adoption of virtual reality training in the Egyptian hotel sector.

2. Literature Review

Numerous emerging technologies incorporate functionalities that facilitate effective learning and applying acquired skills. When well built, these technologies have the potential to establish a favorable learning environment by engaging various senses and allowing individuals to regulate their progress, receive feedback and encouragement, and access expert knowledge when required. Technology-driven training methods include online e-learning, web-based computer-based training, computer-based training without internet access, remote learning, adaptive training, simulations and games, augmented reality, VR, mobile learning, social media integration (noe, 2020).

VR offers opportunities for innovative, engaging, and cost-effective interventions that can help with onboarding, learning and development, and coordination between the team. The increasing use of VR is poised to revolutionize

training and development. Therefore, VR tools can facilitate the design and delivery of programs for developing human resources at various stages of a career, from onboarding to retirement (Khandelwal and Upadhyay, 2021). According to Naro and Calabrò, (2021) there is no specific definition of VR. The commonly accepted definition of VR is the use of a computer-generated 3D environment with which the user can navigate and interact, resulting in real-time simulation of one or more of the five senses of the user (Gutierrez, et al., 2008; Guttentag, 2010).

2.1. Use of Virtual Reality Training in the Hotel Sector

VR offers extensive training opportunities for engineers across various industries, including automotive and space. During space training, NASA uses immersive virtual reality simulations to familiarize astronauts with zero gravity conditions and instruct them on spacewalking techniques before their journeys. Additionally, immersive automotive VR automotive applications encompass driving simulations, automotive design, and virtual automotive ergonomics. Furthermore, VR offers enhanced health and safety training methods. These include evaluating the ergonomics of workplace arrangements, creating prototypes of control interfaces, and simulating hazardous environments such as nuclear plant maintenance. (Hernández-Chávez *et al.*, 2021; Easa, 2021).

Wei (2012) states that virtual reality has been progressively implemented in the hotel sector. Hwang et al. (2012) initiated using VR technology to examine the influence of crowding on consumer behavior during the waiting period in a VR restaurant. Kim et al., (2016) employed VR in a controlled environment to examine the impact of multistage waiting on consumers' emotions, utilizing a simulated restaurant. Furthermore, Yoon et al. (2021) examined the influence of VR applications on hotel reservations. This study examined the factors influencing hotel customers' inclination to utilize VR. It investigated how this tendency affects your willingness to pay a higher price for a hotel room when VR is accessible during selection and booking. Virtual reality technology is often used to educate hospitality workers (Wong, 2021). For example, the semi-immersive VR system has practical uses, including instruction in the culinary domain (Alqahtani et al., 2017).

Training methods relying on media, such as lectures and documents, may result in higher levels of task ambiguity for hospitality business employees, as they frequently operate in a group setting. Thus, a method to address these problems is to employ more advanced media platforms, such as VR, to provide hospitality training. Therefore, the VR model may convey information using the user's inherent spatial perception capabilities. At the same time, VR allows for an authentic and favorable setting that promotes synchronous work tasks (Lui and Goel, 2022).

2.2. Prospects of Virtual Reality Training

VR technology continues to provide advantages in diverse training domains. When reviewing the present uses, it is evident that VR can be regarded as a valuable instrument for teaching and training. VR can serve as a substitute in training activities and give answers to difficulties related to insufficient equipment or facilities in the training environment. Consequently, VR exhibits exceptional and encouraging potential in education, tourism, entertainment, and training (Akinola et al., 2020).

Welch (2009) asserts that the progress of VR technology is intricately linked to the continuous development of additional systems to enhance human experiences. Researchers are currently studying computer interfaces. These interfaces aim to facilitate access to embedded information that is connected to the physical world

surrounding us. Furthermore, the data and its corresponding databases will be organized based on geographical position and chronological order, allowing users to save and access information from the past, present, and future in the context of physical proximity and visual focus. Messinger et al. (2009) stated that visual education in the training sector can encompass several forms of contact, such as synchronous face-to-face communication, group interaction, voice communication, the study of three-dimensional models, and the presentation of visual information using PowerPoint.

