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EXPLORING THE IMPACT OF DIGITAL HUMANS ON CUSTOMER EXPERIENCE

TREO PAPER

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Abstract

This ongoing work focuses on the virtual technology of digital humans, specifically on the potential impacts on customer experience. It starts by introducing the development of a believability framework for digital humans, emphasizing the interactions between behaviour, personality, appearance, and environment to enhance their realism. The framework aims to alleviate the "uncanny valley" effect and improve consumer interaction by making digital humans more lifelike and emotionally intelligent. The study employs a design science research approach, creating digital humans as student ambassadors in a university scenario, and has undergone three iterations, including interviews with university faculty and staff, co-creative workshops with students, and field experiments. The goal is to conduct empirical tests to refine the framework, thus enhancing customer experience in a virtual world environment.

Keywords: Believability, Digital Humans, Customer Experience.

1 Introduction

The term ‘Digital Human’ refers to virtual characters or agents simulating human behaviour, appearance, and interactions in virtual environments. In contrast to conventional avatars or chatbots, digital humans aim for a distinctive mix of realism, interactivity, and emotional intelligence (Yang et al., 2023), with the aim of providing realistic interactions with real humans (using computational language systems combined with the ability to learn from those interactions).

Customer experience provides one promising application for digital humans, as a means of building brand loyalty and trust (Zhu, Fan, & Zhang, 2019), partly in anticipation of a future metaverse (Hadi, Melumad, & Park, 2023). However, prior research indicates that ‘almost’ humanlike artificial creatures tend to be perceived as undesirable when compared with those that appear less life-like. This phenomenon is known as the “uncanny valley” (Mori, Macdorman, & Kageki, 2012) and, in exploring the relationship between the human likeness of an object and the emotional response it provokes, research has focused mainly on user reactions and perceptions of interacting with different digital characters (ibid.). Less attention has been paid to other factors such as emotions, environment, and interaction (Kim, de Visser, & Phillips, 2022).

We explore these aspects by developing the notion of believability, responding to calls in the literature to examine the believability of digital humans and how the concept shapes consumer experiences. Specifically, we propose a framework to assess the believability of digital humans; drawing together four key elements: Behavior, personality, appearance, and environment. We discuss how these components collectively alter our understanding of consumer experiences, and detail results from a

series of practical experiments. (In the context of developing digital student ambassadors to improve the experience of student.) We conclude by outlining research finding for developing the believability of digital humans in the context of customer experiences.

2 Theoretical Background

The notion of believability originates from character design (Bates, 1994). In this field, believability can be divided into character believability and personality believability. Character believability means people perceive the character/robot itself as real, though this has been argued as unimportant in highly realistic environments (Gray & Wegner, 2012). Personality believability includes factors that give the character the illusion of life – e.g., through the projection of emotions and physical movements – that contribute to a more immersive experience (Chang, Chen, Chien, Kao, & Soo, 2005). The relationship between believability and perceived control is particularly relevant in the context of games. For example, studies show that realistic characters can enhance people' immersion and experience (Even, Bosser, & Buche, 2018).

Consequently, believability may be defined as computer-controlled agents that persuade users to suspend their disbelief of non-human control (Bates, 1994). In other words, believability entails convincing a user that they are engaging with a character that 'is' (i.e., appears) alive within an environment that is consistent and logical. Consequently, underlying our effort to develop a believability framework is the belief that digital humans are most appealing when convincingly mimicking human control, thus enhancing the user experience. Our research draws on the believability literature available in the Scopus database. Following a series of selective searches, we initially retrieved 31 academic papers. Following an in-depth investigation of these studies, we identified 15 related dimensions. After further analysis, we collated those dimensions into four broad categories that form the foundation of our framework: Behavior, personality, appearance, and environment (Figure 1).

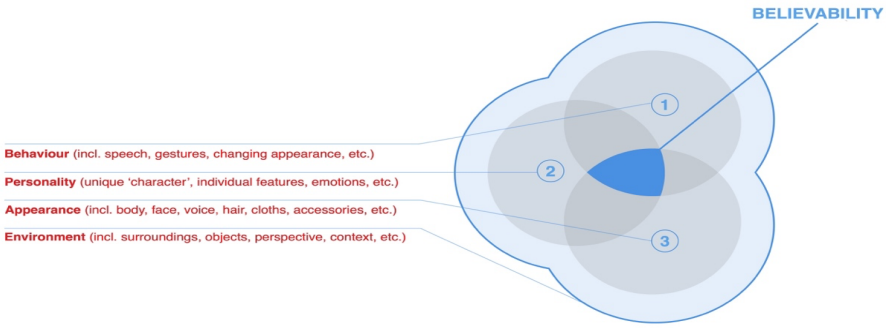

Figure 1. Believability framework.

3 Research Design

Our framework aims to identify attributes within these categories that affect the believability of digital humans. It is context-specific, thus considering the surrounding environment and application, such as being a brand ambassador on campus. Our research is based on the Design Science Research (DSR) methodology (Hevner, March, Park, & Ram, 2004) and consists of three iterations, two of which have been completed. Iteration 1 defined the research problem, set the research objectives and developed an initial believability framework based on literature review. Iteration 2 identified design requirements to address customer experience issues in designing digital ambassadors (incl. interviews with senior staff and customer journey mapping exercises as part of co-creation workshops with students). Iteration 3 will conduct field experiments to test the believability framework and evaluate the framework.

For Iteration 1, we interviewed 11 senior university staff to assess the potential for using digital humans as brand ambassadors for enhancing the student experience. Results were coded and specific

attributes identified. These attributes helped to guide the development of an initial version of the believability framework derived from the literature. In Iteration 2, we organized co-creation workshops with undergraduate and postgraduate students to gather their opinions on digital brand ambassadors. These guided exercises – using design thinking principles (incl. empathy maps, feature clustering, and dot voting) – were conducted in several rounds with 12 groups of 5-7 students each. Results from Iteration 2 were first coded and then evaluated by a team of four researchers. The team met three times to discuss findings and agree on the attributes matching the framework's broad dimensions (each evaluation workshop lasted between 3-4 hours). Based on this evaluation, the team agreed on the framework shown in Figure 1.

4 Outcomes and Further Work

Preliminary results from Iteration 1 indicate that digital ambassadors have the potential to improve student experience. The results from Iteration 2 enriched the factors of the believability framework and refined the content of each dimension. Practical experiments give initial support to the four dimensions of this framework identified from the literature. Iteration 3 will test the framework empirically to measure the believability of several digital human variations. Each variation will combine different attributes in a manner that either strongly reinforces participant views, strongly refutes them, or is somewhere in the middle – a standard approach applied in psychology to test variations. Over time, our intention is to develop the framework such that it is general enough for use across many contexts.

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