

# Playful Advertising: In-Game Advertising for Virtual Reality Games

Xiaopeng Li<sup>1</sup> Mario Romero<sup>2</sup>

<sup>1</sup> KTH Royal Institute of Technology

<sup>2</sup> HPCViz, KTH Royal Institute of Technology

---

## Abstract

*We present an early exploration of in-game advertising for virtual reality games. First, we establish a theoretical grounding for understanding interactivity and immersion in virtual reality games. Next, we report the results of a number of field studies, expert interviews, prototype designs, and describe the design of a pilot user study. Based on these results, we discuss the design of interactivity and immersion for in-game advertising and the impacts on consumer learning and game experience.*

Categories and Subject Descriptors (according to ACM CCS): I.3.7 [Computer Graphics]: Three-Dimensional Graphics and Realism—Virtual reality

---

## 1. Introduction

Interactive 3D advertising has been receiving increasing attention and may soon become mainstream. By utilizing interactions and 3D graphics, advertisers are able to produce highly engaging and effective digital advertisements. Virtual reality, with its recent consumer-level device development, enables the interactivity and immersion of 3D graphics to be lifted to a new level. Among various types of digital advertising, in-game advertising stands out for its interactivity and immersion, which correspond to the two salient characteristics brought by virtual reality. We're set out to study in-game advertising for virtual reality games due to the shared attributes of virtual reality and games: interactivity and immersion.

Previous researches have studied the influence of interactivity on advertising [LS02] as well as the impact of 'media richness', a major antecedent of presence [LDB02]. Yet, the correlation between interactivity, immersion and sense of presence in digital advertisements is still uncharted. User experience of 3D graphics systems [YLO08] and gamers' response of in-game advertising [NKY04] have also been explored. Nevertheless, a comprehensive research framework covering both effectiveness measures and experiential metrics of in-game advertising remains missing. To fill those gaps and further explore in-game advertising in virtual reality games, we investigate the impact of interactivity and

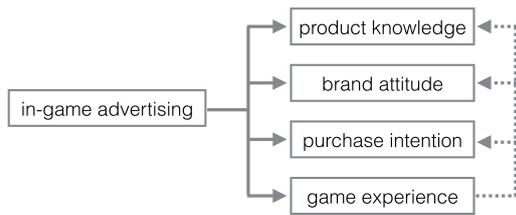
immersion of in-game advertising on consumer learning and game experience.

## 2. Research Framework

The study employs the measure of game experience, and three measures of the marketing effectiveness: product knowledge, brand attitude and purchase intention.

The effectiveness of 3D advertising refers to its effects on consumer learning, which can be measured by product knowledge, brand attitude, and purchase intention (e.g. [LDB02]). Interactivity is identified as one of the major factors influencing the effectiveness of interactive advertising, especially in virtual environments, with the sense of presence acting the mediating role (e.g. [LSD01, SL05]). According to Ryan [Rya99], immersion is the other main antecedent of presence beside interactivity. Studies also show that the sense of presence influences the gameplay experience (e.g. [Raa12]).

We establish a research framework, as can be seen in Figure 1, where interactivity and immersion act together to arouse a sense of presence, which further impacts the effectiveness of advertising as well as the game experience. In addition, since game experience involves game players' sensations, thoughts, feelings and actions [Raa12], we argue that it might (partially) mediate the effects of presence on the three effectiveness measures.



**Figure 1: Research Framework**

### 3. Field Research

The field research aims at informing the research through collecting information from academic researchers and industrial experts in the field of in-game advertising, virtual reality and human-computer interaction. We interviewed five people. Each interview lasted approximately 30 minutes. We collected data through noting and recording, and we analyzed the interview data through transcribing, coding and thematic analysis.

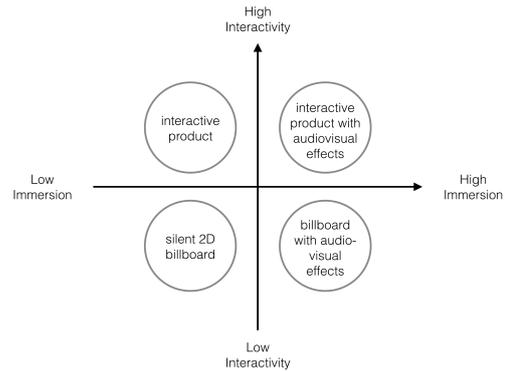
In general, interviewees held positive attitude towards in-game advertising for its potential to achieve interactivity and immersion compared to advertisements in TV or movies. They also shared the opinion that in-game advertising has the risk of hindering game experience, confirming the importance of taking the game experience into account when measuring the performance of advertising. A consensus was made among interviewees that thematic congruity between game and advertisements is crucial for game experience.