Wie (2019) study examined virtual reality literature from 2000 to 2018 and found that most researchers used established VR tools, including mobile/smartphone-based apps (Kourouthanassis et al., 2015), augmented smart glasses (Rauschnabel et al., 2016), wearable Google Glass/cardboard VR viewer (tom Dieck et al., 2016), and wearable VR head-mounted displays (Marasco et al., 2018). Other studies have a more progressive approach focusing on developing new VR technologies based on consumer expectations (Olsson et al., 2013) or testing newly created VR technologies for specific tourist destinations and attractions (Tussyadiah et al., 2018).

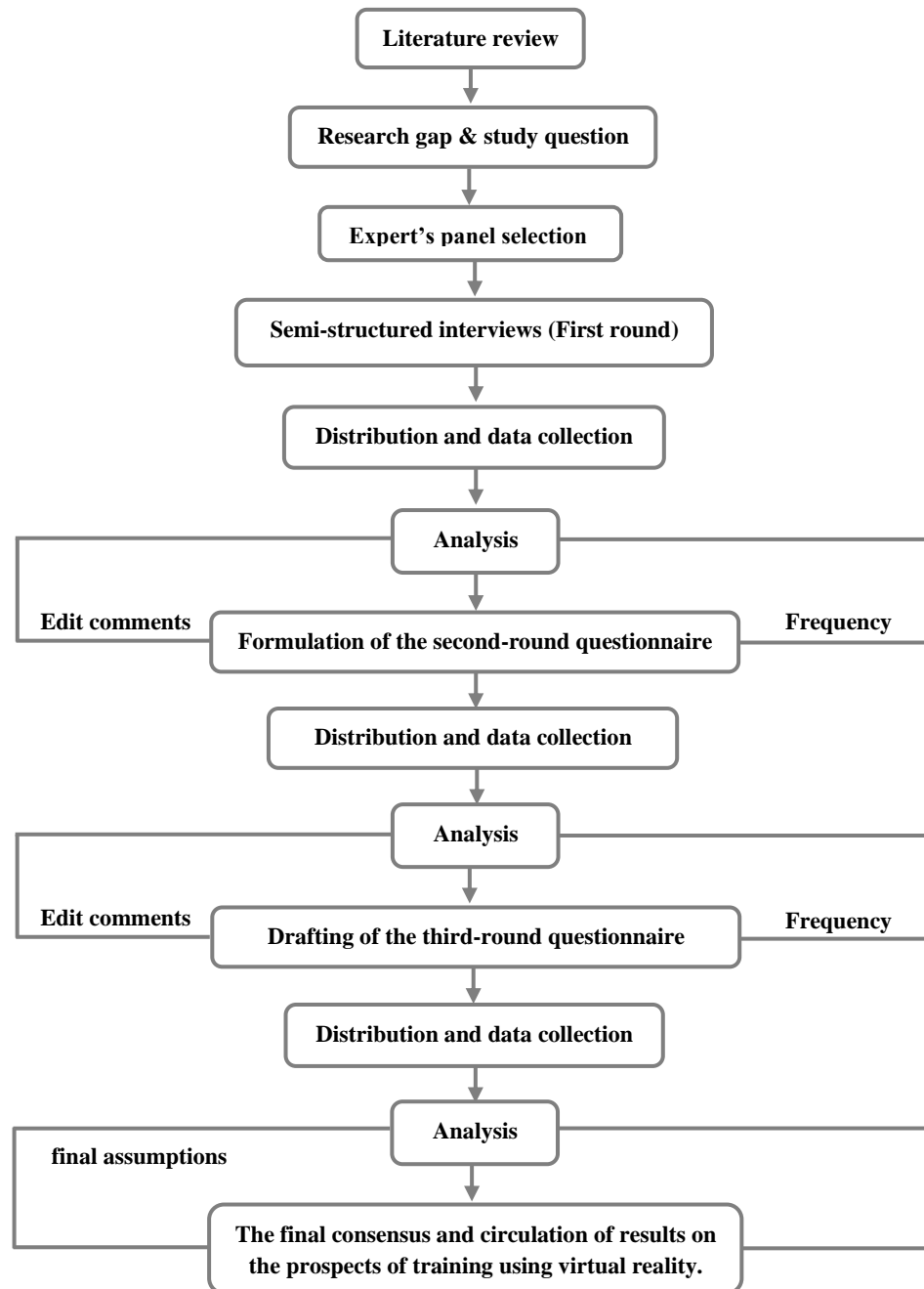
Azuma, (1997) suggests that a seamless fusion of virtual and real-world components can be achieved by integrating VR with AR and mixed reality. Amalgamation is commonly denoted as extended reality. Oviatt (2007) stated that VR systems frequently include gesture detection technologies to facilitate user interaction with virtual worlds through organic bodily gestures. Moreover, VR facilitates the creation of shared environments where individuals located in different geographic locations may engage in mutual interaction with both each other and 3D digital content. This promotes the development of cooperation and effective communication (Dede, 2009).

