Comparing Tablet and Virtual Reality Glasses for Watching Nature Tourism Videos

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This is the author copy of the final paper and is subject to change. Please see https://link.springer.com/chapter/10.1007/978-3-030-05940-8_10 for the final version. Citation:

Pasanen, K., Pesonen, J., Murphy, J., Heinonen, J., & Mikkonen, J. (2019). Comparing Tablet and Virtual Reality Glasses for Watching Nature Tourism Videos. In *Information and Communication Technologies in Tourism 2019* (pp. 120-131). Springer, Cham.

Abstract

360-degree videos offer great tourism marketing opportunities. Compared to traditional videos, 360-degree videos offer more compelling imagery of potential travel destinations, a "try before you buy" experience. These 360-degree videos can be viewed with various devices, including tablet and VR (Virtual Reality) goggles. The study, conducted at Helsinki-Vantaa airport, comprised 221 international tourists given VR glasses or iPads to watch a 360-degree video and answer a survey. The results reveal that the VR glasses and the iPad tablet had similar effects on travel intentions and behaviours. However, the viewing experience differs depending on the device. These findings suggest that some 360-videos will actually perform better on a tablet than with VR glasses. Tourism businesses and destinations should develop different content and situations for different devices. This study contributes to media richness theory and helps us to understand VR content as a type of rich media.

Keywords: virtual reality (VR), tourism marketing, 360-videos, nature tourism

1. Introduction

Virtual reality (VR), a powerful marketing tool, offers great opportunities for tourism and destinations. VR can provide compelling destination imagery to potential tourists through a sense of being there, a "try before you buy" experience [1] or communicate how a distant place or experience feels [2]. VR can reduce the perceived risk of

intangible services, helping travellers make more informed decisions with more realistic expectations [3].

Virtual reality is “a real or simulated environment in which a perceiver experiences telepresence [4, p. 7].” Even though almost three decades old, the definition contains the important elements of simulated environment and user experience. Thus, this paper includes 360-degree videos viewed with virtual reality goggles in the VR discussion.

The marketing potential of VR lies primarily in its ability to provide extensive sensory information to prospective tourists [5]. This VR capability suits tourism as many tourism products are ‘confidence goods’, which consumers cannot test in advance and must purchase, or not purchase, based simply on available descriptive information [6, 7]. The experiential nature of VR makes it an optimal tool for providing rich media data [8] to potential tourists seeking destination information.

Yet gauging the effectiveness of VR technology to induce favourable tourism destination attitudes and visiting intentions is challenging [9]. The potential VR tourism opportunities include planning the places and experiences, reducing barriers to accessibility, opening up remote places, educating and guiding visitors, preserving fragile sites [5], enhancing entertainment [10], and broadening global interaction among travellers [11].

As VR becomes more widely accessible [12], tourism marketers need more information of the use of VR technology. However, little empirical research investigates VR use in tourism marketing and how VR affects tourist information search, travel decisions, behaviour, and attitude towards a destination or type of tourism. Furthermore, researchers call for comparing new technologies, such as VR, with traditional viewing devices [13]. Media richness theory suggests that different devices have different communication effects as the media content and ways to view it differ [14]. However, studies that examine these effects in tourism, and especially in VR tourism, are not common.

This research widens virtual reality technology use in general and particularly, consumer experiences of and willingness to use VR-technology in travel situations. Specifically, the study explores how potential visitors perceive 360-degree Finnish nature video, how this VR experience and the device used for watching the video affects their future travel intentions. Media richness theory [14, 15] serves as the theoretical base to help understand how consumers perceive media, such as VR. This study contributes to understanding of VR devices and content from media richness theory perspective.

2. Theoretical Background

2.1 Media Richness

Media differ in their communication effects. As media increase in richness and information, such as adding pictures to text or shifting from pictures to moving pictures, such media richness increases communication effectiveness [14, 15]. For example, users perceive destination websites more realistic or positive depending on the media elements in a website [3, 16]. Tourism companies and destinations can incorporate

virtual reality (VR), the latest in a long line of media rich innovations, to enhance their communication mix and customer experiences [17].

