CHATBOT ANTHROPOMORPHISM:

Adoption and acceptance in customer service

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Chatbot anthropomorphism: Adoption and acceptance in customer service

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Abstract

Purpose – Robots are becoming more common in customer service. Customer service chatbots are made to create a better customer experience, increase satisfaction and engagement. These conversational agents are getting more advances due to progress in artificial intelligence, and their appearance and conversational tone can be extremely human-like. Since many firms want to either replace or support their existing customer service with chatbots, it is important to examine how the customer experience can be improved. However, there is a lack of studies concerning how appearance and conversational style influence users' adoption and acceptance of chatbots. This study aimed to explore how human characteristics in chatbots influence attitudes towards using chatbots, concentrating on the visual (human/robot/logo) and conversational style (formal/informal).

Design and Methodology – The study used an online experimental 3x2 between-subjects design followed by a questionnaire to explore users' (N=339) perceptions of the perceived usefulness, ease of use, helpfulness, competence, trust, and attitude towards using chatbots of an e-commerce chatbot in a customer service setting. Additionally, 12 semi-structured interviews were conducted to further explore how users feel about chatbots' visual appearance and conversational style.

Results – The results of the online experiment show that there is no significant effect of human appearance or conversational style on the perceived ease of use, usefulness, helpfulness, competence, trust towards chatbots, or attitude towards using chatbots in the future. The results of the interview showed that users prefer a human or a robot avatar and the informal conversational style. Emojis are appreciated as they create a friendly atmosphere but should not be used in difficult situations. Additionally, the interviews showed that the chatbots do not significantly differ in their perceived ease of use, usefulness, helpfulness, or competence. However, users want to use chatbots in simple interactions which the bot is competent enough to provide useful assistance. In general, users trust chatbots unless they must share private or sensitive information with them. Furthermore, chatbot users would like to know when they are interacting with a bot instead of a human customer service agent.

Discussion – A customer service chatbot should have an informal, friendly conversational style. Emojis should be used sparingly, and not in serious interactions where the customer might be distressed. Furthermore, a chatbot should not pretend to be a human and disclose themselves as a robot. Moreover, users might be hesitant to share private information with a chatbot, so access to a human customer service agent is recommended. These results can be particular for anyone interested in chatbots, as well as scholars, conversational designers, chatbot developers, and copywriters.

Keywords – Text-based chatbots, visual appearance, conversational style, anthropomorphism, Technology Acceptance Model

Contents

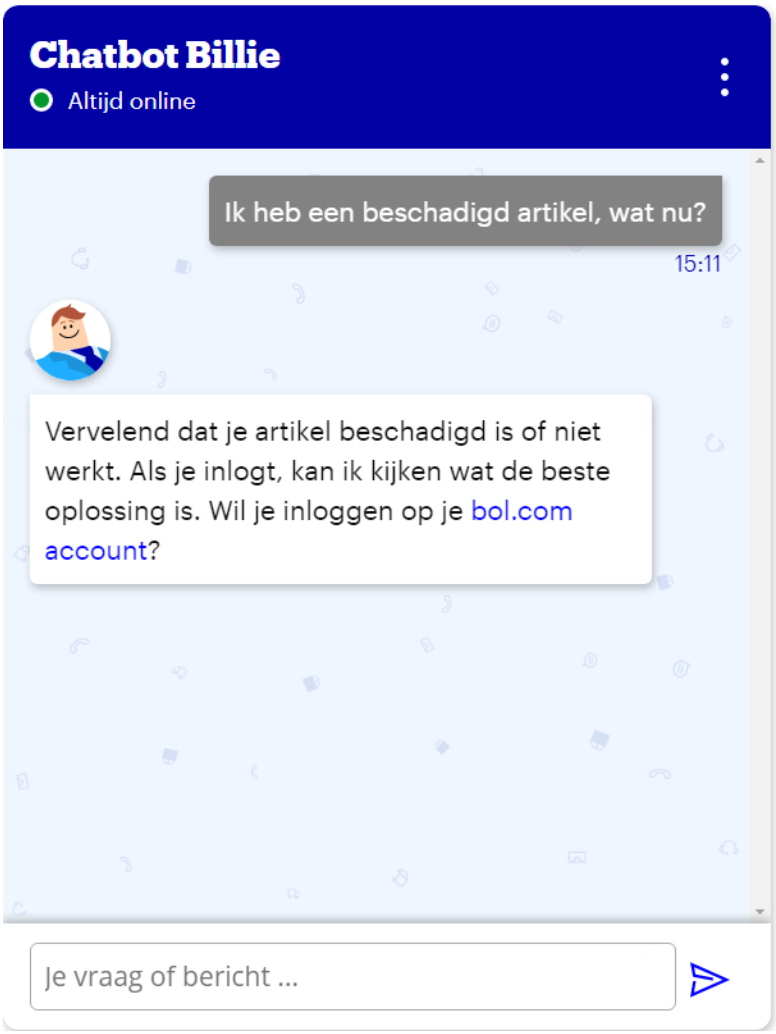
1 Introduction

Traditionally, customer service interactions have taken place in direct face-to-face communication between customers and employees. Over the decade, advances in Artificial Intelligence (AI) technologies have transformed the way businesses conduct customer service operations. Consequently, chat interfaces have become an increasingly popular tool to provide customer service in real-time. These messaging applications are popular among customers and sometimes even preferred over other types of customer support, such as phone or e-mail (Conversocial, 2017). While human customer service agents can operate live chats, companies have discovered the potential of chatbots to automate workflows, boost customer and employee engagement, and improve productivity (NT, 2020).