According to Slater and Sanchez-Vives (2016), artificial intelligence (AI) algorithms have the potential to improve VR experiences by offering intelligent and adaptable content that is tailored to user behavior and preferences. Furthermore, integrating biometric data, such as heart rate and facial expressions, with virtual reality can augment users' emotional and physiological responses (Cowie, 2019). Additionally, VR applications can accommodate numerous users who can participate in a shared space and interact with remotely located tracked objects (Schild *et al.*, 2018).

3. Methodology

The Delphi technique was used to explore the prospects of training using virtual reality from the point of view of academics and the hotel sector experts.

The Delphi technique is known as the “expert judgment approach.”. This method is based on the opinion of a group of experts in the field of the study, so indirect discussion takes place, meaning that each member of the experts’ panel shows an excellent distance from the influence of the group's opinion (Delbecq *et al.*, 1975). Furthermore, the cardinal features of the Delphi method are the use of several questionnaire rounds, feedback on responses, the opportunity for participants to modify their responses, and the anonymity of responses (McKenna, 1994). When the researcher feeds back results from the previous rounds, there tends to be convergence to a consensus (Jairath and Weinstein, 1994).



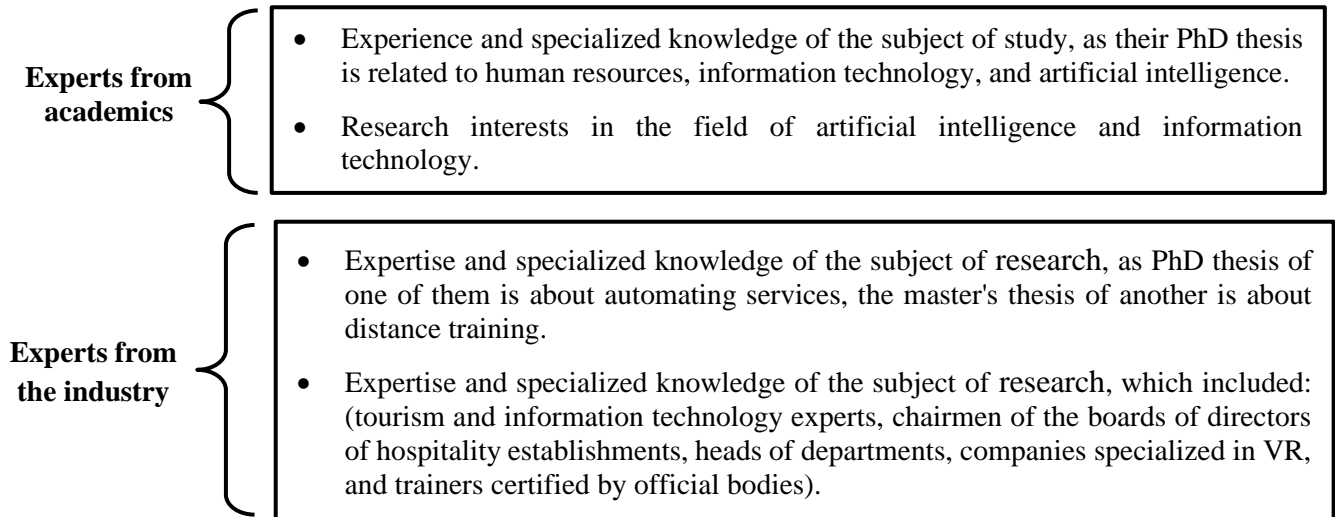
(Fig. 1) Delphi Technique rounds, source: modified from (Abdelhakim, et al., 2020 (Modify)).