Potential customers have high expectations and high uncertainty when purchasing tourism services. Adding media richness, such as VR, enhances the media experience and augments the versatility and trustworthiness of tourism product information [18] and attenuates purchase decision barriers. VR, which provides both instrumental and experiential benefits, also improves responses in the Attention, Interest, Desire and Action (AIDA) advertising model [19, 20].

Yet adding media richness does not guarantee positive customer behaviours. The situation can affect online communication experiences and could benefit from adapted content [21, 22]. Interactivity might enhance the online experience and help consumer decision-making and engagement [8, 23]. Virtual reality increases media richness, particularly with moving images in a 360-degree environment that envelops the user. However, little to no research examines the effect of this viewing device on media richness.

2.2 Video Content, Destination Marketing and Behavioural Intentions

Films and videos are important in creating destination awareness and intention to visit due to their unique ability to create emotions that relate directly destination recommendations and visits [24]. Scholars argue that positive tourism experiences include at least two basic emotions, interest and happiness [25, 26, 27, 28, 29]. Where happiness promotes attachment to rewarding things, interest motivates trying new things, places or experiences [28, 30].

The Theory of Planned Behavior (TPB), which argues that the intention to perform a behaviour is the closest cognitive antecedent of actual behaviour, also supports emotion's role [e.g. 31, 32, 33]. The TPB implies that intentions to engage in a behaviour accurately predict performing that behaviour. Many studies substantiate the predictive validity of behavioural intentions [34], which could arise from viewing a film or video.

Short promotional, as well as full length, films and movies can change viewer perceptions of a destination, create positive destination images and increase willingness to travel to that destination [e.g. 35, 36, 37, 38, 39, 40]. As tourist interest in real and authentic leisure experiences grows, and their time shrinks, prospective tourists seek information sources that will heighten their experiences, and reduce their chances of disappointing experiences [41]. Videos should give relevant information to help viewers imagine their future destination experiences [42, 43]. The mental images that tourists form influence the expected destination experiences and subsequent destination choice [43, 44].

Relative to films, promotional video effectiveness has been less studied. One study found that destination video content and repeating certain shots could enhance traveller perceived destination image and trigger potential traveller interest in collecting more information and visiting the destination [40]. Promotional video research also suggests that a dramatized event can affect viewer attitudes positively toward the destination and the event [38]. However, evidence suggests that video might not be the most efficient media to influence buying decisions and to study various media forms [45].

Finally, two factors for trusting online videos are the source, user- versus agency-generated and technical quality. Relative to agency videos, user-generated videos may exhibit higher source credibility and thereby a stronger influence on intended behaviour with low quality videos [46]. The generating source had no impact on high quality video trustworthiness [46]. Online video's technical quality and source merit consideration when investigating perceived credibility and its impact on intended consumer behaviour.

2.3 Virtual Reality and Destination Marketing

Emerging virtual reality research provides empirical evidence to support and explain VR as an effective tourism promotional tool. One study [2] for example, compared the impacts of viewing a South African destination promotional material in VR, traditional 2D videos or as website pictures. Relative to the website pictures, VR condition participants reported a significantly stronger affective destination image, intention to visit, seek further information, share information and suggest South Africa as a destination. The VR condition also performed better than the 2D condition, albeit not as strongly as versus pictures on the website.

Researchers [1, 9] used spatial presence, the sense of being in a virtual environment, to study VR experiences and travel decision making. User attention to VR environments contributed significantly to spatial presence: the more attention users allocated during the VR experience, the more spatial presence. Thus, reducing user distractions to VR objects or events becomes important. The studies also found that spatial presence positively affected post VR attitude change toward tourism destinations, indicating VR persuasiveness.

Four central issues relate to VR persuasiveness and VR presence [9]. First, a sense of presence during VR leads to positive attitude change toward a destination. Second, the effect of presence on VR enjoyment confirms VR as a hedonic experience. Third, a positive change in attitude leads to visit intention, confirming VR's persuasiveness. Finally, VR is more persuasive when the virtual environment conveys its situated affordances. Emotional theories support this view, where visual engagement leads to revisits, while happiness leads merely to recommendation [47].

