Exploring the Students' Perceptions to Virtual Reality Environment

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Abstract

Hotel operators around the world, as well as Destination Marketing Organisations have shown interest in possibilities of virtual environments. Modern virtual reality technology offers a wide range of possibilities for hospitality and tourism marketers, enabling the creation of educational and engaging virtual environments, immersive and attractive virtual experiences, and unforeseen multi-media communication. In previous studies, Technology Acceptance Model (TAM) has been successfully used to evaluate how consumers perceive new technology and how it might affect the consumer behaviour. However, considering the intangibility, and the hedonic essence of hospitality and tourism experience, the previous studies have not fully addressed the possibilities of augmented and virtual reality environments within the hospitality and tourism context. This research presents the first step to develop, and test a framework of the tourism consumer behaviour in virtual reality environment.

Key Words *Virtual Reality, Technology Acceptance Model, Hedonic Consumption, Flow*

Theme *Miscellaneous*

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Introduction

Innovations in consumer electronics and changing patterns of consumption will play a major role in in the future of hospitality and tourism industry. Amongst other stimuli, traditional advertising and promotion, web-based services, and also the more informal medias like word-of-mouth will influence the travel decision-making process. Already 20 years ago, Middleton (1994) postulated that for tourism marketing, it is essential to embrace the experiential information in marketing stimuli. Today, tourism operators and Destination Marketing Organizations (DMOs) already have the advantage of expending myriad of media to communicate with potential consumers. Along the more traditional ways of communicating with the consumer, virtual reality environments are also considered to be a powerful way to reach consumers (Cruz-Neira et al., 1992). For example, the present, and relatively low cost Head-Mounted Displays (HMD), the embryonic virtual reality (VR) environments, and polymorphic spaces hold the potential to replace the expensive physical constructions where experiences have been previously created. These new virtual reality appliances, as well as the immersive VR environments,

provide hospitality and tourism operators new approaches to produce educational and engaging performances and to enhance the communication between the service provider and the customer (Bogdanovych et al., 2007). Since the VR technology provides an immersive experience and a virtual simulation of for example the servicescape, Gretzel and Fesenmaier (2003) postulated that this technology should be integrated with sensory experience while developing the communication strategies. Furthermore, Hay (2008) stated that hospitality and tourism companies could use the virtual environments to introduce new products and services to the attention of the consumers while influencing the potential visitor's image of for example a destination.

Recently, travel and tourism companies have begun to explore the virtual reality displays as a collaborative and commercial tool for communicating with travellers. After Starwood Hotels and Resorts utilized the Second Life virtual world to build and experiment a prototype of its Aloft concept hotel, several Hotel operators and DMOs has shown interest in commercialization of these virtual environments. Still, considering that most of the virtual reality technologies are designed for gaming and other commercial fields like design and manufacturing, hospitality and tourism entrepreneurs are not fully aware of the potentials of virtual reality technology (Guttentag 2010).

Amongst others, Jung, Chung & Leue (2015) recently concluded that the Technology Acceptance Model (TAM) is a useful theoretical framework to illuminate how consumers perceive new technology and how it might affect the consumer behaviour in for example augmented reality environment. Trying to reveal the use of technology during the travel and for example in travel planning, the scholars of travel and tourism have applied TAM to understand the use of information technology and mobile devices (Pesonen & Horster, 2012). In conjunction with TAM, several studies have incorporated the hedonic theory to describe the consumer behaviour of entertainment oriented technology (Barnes, 2011). Yet, the applications of these frameworks in the context of tourism in virtual reality environment are limited. Therefore, this research aims to develop an integrated research framework to test the antecedents of an hedonic experience in virtual reality environment.

Literature review

Davis's Technology Acceptance Model (TAM) is the most widely applied model of how users come to accept and use a technology (Venkatesh, 2000). The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. External variables influence perceived usefulness (PU) as well as perceived ease of use (PEU). The former is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, 320) and the latter "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, 320).

In the advent of commercially viable augmented reality services and virtual reality environments, the Technology Acceptance Model has been proved useful in explaining the acceptance of new information technologies and the possibilities that these services provide (Cranmer, Jung, tom Dieck & Miller, 2016). Also, the convenience and ease of use, representing the key elements inducing consumer's assertiveness to use technology like mobile phones or tablets in the trip decision-making process, has been explained with the Technology Acceptance Model.