A chatbot is a computer program system that interacts with humans through written text or voice, and usually incorporates some type of avatar (Coniam, 2008). For example, many online operators in the Netherlands use a customer service chatbot, such as the web shop bol.com as shown in Figure 1.

Figure 1.

Chatbot Billie (n.d.). © Bol.com. Retrieved April 15, 2021, from https://www.bol.com/nl/klantenservice/index.html. Screenshot by author.



Customer service chatbots are designed to communicate with customers to obtain product details or assistance, such as solving technical issues (Adam, Wessel, & Benlian, 2020). They are widely used to substitute human customer service agents; human support agents dedicate a lot of time answering frequently asked questions, which can be easily done by chatbots (Cui et al., 2017). Moreover, chatbots are available 24/7 and reduce personnel costs (Hald, 2018).

Due to their increased popularity, considerable effort has been devoted to improving the interaction between humans and chatbots. For example, developers have added humanlike elements to the chatbots' personality, such as empathy and friendliness (Callcentre Helper, 2020). Furthermore, progress in AI technologies has allowed chatbot developers to employ various tools to design smarter chatbots. Moreover, the ease of implementation has boosted the use of chatbots in online customer service. For example, many businesses offer software that requires no programming skills to create a chatbot. These platforms provide visual flow builders, drag-and-drop options, and situation-specific templates, making them simple to use (NT, 2020). However, most of these platforms are limited to scripted interactions; chatbots are not yet successful enough in mimicking a natural human conversation. Therefore, most of the current customer service chatbots are used for basic interactions with a limited range of responses (Adam, Wessel, & Benlian, 2020).

Due to chatbots' limited capabilities, some users may have negative experiences with chatbots. As a consequence of an unpleasant interaction with a bot, the user leaves dissatisfied, which in turn, negatively affects businesses' customer relationships (Brandztaeg & Følstad, 2018). Moreover, if the chatbot does not offer enough value for the customer, it will be left unutilized. Furthermore, ignoring users' frustrations can lead to negative perceptions of the service, ultimately leading to customers perceiving the chatbot as cold and incompetent (Brave & Nass, 2002). For example, users are frustrated with the bots' inability to provide a clear response to queries, lack of empathy, and low intelligence (Smolaks, 2019).

Since customer service chatbots are being implemented more frequently, it is important to examine how users react to different chatbots. Moreover, users will exhibit new behaviors and expectations in an online customer service situation (Brandztaeg & Følstad, 2018). Therefore, for a chatbot to be successful, it should be considered which design factors increase user acceptance.

The distant nature of online interactions has urged companies to create chatbots that act like humans to make customers feel like they are interacting with a traditional customer service agent (Go & Sundar, 2019). For example, chatbot developers add human characteristics to bots to compensate for that (Penn State, 2019). These design features include manipulating the chatbot's conversational style and appearance, usually represented in terms of an avatar, and incorporating human-like conversational cues into their responses.

Despite the growing popularity of customer service chatbots, there is still a gap in the theoretical knowledge of optimal chatbot design characteristics; the influence of the chatbot's appearance and conversational style is not entirely clear, and to what extent they influence the users' acceptance of chatbots.

This research aims to investigate if visual appearance and conversational tone chatbot design characteristics might influence users' perceptions of them in a customer service setting. Designers and developers would greatly benefit from the users' insights and perceptions of chatbots. When aware of how different design characteristics are perceived by the users, practitioners can save resources and time to design chatbots that lead to satisfied users who want to come back to the chatbot. Furthermore, this study contributes to the theoretical knowledge of chatbot design, especially in the context of acceptance in the customer service setting. Thus, the following research questions are proposed:

RQ1: To what extent does the visual appearance of a customer service chatbot influence their acceptance?

RQ2: To what extent does the conversational style of a customer service chatbot influence their acceptance?

The extensively applied Technology Acceptance Model (TAM) will serve as the basis for this study. The original TAM variables perceived ease of use perceived usefulness, and attitude are kept. The model is extended with additional variables perceived helpfulness and perceived competence.

In the next sections, literature regarding user acceptance of chatbots will be discussed. Additionally, literature about human-chatbot interactions, chatbot appearance, and conversational style will be reviewed. Based on the findings, 16 hypotheses will be presented. Later, the research design and methods will be elaborated, followed by the data analysis and results. The final chapter includes the discussion, limitations, and the practical and theoretical implications of this study.

2 Theoretical Framework

2.1 Understanding user acceptance

The success of any information technology depends on whether users are going to adopt it or not. Therefore, understanding the reason why people adopt, accept, and use information technologies is crucial in developing optimal chatbots (Brandtzaeg & Følstad, 2018). For this reason, developers must know more about the experience users have with chatbots, and what motivates their future use. Many chatbots are developed without understanding why and how people use them, resulting in unsatisfied users (Brandztaeg & Følstad, 2018). However, customer service is a relatively big part of peoples' life. Thus, it must be recognized if customers find customer service chatbots useful and valuable; a chatbot that offers a bad user experience will not be successful in the long term.

It is important to investigate how chatbots can be designed to resonate with users' needs, behaviors, and desires (Brandztaeg & Følstad, 2018). For example, current chatbots often fail, because they seldom succeed in unpredictable, open-ended conversations (Adam, Wessel, & Benlian, 2020; Brandztaeg & Følstad, 2018; Coniam, 2015). To create a successful chatbot, developers need to have in-depth knowledge about peoples' motives to use them, how they are perceived, and why people keep or stop using chatbots. Moreover, it is important to understand the users' goals and the context of use, including the tasks they must perform to reach that goal.