Related to persuasiveness, viral advertising research argues that videos with strong feelings increase the chance of spreading a video [48]. Furthermore, the expected video control, inclusion and affection benefits can significantly affect video forwarding intentions [49]. This intention to forward a video derives from two factors: sufficiently interesting video content quality and empathy. Empathy associates closely with the forwarder and recipient's relationship.

Finally, a recent study used the Oculus Rift virtual environment to examine perceived VR visual appeal and emotional involvement to visit a cultural heritage destination [50]. Perceived visual appeal had a positive relationship with user intention to visit, recommend and seek additional destination information, and with user emotional involvement. It is also implied that videos with positive images create positive emotions that spark a desire to visit the destination [24]. One good option is to show tourists having a good time [51].

The literature review presented above suggests that video content can affect tourists' attitudes, intention, and thus behaviour [39, 40]. VR material should be more effective than other material [2]. The richer the media, the more effective communication should be [52]. However, these assumptions are hardly ever discussed in the viewing device context. How are the viewing experience and the changes in consumer behaviour affected by the device used to watch the content?

3. Study Methods

This exploratory study was conducted during four days in December 2017 and January 2018 at Helsinki-Vantaa airport, convenience sampling 221 of departing international travellers from Schengen and non-Schengen flights to get answers from different nationalities and, from Finland's main markets. Convenience sampling is appropriate given the study's exploratory nature. The participants received Samsung Gear VR glasses (n=114) or an iPad (n=108) to watch the same 360-degree video filmed in eastern Finland's Ruunaa nature tourism area in autumn 2017 (video: https://www.youtube.com/watch?v=p90d33rTSJg). Both groups wore headphones while watching the video and were asked to turn around and look around while watching the video. After watching the video the travellers answered a survey, in English, concerning the video. Data collectors stood nearby to help use the device or complete the survey. On average it took 10 to 15 minutes to watch the video and fill in the survey. The questionnaire had altogether 21 questions.

Filmed by Karelia University of Applied Sciences students, the three-minute video showed four different situations in order to test which settings appealed to international visitors. The first setting, lakeside, let viewers experience watching the scenery. In the second setting, the viewers could see people walking past in the forest without being part of the action or the group. The third setting immersed the viewer in a moving boat with others. In the final setting, the watcher was also part of the action, sitting with a group by a campfire.

The survey stemmed from tourism and video marketing research. The survey examined if watching a 360-video would increase willingness to travel to the destination and participate in the activities on the video [2, 30, 53], participant feelings about the video [30], their spatial presence while watching the video [1, 30, 54, 55] and their intentions to share the video on social media [46].

The survey also explored how familiar tourists were with VR technology and in which part of their decision making process (inspiration, looking for potential destination information, planning after the decision has been made, while on holiday) VR technology would interest them. The survey included socio-demographic background questions as well as tourist interest towards outdoor activities and interest in nature holiday in Finland. In summary, the survey examined how VR could market a nature tourism destination, and how significant a role VR has when watching promotional destination videos.

The data was analysed using comparative analysis methods such as chi-square test and Independent Samples Mann-Whitney U-test. Also ordinal regression analysis was used to study if differences in the two samples affected the results.

4. Results

Table 1 below profiles the respondents evenly distributed between men and women and with a mean age of 31.8 years, mostly young people. Major countries represented are the UK, France, China, Russia, Germany and Australia. Respondents are highly educated and more than half of them do outdoor activities at least monthly.

Table 1. Respondent Profile.