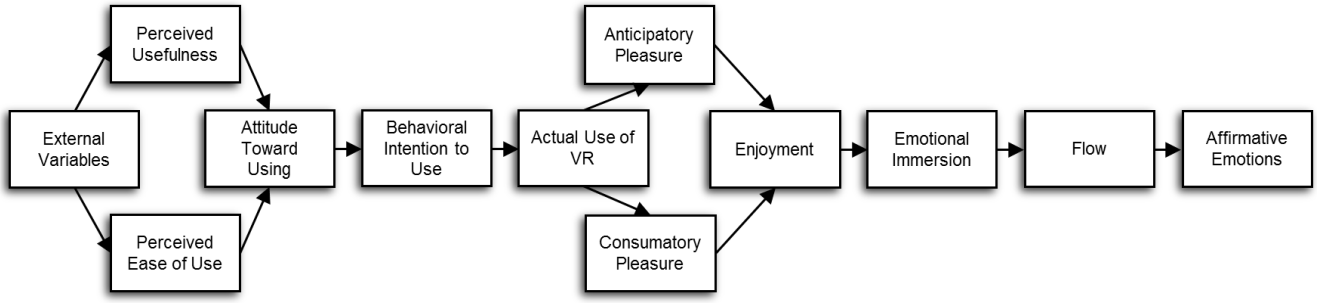
Notwithstanding the popularity of social media, and the profusion of peer reviews and affordable portable devices, the use of the available information that the technology provides for travel planning, there are still many consumer groups that does not take full advantages of these advancements (Ayeh, 2015). Therefore, it is necessary to explore the consumer behaviour in virtual reality environments more thoroughly. Especially, when the TAM model is mostly concerned about the perceived utility value, while the hospitality and tourism industry relies deeply on the perceived pleasure, enjoyment and other hedonic attributes.

Encompassing the early research on motivation and product symbolism (Dichter, 1960), and embracing the current marketing literature, the methodical research of hedonic consumption began in the 1970s. Examining consumption experience based on subjective symbols, product image, consumer emotive response and aesthetic criteria, Hirschman & Holbrook (1982) defined hedonic consumption as an aspects of consumer behaviour that relate to multisensory, fantasy and emotive features of user experience, and stated that while concerned with emotional and imaginative responses to products, the hedonic consumption perspective should enhance the

marketing theories and extend the understanding of consumer behaviour in marketing. Lately, the discussion of hedonic construct has involved concepts of *anticipatory* pleasure, closely linked to motivation and goal-directed behaviour, leading one to have the experience of wanting more, and *consummatory* pleasure, hence the resolution of desire (Dube & Bel, 2001). Furthermore, Nah, Eschenbrenner and DeWester (2010) stated that the hedonic constructs of enjoyment, emotional immersion, affirmative emotions, and the flow experience are significant characteristics for comprehending virtual reality experience. Consequently, Goh and Yoon (2011) established that perceived enjoyment in a hedonic virtual reality world influences the user's experience, and while virtual worlds offer a game-like realistic simulation for members to play and enjoy, the virtual reality environment also reveals the entertainment nature of the technology, thus providing an important motivation for participation (Lau & Lee, 2015). While perceived ease of use and the perceived usefulness have been proved to be associated with the enjoyment of technology usage, perceived enjoyment in the virtual environment may also be used as an antecedent of behavioural intention (Venkatesh, 2000). Barnes (2011) correspondingly indicated that the perceived enjoyment influences the purchase and use intentions. Moreover, in physical environments and service encounters, the relation between customer's positive emotions and overall satisfaction and re-visit intentions has been established. In hospitality, travel and tourism context, the influence of positive emotional states has been proved to influence positively on the likelihood of repurchase, and that a hedonic reaction, to for example travel information, will stimulate positive emotions that contribute to destination choice behaviour (Grappi and Montanari 2011).

Studying the components of imaginative and emotional responses to virtual worlds, Holsapple and Wu (2007) pointed out that the construct of emotional involvement can help researchers understand why an individual wants to interact with a virtual reality world. The construct of emotional involvement may also play an important role in understanding consumers' behavioural intentions in the context of virtual reality worlds. Subsequently, the construct of flow, describing the mental state of operation, in which a person performing an activity is fully immersed in a feeling of energized focus, full involvement, and enjoyment, in the process of the activity (Csikszentmihalyi, 1990) can help researchers understand why an individual wants to interact with a virtual reality world. Positive flow experiences lead to positive affect, better performance, and holistic sensation and to a state of full immersion in an experience. Richard & Chandra (2005) successfully used the construct of flow, hence the complete absorption in what one does, as a theoretical framework for understanding online consumer experience. Moreover, Faiola and Smyslova (2009) suggested that flow must be considered as a significant indicator in understanding virtual reality experiences, and that the construct of flow can help to improve the understanding of an individual's virtual reality experience. Consequently, as Hsu, Chang and Chen (2012) stated, flow experience has a significant impact on consumers' purchase/pre-purchase and revisit intentions during the human and computer interaction. Therefore, along the Technology Acceptance Model and hedonic construct, the construct of flow must be considered significant, in the context of the proposed integrated framework of the tourism consumer behaviour in virtual reality environment (fig.1).