2.2 Technology Acceptance Model

The theory of reasoned action (TRA) is the earliest acceptance theory. The model was developed by Icek Ajzen and Martin Fishbein in 1967. TRA states that specific behavior is determined by behavioral intent , which is determined by one's attitude and subjective norms towards specific behavior (Fishbein and Ajzen as cited in Davis et al. 1989). The central message of TRA is that people make rational decisions regarding technology use (Davis, 1989).

A model extending from TRA is the Technology Acceptance Model (TAM), developed by Davis in 1986. TAM derives from TRA to determine whether there is a causal relationship between perceived usefulness (PU) and perceived ease of use, the user's attitudes, intentions, and adoption of technology. Moreover, users will want a balance between ease of use and performance benefits (Davis, 1989). In TAM, peoples' attitudes towards technology are determined by its ease of use and usefulness.

Consequently, a positive attitude towards a technology positively influences the behavioral intention to use it.

TAM is one of the most extensively reviewed models in the literature. For example, a meta-analysis by Legris, Ingham & Collerette (2003) reviewed TAM by analyzing 22 published articles from 1980 to 2001 in which the model was applied. Their findings concluded that the model generates statistically reliable results and is tested empirically. However, the authors suggest that the model should have additional factors to explain more than 40% of system use. Moreover, since TAM was originally intended for organizational use, it is recommended that external variables need to be added (Legris, Ingham, & Collerette, 2003). For example, on top of perceived ease of use and perceived usefulness, chatbot acceptance has been studied in the context of the perceived competence, trustworthiness, and helpfulness. Therefore, the model for this study incorporates the original TAM variables perceived usefulness, perceived ease of use, and attitude, and adds the chatbots' perceived competence, trust towards chatbots, and perceived helpfulness as additional variables. The next sections will include a detailed explanation of each of the variables included in the model of this research, including a hypothesis.

2.2.1 Perceived usefulness

The perceived usefulness is defined as "The degree to which an individual believes that using a particular system would enhance his or her job performance." (Davis, 1989, p. 320). The original definition was based on the workplace context. However, studies have shown that perceived usefulness plays a role across technologies and contexts, including chatbots (Zarouali, van den Broeck, Walrave, & Poels, 2018). Additionally, perceived usefulness is one of the key variables in determining the use and attitude towards retailers (Kulviwat et al., 2007; Cheng, Gillenson, & Sherrel, 2002; Chen & Tan, 2004; Zarouali et al., 2018).

Perceived usefulness is a significant predictor of continuance intention for chatbots (Ashfaq, Yun, Yu, Loureiro, 2020). After all, customer service chatbots are designed to help customers and provide them with useful information. Moreover, it has been demonstrated that perceived usefulness is positively linked with the intention to adopt (Thong, Hong, & Tam, 2006; Venkatesh, 2000), the continuance of use (Agarwal & Karahanna, 2000), and satisfaction (Limayem et al., 2007). Therefore, the more benefits users find from using a chatbot, the more satisfied they are with the experience. Consequently, the likelihood that they continue using chatbots is higher (Oghuma, Libaque-Saenz, & Wong, & Chang, 2015).

Chatbots' anthropomorphic qualities have been noted to increase their perceived usefulness in the enterprise context. Rietz, Benke, and Maedche (2019) studied how anthropomorphic chatbot characteristics influence adoption in the workplace. The authors explored the impact of functional and anthropomorphic chatbot features on employees' acceptance using Slack, a popular enterprise collaboration system. The authors concluded that anthropomorphic chatbot design features have a highly significant effect on perceived usefulness. However, what is less clear is the nature of chatbots' design features in the customer service context; only a few studies have examined the relationship between anthropomorphic design features and perceived usefulness in customer service (Sheehan, Jin, & Gottlieb, 2020), especially in terms of the chatbots' visual appearance.

2.2.2 Perceived ease of use

The perceived ease of use is correlated with the acceptance of new technologies (Davis, 1989). Therefore, products that are easy to use will be more likely to be accepted by users (Davis, 1989). Davis (1989) defines perceived ease of use as "the degree to which an individual believes that using a particular

technology will be free of mental effort" (Davis, 1989, p. 320). Thus, Davis argues that ease of use indicates technology acceptance. In other words, perceived ease of use can increase the enjoyment of using an information system. When technology is easy to use, it has a positive effect on efficacy and competence.

Perceived ease of use is often linked with the infrastructure of technology, for example, the interface of a chatbot (Kasilingam, 2020). In other words, the chatbot must be user-friendly, which lowers the barrier to entry (Kasilingam, 2020). A study conducted by Kasilingam (2020) identified perceived ease of use as an important factor affecting chatbot use in the mobile shopping environment.

A study conducted by Sheehan, Jin, and Gottlieb (2020) demonstrated that perceived ease of use plays a role in increasing adoption intent. However, this relationship was mediated by anthropomorphism, suggesting that people prefer human-like chatbots as they are easier to use because they mimic human service agents (Sheehan, Jin, & Gottlieb, 2020). Thus, it can be hypothesized that a chatbot that behaves like a human would be perceived as easier to use.

2.2.3 Perceived competence

Before the use of chatbots in customer service, customers interacted with human support agents. Already then, the competence of the support agent was important for customers (Verhagen, van Nes, Feldberg, & van Dolen, 2014). Furthermore, customers are satisfied with interactions when the communicator appears to be credible, competent, and conveys expertise (Verhagen et al., 2014).