Age	**% (N=218)**	**Nationality**	**% (N=221)**
17-24 years	25.7 %	UK	12.7 %
25-34 years	43.1 %	France	8.6 %
35-44 years	19.7 %	China	7.7 %
45-54 years	7.8 %	Russia	6,3 %
55-73 years	3.7 %	Germany	5.0 %
		Australia	5.0 %
		Other	54.7 %
Mean age	**31.8**		
Gender	**% (N=220)**	**Education**	**% (N=218)**
		Comprehensive school / basic education	0.9 %
Male	50.5 %		
Female	48.6 %	Secondary education	15.8 %
Other/Don't want to answer	0.9 %	Bachelor's degree	34.4 %
		Master's degree	42.7 %
		Doctoral degree	4.6 %
		Other	1.4 %
How often do you do nature/outdoor activities (e.g. hiking, kayaking, canoeing, mountain biking or related)?			
Weekly	22.9 %		
Monthly	28.0 %		
Couple of times a year	36.7 %		
Once a year	7.3 %		
Less than once yearly	5.0 %		

The respondents reported what feelings they had when watching the 360-degree nature video, either on an iPad or Samsung Gear VR glasses (1: Not at all, 6: Very much). Both devices created feelings of interest, relaxation, comfort, and happiness, which were the feelings people ranked the highest. However, the only statistically significant difference was that there was more boredom with the iPad than VR glasses (Mann-Whitney U test, $p=0.027$).

Chi-square tests reported no statistically significant differences in behavioural intentions towards nature tourism holiday between watching the video with VR glasses or an iPad. Nor there were any statistical differences regarding the device used in interest in nature holiday in Finland, information search, word-of-mouth or intention to participate in the activities seen in the video.

Respondents, however, differed significantly in background factors when comparing VR glasses and iPad users. These sampling differences led us to examine if 360-VR video watched with VR glasses generated more interest in nature holiday in Finland than watching the same video on an iPad. The ordinal regression was used. In the regression analysis interest in Finnish nature tourism holidays was used as the dependent factor. Respondent socio-demographics and video watching device were the factors explaining the interest in the nature tourism holiday. The regression analysis identified that only respondent origin country explained the differences in interest in nature holidays in Finland. This result also suggests that despite differences in interest in nature tourism activities between the devices, the device they watched the video from was not the reason for these differences.

The videos had four scenarios: lakeside, walking in the forest, boating and sitting by the campfire. The cross-tabulation and chi-square test results showed that the preferred videos differed between the video watching device, albeit walking in the forest was the least preferred scene on both devices (Table 2). Boating was the preferred scene with VR glasses, almost triple the forest scene. Lakeside was the preferred tablet scene, about double walking in the forest, with the boating and campfire scenes in between.

Table 2. Preferred video scene by device

Which part you liked the most?	**VR glasses**	**Tablet**	**X^2=7.964, p=0.047**
Lakeside, me watching the nature	24.6 %	31.1 %	
Walking in the forest, me watching other people	15.8 %	15.1 %	
Boating, me on the boat with other people	44.7 %	28.3 %	
Sitting by the campfire, me together with others	14.9 %	25.5 %	

Comparing respondent feelings during the film showed that those who watched the 360- video with iPad were more distracted than VR glasses users (Table 3). VR glasses users were more immersed in the video and 360-video seemed more enjoyable to watch.

Table 3. How the video made the respondent feel

	Device	**N**	**Median**	**Independent Samples Mann-Whitney U test sig.**
How you felt during the film. (1=at no time … 6= almost all the time)				
I had the feeling that I was in the middle of the action rather than merely observing	VR glasses	114	4	0.072
	Tablet (iPad)	107	4	
I felt like I was actually there in the environment of the presentation	VR glasses	114	4	0.242
	Tablet (iPad)	107	4	

I was fully focused to this film	VR glasses	114	*5*	**0.013**
	Tablet (iPad)	107	4	
I was distracted by other things during watching the film.	VR glasses	114	2	**0.025**
	Tablet (iPad)	107	*2*	
The computer generated world became the "reality" for me, and I forgot about the "real world" outside	VR glasses	114	*3.5*	**0.021**
	Tablet (iPad)	107	3	
I felt emotionally attached to the video	VR glasses	114	3	0.700
	Tablet (iPad)	107	3	
I enjoyed watching the video	VR glasses	114	*5*	**0.022**
	Tablet (iPad)	107	5	
I felt as if I was in the real world whilst watching the video	VR glasses	114	4	0.238
	Tablet (iPad)	107	4	
I was aware of surroundings	VR glasses	114	4	0.059
	Tablet (iPad)	107	4	
I felt detached from the outside world	VR glasses	114	*3*	**0.009**
	Tablet (iPad)	107	3	
I noticed events taking place around me in the real world	VR glasses	114	3	**0.001**
	Tablet (iPad)	107	*4*	