Regarding interactivity of in-game advertisements, interviewees shared the concern that interaction with advertisements may distract players from the game. However, one of the interviewees pointed out that this concern could be resolved by integrating the advertisements as part of the game. These findings threw light upon the prototype design in the following step.

Most interviewees were in favor of the application of virtual reality in media production due to its capabilities of enhancing interactivity, immersion and eventually the holistic experience. One of them also shared the perspective that positive game experience might have positive effects on gamers' attitude towards the advertised product, supporting the assumption in the research framework that game experience could influence consumer learning.

### 4. Prototype Design

We used a web-based virtual reality game called TRIF as the basis of the prototype. By controlling the two independent variables - interactivity and immersion, we designed four types of in-game advertisements, corresponding to four versions of prototypes. The four types of product placements are shown in Figure 2.



**Figure 2: Two Dimensions Categorizing Prototypes into Four Types**

Gamers play the game with mobile phones and Google Cardboards, which track the movement of their heads and switch the views accordingly in the game. A handled controller is used to drive the flight. Players follow a certain path in the game to collect power-ups, which are branded in certain prototypes. Along the path, they will be exposed to in-game advertisements.

### 5. User Study Design

A series of laboratory experiments will be conducted using between subjects design where participants are randomly divided into four groups, each group exposed to one type of the advertisements in the game. Participants will be chosen from virtual reality enthusiasts (game players, developers, researchers, and students) in Stockholm, since their prior knowledge helps alleviate the novelty effect of virtual reality and they tend to be early-adopters of future virtual reality games as well as the advertisements within.

The experiments will be set up with Moggles (counterparts of Google Cardboards) and smartphones with screen size from 4' to 5.7'. Moggles is chosen instead of Oculus Rift due to the fact that Moggles can be easily set up with smartphones enabling simultaneous execution of multiple experiments.

Participants will be welcomed with an introduction to the experiment procedures, followed by a training session where they play with ad-free version of TRIF for 5 minutes. Then, the experiment session will start and last for 10 minutes, followed by an individual questionnaire containing semantic differential and Likert-scale items, and a semi-structured group interview. The questionnaire aims to measure the dependent variables for the study, including sense of presence, product knowledge, brand attitude, purchase intention and game experience.

## 6. Future Work

In the current study, immersion is defined as sensory fidelity and operationalized as audiovisual effects in the experiments. Nevertheless, the definition of immersion varies among previous researches, and is confounded with sense of presence in some cases. A comprehensive or united definition of immersion awaits further investigation, in light of which the study on virtual gaming environments would possess more solid foundation.

In this research, the interaction with advertisements in the game is achieved by either looking at the billboards or collecting branded power-ups as response of head tracking and hand control. Since alternatives abound, further research might explore more interaction techniques among which eye tracking and haptic interfaces are of interest. As well, higher level of brand integration in the game will be explored which is expected to be more native and player-friendly.

## References

- [LDB02] LI H., DAUGHERTY T., BIOCCA F.: Impact of 3-d advertising on product knowledge, brand attitude, and purchase intention: The mediating role of presence. *Journal of Advertising* 31, 3 (2002), 43–57. 1
- [LS02] LIU Y., SHRUM L.: What is interactivity and is it always such a good thing? implications of definition, person, and situation for the influence of interactivity on advertising effectiveness. *Journal of advertising* 31, 4 (2002), 53–64. 1
- [LSD01] LOMBARD M., SNYDER-DUCH J.: Interactive advertising and presence: a framework. *Journal of Interactive Advertising* 1, 2 (2001), 56–65. 1
- [NKY04] NELSON M. R., KEUM H., YAROS R. A.: Advertainment or adcreep game players' attitudes toward advertising and product placements in computer games. *Journal of Interactive Advertising* 5, 1 (2004), 3–21. 1
- [Raa12] RAATIKAINEN O.: Dynamic in-game advertising in 3d digital games. *Nordicom Review* 33, 2 (2012), 93–102. 1
- [Rya99] RYAN M.-L.: Immersion vs. interactivity: Virtual reality and literary theory. *SubStance* 28, 2 (1999), 110–137. 1
- [SL05] SUH K.-S., LEE Y. E.: The effects of virtual reality on consumer learning: an empirical investigation. *Mis Quarterly* (2005), 673–697. 1
- [YLO08] YOON S.-Y., LAFFEY J., OH H.: Understanding usability and user experience of web-based 3d graphics technology. *Intl. Journal of Human-Computer Interaction* 24, 3 (2008), 288–306. 1