In the context of chatbots, competence has been identified as the most important factor in explaining trust in them in customer service (Przegalinska, Ciechanowski, Stroz, Gloor, & Mazurek, 2019; Nordheim, Følstad, & Bjørkli, 2018; Koh & Sundar, 2010). Since the perceived competence of a customer service agent has been widely recognized in previous research (Corritore, Kracher, & Wiedenbeck, 2003; Przegalinska al., 2019; Følstad, Nordheim, & Bjørkli, 2018; Koh & Sundar, 2010), it is included as a dependent variable in this study.

Nordheim et al. (2018) studied how the perceived competence of chatbots influences users' trust in them. In their study, expertise concerned the users' perception of the chatbot's knowledge, experience, and competence as reflected in the interactive system. The authors identified perceived competence as the most important factor influencing trust towards customer service chatbots. Moreover, competence was linked to four categories: the correct answer, interpretation, concrete answer, and eloquent answer. Correct answer refers to the accuracy and relevance of the information that the bot provides. Interpretation is linked to the chatbot's (in)correct interpretation of an answer, and how it expresses misunderstandings. Concrete answers refer to clear and easily understandable answers given by the chatbot. Lastly, eloquent answer means that the chatbot sounds professional.

Nordheim et al. (2018) suggest that the expertise of a chatbot is perceived as important because they do not yet possess natural communication skills. Thus, the chatbot must adequately adapt to the users' needs; if the bot misinterprets a request or provides impartial answers in a style that is not adapted to the dialogical context, it is perceived as less competent (Luger & Sellen, 2016).

Ciechanowski et al. (2019) studied chatbots' perceived competence in the context of anthropomorphism, attempting to investigate the extent to which participants are willing to collaborate with bots on different anthropomorphic levels. To manipulate anthropomorphism, the authors tested two chatbots without and with an avatar. The results showed that the less a chatbot was perceived as human, the less competent it seemed to the participants. Thus, it can be hypothesized that a chatbot that appears more human would be perceived as more competent by the users.

2.2.4 Perceived helpfulness

Helpfulness has been identified as one of the core tenets of customer service; a customer service situation that ends with customers getting answers to their questions leads to more positive attitudes about those services (Coyle, Smith, & Platt, 2012; Walther, Liang, Ganster, Wohn, & Emington, 2012; Zarouali et al., 2018). Zarouali et al. (2018) define the perceived helpfulness of a chatbot as "the degree to which the responses of the chatbot are perceived to be relevant, hereby resolving consumers' need for information" (Zarouali et al., 2018, p. 493).

It is very important for customers to be able to communicate and get helpful assistance from companies online; previous studies have established that the helpfulness of a chatbot is imperative to influencing positive attitudes (Følstad, Nordheim, & Bjørkli, 2018; Zarouali et al., 2018). It is not a surprise that customers appreciate chatbots that can help them save time or obtain information easily (Brandtzaeg & Folstad, 2017).

The perceived helpfulness of a customer service chatbot has been noted to increase positive attitude towards services (Zarouali et al., 2018). The ease of receiving help and information has been identified as the most important motivation for using chatbots (Brandtzaeg & Folstad, 2017; Zarouali et al., 2018). As the perceived helpfulness of a chatbot plays such an important role, it is important to examine the extent to which chatbot design features influence its perceived helpfulness.

Next to perceived usefulness, the perceived helpfulness of a chatbot has been highlighted to play a role in determining users' attitudes towards them (Følstad & Bjørkli, 2018). A study conducted by Følstad, Nordheim, and Bjørkli (2018) examined the acceptance of customer service chatbots in the context of trust. The authors tested four chatbots and measured factors that affect the participants' trust in them. The results indicated that the quality of the chatbot's interpretation of the users' request and advice is one of the most important factors influencing its perceived trust.

Recent work by Laban and Araujo (2020) focused on users' perceptions of chatbots in customer service settings. The authors hypothesized that a chatbot's perceived anthropomorphism mediates the relationship between perceiving the agent as more cooperative. They concluded that anthropomorphic chatbot design features are associated with higher perceptions of cooperation. Cooperation was defined as a ''human personality trait that is embodying qualities such as social tolerance, empathy, helpfulness, and compassion" (Laban & Araujo, 2020, p. 3). Thus, it can be hypothesized that a chatbot that looks or converses like a human would be perceived as more helpful than a chatbot that does not resemble a human.

2.2.5 Attitude towards using chatbots

According to Ajzen and Fishbein (1980), people with favorable attitudes towards technology are more inclined to perform a particular behavior. Davis, Bagozzi & Warshaw (1989) defined attitude as an individual's positive or negative feeling about using technology.

It seems that anthropomorphic design cues in chatbots increase customers' feeling of social presence (Go & Sundar, 2019). When a chatbot is perceived as having a social presence, its' perceived homophily is increased. Homophily is defined as "the amount of similarity two people perceive themselves as having" (Rocca & McCroskey, 1999, p. 309). Consequently, highly homophilic chatbots play a role in creating favorable attitudes towards them (Go & Sundar, 2019). Furthermore, human-like cues in chatbots are rated more favorably than non-human resembling agents (Koda, 1996). Koda (1996) studied the personification of poker software agents, including the effects of face and facial expressions. He found that people have more favorable attitudes towards agents with a face.

Additionally, Sundar et al., (2016) show that chatbot dialogue plays an important role in creating favorable attitudes towards them. Bots that can have high message interactivity (human-like conversation) boost positive attitudes towards chatbots (Go & Sundar, 2019). Thus, based on the findings in the literature, it can be hypothesized that chatbots with anthropomorphic qualities increase customers' attitudes towards the bot.