Nworie, (2011) reported that selecting experts to participate in a Delphi study is a critical component of Delphi research since it is their expert opinions upon which the output of the Delphi is based. They should be experienced professionals to provide an informed view or expert opinion on issues in their given field.

Concerning the appropriate number of experts to involve in this Delphi study, Delbecq et al., (1975) suggested that ten to fifteen respondents could be sufficient if the background of the Delphi subjects is homogeneous. Moreover, Skulmoski et al., (2007) reported that triple, double, and single rounds Delphi had been developed with a variety of sample sizes ranging from four to (71) participants, which assumes that

there is no standard form of Delphi. However, the needs of fitting the research question and its circumstances usually control the process.

In this research, the panel comprised (19) academic experts who have dissertations and scientific papers published in the field of study or areas of modern technology in the hospitality industry, and expert practitioners. Who has a sufficient level of knowledge about the research subject. Figure (2) shows the criteria for selecting the expert panel to participate. Moreover, table (1) also shows the specializations and functions of the expert team.



(Fig. 1) the participant's relationship with the subject of the research

Table (1): Specialization and Position of the group of experts

Position		No.	Specialization							
			Tourism studies	Hotel Management	AI	IT	HR	F&B	OSH	Higher Management
Academic	Professor	5	1	3	1	-	-	-	-	-
	Assistant Professor	2	-	2	-					
	Lecturer	1	-	1	-					
Experts from the industry		11	-	-	1	2	2	2	1	3
Total		19	1	6	2	2	2	2	1	3

In Delphi studies, the number of rounds depends on the purpose of the research. Delbecq et al. (1975) suggested that, if a group consensus is desirable and the sample is heterogeneous, three or more rounds may be required. However, if the goal is to understand nuances (a goal in qualitative research) and the sample is homogeneous, fewer than three rounds may be sufficient to reach a consensus.

Although this research paper relied on a homogeneous group of academics and hotel industry experts, it reached a consensus after three rounds.

In the first round, the experts were interviewed face-to-face and via the Internet (Zoom meetings) Their opinions on the research topic were obtained through a semi structured interview. In the second round, the researcher designed a questionnaire form based on the review of literature related to the research subject (see Table 2). The responses were analyzed, filtered and used to design a second

questionnaire form distributed to the same group, and then the answers to the second round questionnaire were also analyzed, filtered and used to design the third round questionnaire form. The responses to the third round questionnaire reached a consensus, which means that all respondents agreed on all the opinions about the prospects of training using virtual reality in the hotel sector.

Table (2): Statement of the second-round questionnaire from review of literature

Dimensions	Reference parts		Statements	
	Paragraph	Authors	Paragraph	Authors
Prospects	VR can be combined with AR and MR to create a seamless blend of virtual and real-world elements.	Azuma, 1997	VR will be combined with AR to create mixed-reality training environments that enhance training by having virtual elements in the real world	Azuma, 1997
	VR systems often incorporate gesture recognition technologies, enabling users to interact with virtual environments using natural body movements.	Oviatt, 2007	The development of wearable devices that provide tactile sensations will enable trainees to feel the texture, temperature, and physical interactions, as well as devices that track the trainee's entire body movements enabling more accurate assessments and observations	Oviatt, 2007
	AI algorithms can enhance VR experiences by providing intelligent and adaptive content based on user behavior and preferences.	Dede, 2009	Artificial intelligence (AI) will be integrated into VRT to create dynamic and adaptive simulations,	Dede, 2009
	Biometric data like heart rate and facial expressions can be integrated with VR to enhance users' emotional and physiological responses.	Cowie, 2019	VRT can include neurofeedback technology to monitor brain activity and cognitive responses in trainees in virtual environments	Cowie, 2019
	VR applications can support multiple users joining a shared volume and remotely placing tracked volumes.	Schild <i>et al.</i> , 2018	Future VRT environments will support remote multi-user interactions, allowing trainees to collaborate with colleagues or peers in virtual environments from different geographic locations	Wie, 2019

According to (Bosereewong, 1994), in the Delphi technique, consensus among panel members could be achieved if the coefficient of variation (CV) was below 40 percent. Therefore, this research relied on a 40 percent coefficient of variation to determine the level of consensus among respondents.