*Italics in median value denote statistically higher mean rank value where there is a statistically significant difference

Finally, the results of a Mann-Whitney U-test showed no statistical differences in spreading word-of-mouth between VR glasses users and iPad users. On average, people were likely to share both kinds of videos.

5. Discussion and Conclusions

This study contributes to the discussion of 360-degree videos as a tourism marketing tool. The research concentrated on consumer experiences of, and willingness to use, VR technology in travel situations. The study explored how consumers perceive 360-degree Finnish nature video, and how VR experience and the device used for watching the video affects their future travel intentions.

Even though the experience of watching 360-degree nature tourism video on VR glasses or iPads differs, the resulting effects are similar. The results suggest that it does not matter if the traveller watches the 360-video with and iPad or Samsung Gear, for intentions to visit or seek information about the destination. In both cases, the video itself aroused positive feelings and interest towards nature tourism in Finland. This result supports a study showing that the device matters little [13]. This also contributes to the theoretical understanding of the device type as a moderating variable in digital experiences.

However, the experience was more immersive when watching the video with the Samsung Gear VR. The feeling was more of being part of the action rather than just observing as well as being detached from the real world. It was also easier to focus on

the film and pay less attention to things going on in real world compared to watching video with iPad. The results suggest that the viewing device does not affect media richness, even though it could be thought to affect [21, 22].

Visual appeal in VR content is important both for creating emotional involvement and increasing the intention to visit the destination [9]. What is notable, is that the video used in this study was filmed in late autumn, when the Finnish nature is not at its best and the perceived visual appeal perhaps negative, the video aroused positive feelings and interest to travel to Finnish nature destination. One contribution of this study is identifying several differences in emotions created between different media. It seems that when studying emotions, considering the device is important.

Research has confirmed that both 2D videos and VR engage consumers and affect positively the intention to travel [2, 24, 35, 36, 37, 38]. Rich media content like normal videos and especially 360-degree videos as well as VR content reduces disappointing experiences when making travel decision and traveling, and removes barriers from buying [18]. Different aspects - spatial presence and enjoyment - affect the persuasiveness of VR content. Similar effects were identified also in this study. The results also suggest that in this case the viewing device does not affect expected video control, inclusion and affection benefits [11].

Based on this research, destinations and tourism businesses should consider adopting 360-degree videos and also consider the results of this study. The results show that 360-videos increased positive feelings and willingness to travel regardless of watching with a tablet or VR glasses. 360-degree videos provide more information than traditional videos and work well to demonstrate tourism experiences and locations, no matter the device. Marketers rarely decide what device the end user uses, but for example in exhibitions and events, 360-degree videos can be shown with a tablet. With much action and various things going on simultaneously or to make the potential traveller feel part of the action or a group, like in the boating video, VR glasses may be preferred.

Despite these contributions, this research has limitations, of which most relate to the data collection. The airport was the best place to reach many nationalities at the same time but situational challenges affected the data collection. Some spaces were too small or crowded to do the research, which might have affected the sample size and representativeness of different nationalities. Another limitation is the video filming season.

In the future, translating the survey in different languages would reduce language barriers especially with the Asian travellers, which prevented some of them to take part in this study. It would also be interesting to use two or three different kinds of 360-video clips to see if the experience of watching the video and willingness to try the activities and travel to the destination differs between the videos where you passively watch the people and action around you versus videos where the respondent are part of the group and feels like they are doing the activity. Media richness levels of different devices and content should be more precisely measured and analysed.

Acknowledgements

The authors wish to thank Rural Programme of Finland and Virtual Outdoors Finland project for funding this research.

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