2.2.6 Trust in chatbots as a mediator

Trust is present in most economic and social interactions, especially in uncertain situations (Pavlou, 2003). Trust plays a key role in determining the success or failure of online businesses (Lu et al., 2016). Therefore, it is important to explore the role trust towards chatbots plays in an online customer service setting, as users' trust towards chatbots is determined by their trusting beliefs about the agents' perceived level of competence, benevolence, and integrity (Mayer, Davis, & Schoorman, 1995; McKnight et al., 2002). The link between anthropomorphism and trust is supported by several studies, indicating that people tend to trust human-like behavior, such as anthropomorphic appearance and conversational style (Cassell & Bickmore, 2000; Ho & MacDorman, 2010; Nordheim, Følstad & Bjørkli, 2018). For example, high interaction in conversations and social presence (Go & Sundar, 2019) elicit trust, which are highly anthropomorphic traits (Toader et al., 2020). Moreover, trust has been identified as a determinant of perceived ease of use and perceived usefulness (Pavlou, 2003). Thus, it can be hypothesized that trust moderates the relationship between the dependent variables.

2.3 Chatbot anthropomorphism as a design feature

Chatbot designers should keep in mind that humans tend to respond to computers in a human-like manner, even when aware that they are interacting with a computer (Nass & Moon, 2000; Reeves & Nass, 1996). For example, people tend to act politely and friendly towards chatbots, indicating that humans apply social interaction rules to computers (Nass, Steuer, & Tauber, 1994). Moreover, people attribute human characteristics to computers, such as ethnicity, obtaining social rules within these categories (Nass & Moon, 2000). For instance, Sproull et al. (1996) discovered that participants applied personality traits to interfaces with a face and a voice compared to a computer with just a text display.

In the real world, people are good at communicating with other people and can relate to them (Laurel, 1997). Consequently, humans apply this skill when interacting with inanimate objects by anthropomorphizing them. Anthropomorphism is defined as "The representation of Gods, nature, or not-human animals, as having human form, or as having human thoughts and intentions" (Oxford Reference, n.d.). Additionally, anthropomorphism is quite normal in everyday life, such as applying human-like qualities to objects like houses, cars, and ships (Laurel, 1997).

Different theories exist in the literature regarding chatbot anthropomorphism. Laurel (1997) states that anthropomorphism benefits human-robot interactions. There are certain tasks that chatbots are meant to do, and those should reflect on their design (Laurel, 1997). For example, customer service chatbots are often used to do repetitive tasks, such as answering FAQs. Therefore, Laurel (1997) suggests that chatbots should have two anthropomorphic qualities: responsiveness and the capacity to perform actions. In turn, these qualities can be expressed in terms of character traits. Anthropomorphizing a chatbot means that it is attributed to a character; as in traditional drama, characters have traits that are represented through appearance, sound, and communication style (Laurel, 1997).

Laurel (1997) argues three essential arguments to support anthropomorphizing chatbots in human-robot interactions. First, personalized chatbots help users make assumptions about their

behavior. For example, users have certain expectations of how a customer service agent should behave and look, and that should be reflected in its design. Second, human-like agents invite the user to an interaction. Third, the metaphor of the chatbot as a character channels user to perceive it as having agency. Consequently, users pay more attention to their responsiveness, competence, accessibility, and ability to perform actions (Laurel, 1997).

In contrast to Laurel's (1997) defense of anthropomorphizing conversational agents, Erickson (1997) argues that anthropomorphizing robots contradict users' need for simple, effective interfaces. Erickson (1997) states that humanizing robots may lead to systems that try to mimic humans too much; too emotive and fake humanness may stand in the way of what users need. However, he states that "we may not have much of a choice" (Erickson, 1997, p.79), as people tend to react to computers as they would to humans (Erickson, 1997; Reeves & Nass, 1996; Nass & Moon, 2000). Therefore, it is important to investigate how chatbots with different anthropomorphic levels are perceived, whether their visual appearance or conversational style contribute to users' tendency to anthropomorphize chatbots.

Go & Sundar (2010) propose that people tend to evaluate chatbots' performance based on their pre-existing stereotypes about robots and computers. In other words, when users know that they are interacting with a bot, they place more emphasis and expectations on their pre-existing perceptions of robots and computers. On the other hand, a chatbot with several human-like identity cues is evaluated based on users' expectations of other humans. That being said, it is important to consider the visual aspects of a chatbot. Ultimately, the development of these bots is based on the understanding of the users' needs and motivations (Følstad & Bjørkli, 2018).

2.3.1 Visual appearance

In the natural world, people categorize one another based on various aspects, such as their physical characteristics (Argyle, 1988). Similarly, as people interact with others online, they create mental models of each other (Nowak & Biocca, 2003; Reeves & Nass, 1996). Thus, it is likely that the virtual image influences the categorization of the environment and the medium (Nowak & Biocca, 2003). For example, when humans are presented with an image, they perceive the people and the environment as more "real" (Taylor, 2002).

The appearance of the chatbot can be an important feature to consider when designing its interface (Appel, von der Pütten, Krämer & Gratch, 2012). Appel et al. (2012) suggest emphasizing the right design of a chatbot since its appearance influences the user's interaction and perceptions of it. Moreover, an international study that involved 7000 participants across continents reported that 46% of consumers prefer chatbots with human-like images; 20% of those would like to see them as an avatar for a chatbot (Singh, 2017). Thus, by creating chatbot avatars, designers aim to compensate for the lack of social presence in a virtual environment.