4. Results

Table (3) provides descriptive statistics to know the opinions of the group of experts about the prospects and potential value of using virtual reality technology in training in the hotel sector in the future.

Table (3): The Prospects of training using virtual reality technology

No.	Prospects	Mean	S.D	C.V*
1	Future VRT environments will support remote multi-user interactions, allowing trainees to collaborate with colleagues or peers in virtual environments from different geographic locations	4.53	.510	11.32
2	VRT systems will become more sophisticated in adapting to the levels and skills of trainees, with improvements in graphics and sensory feedback quality to become more immersive and effective	4.42	.500	11.47
3	Artificial intelligence (AI) will be integrated into VRT to create dynamic and adaptive simulations, as well as integrating VR with augmented reality (AR) to create mixed-reality training environments that enhance training through the presence of virtual elements in the real world	4.42	.500	11.47
4	VRT can be turned into a game to make it more engaging and motivating for trainees	4.42	.760	17.39
5	The development of wearable devices that provide tactile sensations will enable trainees to feel the texture, temperature, and physical interactions, as well as devices that track the trainee's entire body movements, enabling more accurate assessments and observations	4.37	.490	11.35
6	The future of VRT holds enormous potential for creating highly effective, engaging, and adaptable learning experiences, as well as reshaping how individuals acquire new skills and knowledge	4.37	.760	17.41
7	VR training will become more accessible, affordable, and scalable, as well as the ability to simulate complex real-world environments and scenarios	4.37	.760	17.41
8	VRT will become increasingly specialized in various departments and will support continuous learning and improvement of skills throughout the career of individuals	4.32	.820	18.98
9	The presence of a virtual library covering a wide range of training programs makes it easier for establishments to find VRT that meets their specific needs	4.26	.650	15.32
10	VRT can include neurofeedback technology to monitor brain activity and cognitive responses in trainees in virtual environments	4.21	.910	21.80

*The coefficient of variation (CV) is estimated using the percentage of the standard deviation to the mean.

This result indicates that the expert group agrees on the prospects of VRT. The highest average was awarded to question4: Future VRT environments will support remote multi user interactions (Mean= 4.53 and CV= 11.32 < 40), which matches the opinion of Wie (2019), who said that future VRT environments will support remote multi user interactions, allowing trainees to collaborate with colleagues or peers in virtual environments from different geographic locations. Followed by question1, and 3: the VRT systems will become more sophisticated in adapting to the levels and skills of the trainees, and artificial intelligence and augmented reality will be integrated with VR (Mean= 4.42 and CV= 11.47 < 40), which is consistent occurs with Dede (2009) and Azuma (1997) who revealed that AI will be integrated into VRT to create dynamic and adaptive simulations. Furthermore, VR will be combined with AR to create mixed-reality training environments that enhance training by having virtual elements in the real world. Followed by question9: VRT can be turned into a game to make it more engaging and motivating for trainees (Mean= 4.42 and CV=