Figure 1 Conceptual model of Virtual Reality Technology Acceptance Model in Hospitality and Tourism Context. Amended from (Davis, Bagozzi & Warshaw, 1989).



Methodology

The primary purpose of this study is to examine the travel related virtual reality experience and behavioural intentions of potential consumers in order to further develop the proposed conceptual model of Virtual Reality Technology Acceptance Model in Hospitality and Tourism Context. This exploratory study employed a convenience sampling method amongst the international hospitality, tourism and experience management student. Perceived usefulness was used to assess the subjective estimation of performance, while perceived ease-of-use measured how easy the respondents thought VR headset was to learn and use. A multidimensional measurement for assessing participants' subjective experience of enjoyment (Tamborini et al, 2010) was modified from the Intrinsic Motivation Inventory (IMI) to reflect the need of this study. Positive emotions measures that echoed the extent to which a person feels, was based on the Positive and Negative Affect Schedule (PANAS) which was established by Watson, Clark, and Tellegen (1988). The assessment of emotional involvement was used to evaluate imaginative and emotional responses to engaging in a behaviour within the context of virtual reality environment. Finally, this study modified the construct of flow from the work of Webster and Trevino (1992), operationalizing it as a four item scale: 1) interest; 2) feel of control; 3) attention; and 4) the curiosity. All constructs were rated on a seven-point Likert scale, ranging from strongly disagree to strongly agree. Primary data for this study was obtained through self-administered web questionnaires (Webpropol), to collect information from participants' about their previous virtual reality experiences. The data collection for the student group was conducted at the end of 2015.

Findings

From the population of 380 hospitality tourism and experience management students, a sample of 120 between the ages of 18-44 were selected. The students were given a task to experience 3 different promotional, tourism related 360 videos with Oculus VR headset and to answer the proposed questions in a 7 point Likert scale. The gender division represents the Finnish hospitality and tourism student profile, while 83,3 percent of the respondent were female and the remaining 16,6 percent male. While the respondents represented the most affluent consumer group, considering the technology acceptance, only 37,5 percent (45 students) had tried virtual reality headset before, and from the ones that had not experienced VR 86,7 percent would like to try one, if provided with an opportunity. Considering the VR experiences, the ride simulations (e.g. flying, rollercoaster, diving) were the most usual (66,7%) and promotional material (e.g. 360 degree video of a hotel or a festival) was the second most popular (44,4%).

Perceived easiness of usage (PEU)

While assessing the subjective estimation of performance, and "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, 320), hence the perceived ease of use (PEU), four questions were used. These questions concerned the learning, difficulties in interaction with the device and the perceived skilfulness.

Table 1 Perceived Easiness of Usage of Virtual Reality Environment (n=120)

	N	Minimum	Maximum	Mean	Std. Deviation
Learning to use the Virtual Headset was easy for me	120	3	7	5,778	1,412
I did not find it difficult to get the VR headset to do what I wanted it to do.	120	3	7	5,33	1,581
I found the VR headset flexible to interact with.	120	4	7	5,444	1,179
It was easy for me to become skilful at using the headset and the content within.	120	3	7	5,556	1,271

The respondents mostly agree that the VR environment was easy to use, thus the perceived easiness of usage is high (mean average 5,778). Only for the descriptor 2, reflecting the manoeuvrability and self-directed actions within the VR environment scored lower mean average (5,33) and in which 22,2 percent somewhat disagreed with the statement. The respondents also considered that the learning curve, therefore the easiness of learning how to use the VR environment was easy (mean 5,778).

Perceived usefulness (PU)

In view of the perceived usefulness of virtual reality environment, especially in travel planning process, hence "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, 320), we used three questions illustrated in table 2.