2.3.2 Conversational style

Since much of customer service operations are now conducted online rather than in person, research has focused on simulating natural human language in computers. Most of the interactions between humans and chatbots are still only text based. Text-based chatbots are popular due to their ease of implementation; most of them rely on scripts developed by designers rather than natural language processing. As these interactions are scripted, chatbot developers must understand which chatbot language characteristics positively influence users' perceptions of the bot.

Computer-Mediated Communication (CMC) is a unique field since the communication process of a written chatbot lacks body language cues, vocal tones, and communicative pauses (Hill, Ford, Ferrares, 2015). Nevertheless, there is still much to learn about how CMC can achieve the expectations that humans have towards interaction with a chatbot. Additionally, both the comprehension and generation of human language are extremely complex; while computers and humans can communicate with each other, A.I. scientists have underestimated the complexity of human language for a long time (Hill, Ford & Ferrares, 2015). Indeed, the biggest hurdle for computers is to understand what words mean and adapt to the variability of expressions and words (Hill, Ford, & Ferrares, 2015).

A study conducted by Gnewuch, Maedche, and Morana (2017) identified the current issues for conversational agents in customer service. For example, they found that bots have only a limited understanding of natural language. Currently, chatbots offer too much generic information unrelated to the customer's questions. Furthermore, current bots are not able to hold longer conversations that reach a specific goal. Moreover, chatbots are not advanced enough to determine the direction of a conversation; they are often not able to detect and recover from misunderstanding, nor they can ask for clarification when they do not understand customer inquiries. Moreover, as mentioned earlier, the authors noted that chatbots often lack traditional characteristics of customer service agents, such as understanding context-dependent cues (Gnewuch, Maedche, and Morana, 2017).

Natural conversation flow can be enhanced by implementing a Conversational Human Voice (CHV) (Kelleher, 2009). Scholars have noted that certain aspects of conversational style can affect chatbot anthropomorphism, such as empathy, informal attitude, personalization, and humor (Liebrecht & van Hooijdonk, 2018). There are many ways to increase the humanness of a chatbot in the way it converses through text-based platforms. For example, studies have found that word frequency, response latency, and styles influence the extent to which the chatbot is anthropomorphized (Gnewuch, Morana, Adam & Maedche, 2018).

The use of CHV allows the bot to use informal speech and be open to dialogue (Liebrecht & van Hooijdonk, 2020). Liebrecht and van Hooijdonk (2018) have identified three linguistic elements for CHV: personalization, informal speech, invitational rhetoric. Personalization refers to the bots' ability to address users personally. The second element, informal speech, refers to the extent that the bot uses casual language that differs from corporate language. For example, the bot could use emojis (😊) or interjections (such as "haha"). The third strategy refers to the flow of conversation that creates a mutual understanding between the user and the bot (Liebrecht & van Hooijdonk, 2018).

2.4 Hypotheses

As described, this research will focus on studying how chatbots' visual appearance and conversational style influence perceived usefulness, ease of use, competence, helpfulness, and attitude towards chatbots. Based on the described expectations, the hypotheses are defined as follows as shown in Table 1:

Table 1

Overview hypotheses

Hypothesis	Description
H1a	The chatbot with a human visual appearance will have a more positive effect on the **perceived usefulness** than a chatbot that is not represented by human visual appearance
H1b	The chatbot with a human visual appearance will have a more positive effect on the **perceived ease of use** than a chatbot that is not represented by a human visual appearance
H1c	The chatbot with a human visual appearance will have a more positive effect on the **perceived competence** than a chatbot that is not represented by human visual appearance
H1d	The chatbot with a human visual appearance will have a more positive effect on the **perceived helpfulness** than a chatbot that is not represented by a human visual appearance
H1e	The chatbot with a human visual appearance will have a more positive effect on the **attitude towards using chatbots** than a chatbot that is not represented by a human visual appearance
H1f	The chatbot with a human visual appearance will have a more positive effect on **trust towards chatbots** than a chatbot that is not represented by a human visual appearance
H2a	The chatbot with a human-like conversational style will have a more positive effect on the **perceived usefulness** than a chatbot that uses a technical conversational style
H2b	The chatbot with a human-like conversational style will have a more positive effect on the **perceived ease of use** than a chatbot that uses a technical conversational style
H2c	The chatbot with a human-like conversational style will have a more positive effect on the **perceived competence** of use than a chatbot that uses a technical conversational style
H2d	The chatbot with a human-like conversational style will have a more positive effect on **the perceived helpfulness** of use than a chatbot that uses a technical conversational style
H2e	The chatbot with a human-like conversational style will have a more positive effect on the **attitude towards using chatbots** than a chatbot that uses a technical conversational style