17.39 < 40), This was suggested by the group of experts in the semi-structured interview and agreed upon during the Delphi technique rounds. Followed by question2: Development of wearable devices that provide tactile sensations (Mean= 4.37 and CV= 11.35 < 40), The study agreed with Oviatt (2007) as it assured that the development of wearable devices that provide tactile sensations will allow trainees to feel texture, temperature, and physical interactions, as well as devices that track the trainee's entire body movements, allowing more accurate assessments and observations. Followed by question7, and 10: The future of VRT holds enormous potential for creating highly effective, engaging, and VRT will become more accessible, affordable, and scalable (Mean= 4.37 and CV= 17.41 < 40), followed by question6: VRT will become increasingly specialized in various departments (Mean= 4.32 and CV= 18.98 < 40), This was suggested by the group of experts in the semi-structured interview and agreed upon during the Delphi technique rounds. Followed by question8: The presence of a virtual library covering a wide range of training programs (Mean= 4.26 and CV= 15.32 < 40), This was suggested by the group of experts in the semi-structured interview and agreed upon during the Delphi technique rounds. Followed by question5: VRT can include neurofeedback technology (Mean= 4.21 and CV= 21.80 < 40). This also agrees with (Cowie, 2019) who argued that VRT can include neurofeedback technology to monitor brain activity and cognitive responses in trainees in virtual environments.

Based on the above, the expert team believes that the prospects for VRT in the Egyptian hotel sector will be as follows, in descending order:

1. Future VRT environments will support remote multi-user interactions.
2. VRT systems will become more developed in adapting to the levels and skills of trainees.
3. AI and AR will be integrated with VR.
4. VRT can be turned into a game to make it more engaging and motivating for trainees.
5. Development of wearable devices that provide tactile sensations.
6. The future of VRT holds enormous potential for creating highly effective, engaging.
7. VRT will become more accessible, affordable, and scalable.
8. VRT will become increasingly specialized in various departments.
9. The presence of a virtual library covering a wide range of training programs.
10. VRT can include neurofeedback technology.

5. Implication

The researcher suggests a set of recommendations for the Egyptian hotel sector based on the study results, including:

1. The study recommends that the Egyptian hotel sector use VR technology in training to improve staff performance, skills, and productivity.
2. The senior management of hospitality organizations must realize that the cost of implementing VRT can save money eventually.
3. The Egyptian hotel sector should allocate funds to develop its digital infrastructure, to support the modern training technologies, and realize that doing so is not a waste of money because these technologies have become necessary.
4. Senior management in hospitality establishments should also recognize the benefits of applying training using VR technology in improving employee

skills, as it is less costly eventually and takes less time and effort. It also gives a competitive advantage to the organization.

5. Encourage staff participation by offering incentives, rewards, or certificates of appreciation for completing VRT programs.
6. Enhancing ICT methods is essential in the Egyptian hotel sector to raise staff efficiency and improve staff skills, thus increasing productivity and job satisfaction.

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الملخص العربي

التدريب القائم على التكنولوجيا: مستقبل التدريب باستخدام تقنية الواقع الافتراضي في قطاع الفنادق المصرية

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يقدم التدريب باستخدام الواقع الافتراضي (VR) في مؤسسات الضيافة نهجًا ثوريًا لتدريب الموظفين وتنمية مهاراتهم، حيث إنه يعمل على إنشاء بيئات افتراضية تحاكي البيئة الحقيقية وتفاعلتها ويعزز عملية التدريب بطريقة لا تستطيع الأساليب التقليدية القيام بها. يهدف البحث إلى استكشاف الآفاق المتعلقة باستخدام التدريب القائم على الواقع الافتراضي (VRT) في قطاع الفنادق المصري. تم استخدام منهج دلفي والذي يتضمن ثلاث جولات باستخدام استبانة مصممة خصيصًا لكل جولة شارك فيها (١٩) خبيرًا أكاديميًا وخبيرًا في صناعة الضيافة. وأظهرت النتائج أن معظم الفنادق في مصر لا تستخدم تكنولوجيا الواقع الافتراضي في التدريب. كما أشارت النتائج إلى أن أحد آفاق التدريب باستخدام تقنية الواقع الافتراضي هو أنه سيدعم التفاعلات متعددة المستخدمين عن بعد، كما سيتم دمج تقنيات مثل الذكاء الاصطناعي (AI) والواقع المعزز (AR) مع تقنية الواقع الافتراضي (VR). ويوصي البحث الفنادق باستخدام تكنولوجيا الواقع الافتراضي في التدريب لتحسين أداء الموظفين ومهاراتهم وإنتاجيتهم.

الكلمات المفتاحية: الواقع الافتراضي، التدريب، الآفاق، قطاع الفنادق.