Table 2 Perceived Usefulness Usage of Virtual Reality Environment (n=120)

	N	Minimum	Maximum	Mean	Std. Deviation
I believe using VR headset has possibilities of enhancing the effectiveness of travel planning.	120	4	7	6,000	1,261
I believe that using VR headset would increase my productivity in travel planning.	120	4	7	5,222	1,042
I believe VR headset could be useful for travel planning.	120	4	7	5,889	1,112

Considering the usefulness, the students mostly agree on the perceived usefulness of the virtual reality environment in travel planning procedure. The increase of productivity, however, scored the lowest average in this area (mean average 5,22) suggesting the prominence of entertainment value.

Emotions and flow

While emotional involvement may play an important role in understanding consumers' behavioural intentions, also the construct of flow, describing the mental state of operation, has to be considered. In order to learn more of the interaction of these two constructs, the following 11 questions were asked assessing participants' subjective experience of enjoyment, positive emotions, emotional involvement, and the interest, feel of control, attention, and the curiosity which contribute to the flow experience.

Table 3 Perceived Antecedents of Emotions and Flow of Virtual Reality Environment (n=120)

	N	Minimum	Maximum	Mean	Std. Deviation
I enjoyed experiencing the virtual reality through VR headset.	120	3	7	5,889	1,465
I thought experiencing 3D virtual world was quite enjoyable.	120	3	7	5,556	1,516
I would describe the virtual reality experience very interesting.	120	4	7	6,000	1,168
The virtual reality experience was fun.	120	4	7	6,000	1,066
I felt carried away while experiencing the virtual reality.	120	3	7	5,778	1,412
I felt as if I was a part of the virtual reality environment.	120	4	7	5,556	,967
I felt deeply about the virtual reality environment.	120	4	7	5,444	1,271
When experiencing the virtual reality, my attention was totally focused.	120	4	7	5,778	1,241
Experiencing the virtual reality excited my curiosity.	120	4	7	6,000	1,066
Experiencing the virtual reality was interesting.	120	4	7	6,222	1,042
When experiencing the virtual reality, I felt that I'm in control.	120	3	6	4,889	1,210

Overall, the respondents enjoyed the VR experience and answered to enjoy/emotion related questions with positive agreement or strong positive agreement. The respondents also strongly agreed (mean average 6.000) that the experience was very interesting. Furthermore, considering the construct of flow, these respondents felt strong feelings of flow during the VR experience. Specifically, the aroused valence, thus the interest in the experience was significant. In contrast, the feeling of control, while immersed in the VR experience, scored the lowest average (mean average 4,889). Meanwhile, considering all the other proposed antecedents of flow, the respondents agreed or strongly agreed.

Discussion and implications

Travel and tourism companies have begun to explore the immersive virtual reality displays and environments as a collaborative and commercial tool to engage, entertain and communicate with the customer. Considering the emotional and imaginative responses to tourism services, the construct of hedonic consumption as an aspects of consumer behaviour that relate to multisensory, fantasy and emotive features of user experience has to be taken into account. Despite the explorative approach, this study suggests the relevance of these hedonic attributes. While the studied international students generally perceived high level of the ‘easiness of use’, and that the virtual reality environment in travel planning procedure is ‘useful’, the perceived increase of productivity, however, was low. The findings of this study suggest distinctive entertainment value of Virtual Reality

environments and based on this study, the VR experience is perceived mostly entertaining and thus relating to the feelings of enjoy and positive emotion. Also, the findings suggest that the VR experience is very interesting, thus signifying the potential for virtual reality environments. Furthermore, considering the construct of flow, the VR experience is highly immersive, and the feelings of flow during the VR experience, specifically, the valence, thus the interest in the experience is noteworthy. Finally, considering the proposed integrated framework of the tourism consumer behaviour in virtual reality environment, the study highlights the importance of non-productive, entertaining, and emotional stimuli instead of productivity.

Limitations and future studies

This study explored only the retrospective perceptions of the VR experience, and therefore the results are not representative as such to other virtual environments. This study also presents only the descriptive statistics without deeper analysis or comparison with the variables. Therefore, future studies should extend to other head mounted displays, immersive environments for better understanding of the tourist experience within virtual environments. Secondly, the experimental nature of this research involved small sample of highly homogeneous hospitality and tourism students, and therefore the future studies should be conducted with larger samples of heterogeneous consumers in order to validating the construct. Thirdly, this research focused on a subcategory of the conceivable factors of virtual reality environment acceptance and hedonic consumption behaviour. Despite the limitations, this preliminary research provides a foundation for future studies and investigations of the factors that affect virtual experience within a tourism context.

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