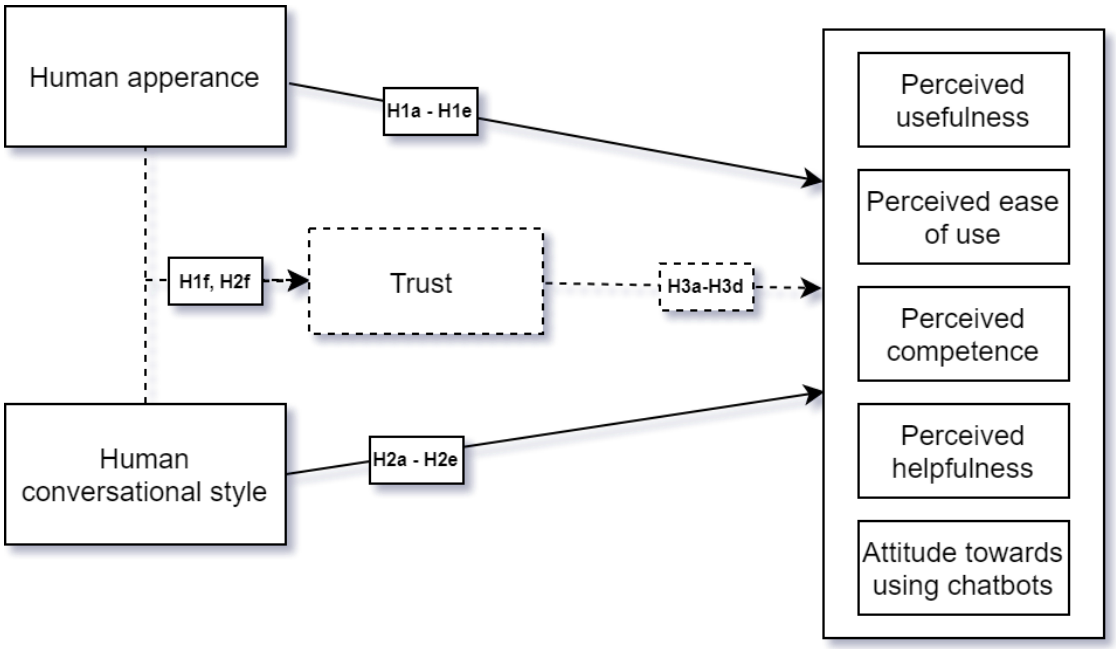
H2f	The chatbot with a human-like conversational style will have a more positive effect on the **trust** than a chatbot that uses a technical conversational style
H3a	The possible effects of human visual appearance and human conversational style on the **perceived usefulness** will be mediated by trust
H3b	The possible effects of human visual appearance and human conversational style on the **perceived ease of** use will be mediated by trust
H3c	The possible effects of human visual appearance and human conversational style on the **perceived helpfulness** will be mediated by trust
H3d	The possible effects of human visual appearance and human conversational style on the **perceived helpfulness** will be mediated by trust

2.5 Research model

The following model (Figure 2) serves as the theoretical model to guide the research.

Figure 2.

Research Model



3 Study 1 – Online experiment

3.1 Methodology

3.1.1 Research design

As shown in Figure 1, this study tested the research model by conducting a 3 (human avatar, robot avatar, logo avatar) x 2 (formal and informal conversational style) online experiment. During this experiment, the independent variables were manipulated to test the effects on perceived usefulness, ease of use, helpfulness, competence, attitude, and trust. By using a 3x2 between-subjects experiment,

participants of the experiment were randomly assigned in one of the six conditions in which the avatar and conversational style of the chatbot were manipulated. Table 2 shows an overview of the experimental conditions.

Table 2

Experiment conditions

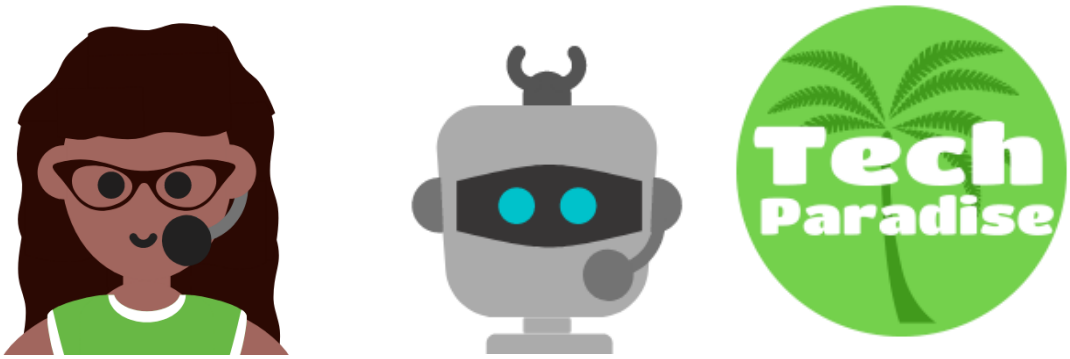
Condition number	Avatar	Conversational style
1	Human	Formal
2	Human	Informal
3	Robot	Formal
4	Robot	Informal
5	Logo	Formal
6	Logo	Informal

3.1.2 Stimulus material

To test the six conditions, two different chatbot conversational styles were created. Additionally, three different chatbot avatars were developed. The human-like conversational style incorporated the key linguistic elements that are in line with anthropomorphic qualities as suggested by Liebrecht and Hooijdonk (2019): humor, empathy, emoticons, and informal style of speech. Moreover, the informal chatbot had a longer response time, imitating the way a human would take a short time while typing a response. The other conversational style was more machinelike, including formal, straight-to-the-point answers without the use of emoticons or colloquialisms. The formal chatbot gave an instant answer to the users' questions. Additionally, Appendix 1 shows a graphical presentation of all the six conditions. Appendix 2 shows the full conversations in each of the conditions. The visual appearance of the chatbot was designed by the author, including either a human named Olivia, a robot named Skip, and a logo of the fictional company "Tech Paradise", as presented in Figure 2.

Figure 2

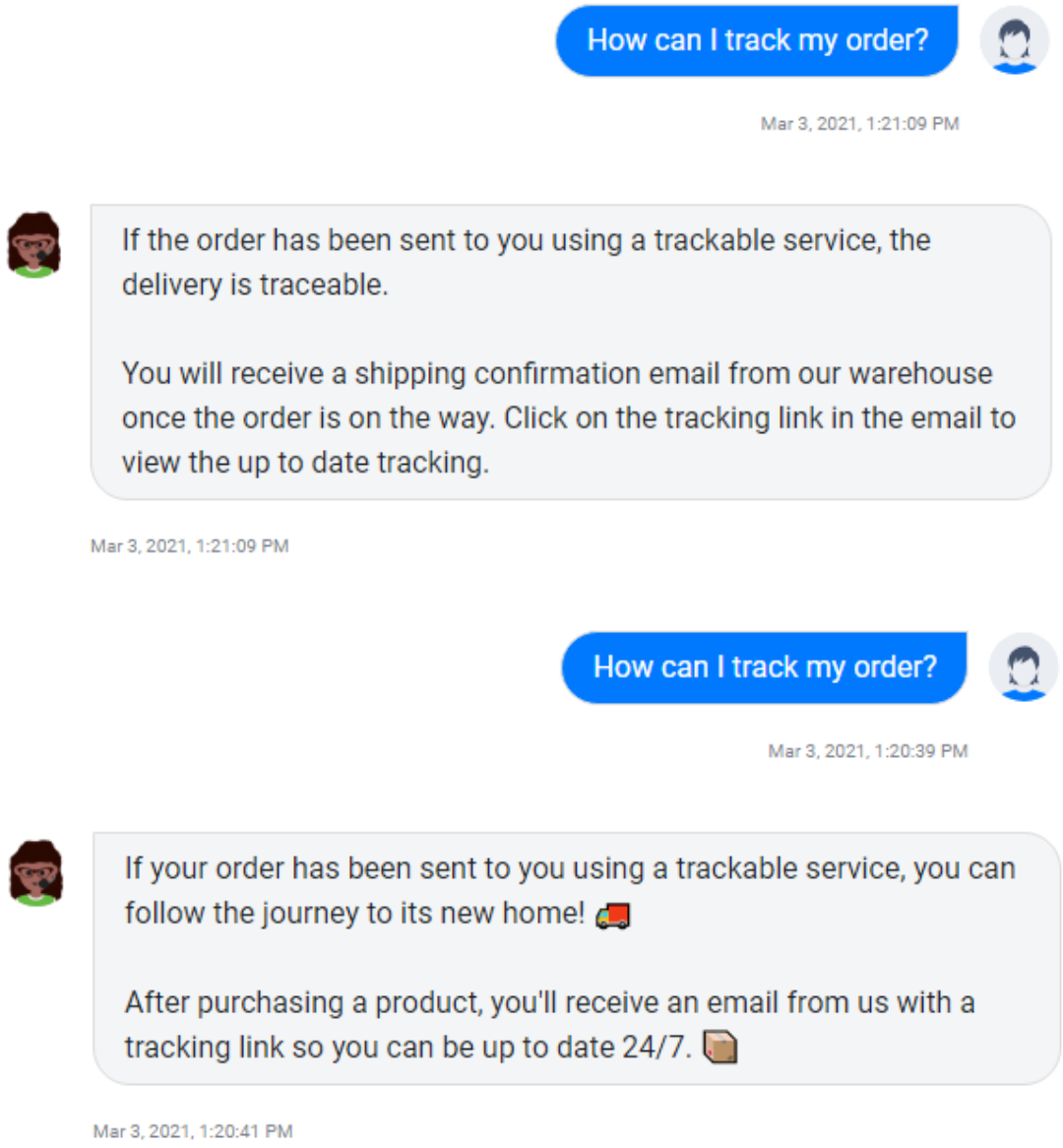
Chatbot avatars from human (left) to logo (right)



The two conversational styles were manipulated according to the findings from the literature. The formal conversational style was mechanic, had no response delay, and has no colloquialisms. In contrast, the informal conversational style attempted to mimic the way a human would chat, using emojis, slang,

delayed responses, lexical bundles, and active voice. Figure 3 shows an example of the conversational style differences in the conditions.

Figure 3.
Conversational style from formal (first) to informal (second)



Pre-test

3.1.3 Pre-test 1

A preliminary test was conducted to check the materials. The test was conducted to determine whether the avatar was correctly perceived as a human, robot, or logo. Moreover, the conversational style was tested to see if the participants can distinguish between the formal and informal styles. At the end of the test, the participants could write comments about the interaction.

The anthropomorphism of the chatbot's avatar was measured with a 5-point semantic differential scale of Bartneck, Croft, Kulic, and Zoghbi (2009). The scale used in the pre-test includes 4 items: Fake/Natural, Machinelike/Humanlike, Unconscious/Conscious, Artificial/Lifelike. One item

(Moving rigidly/moving elegantly) was dropped because the chatbot's avatar is a static image. The anthropomorphism in the chatbot's conversational style was measured with a 5-point semantic differential scale (Bartneck, et al., 2009). The scale includes 5 items: Stagnant/Lively, Mechanical/Organic, Artificial/Lifelike, Inert/Interactive, and Apathetic/Responsive.

25 people participated in the pre-test. Each respondent was exposed to one of the six conditions. The results of the preliminary test indicated that the participants could correctly distinguish between the formal (M= 2.52, SD 0.79) and informal (M=3.77, SD = 0.65) conversational styles. The independent sample T-test result of t (-4.28) $p < .001$ shows that the two groups were perceived differently in terms of anthropomorphism. Thus, H0 can be rejected, and conclude that humanlike and machinelike conversational styles are perceived differently. However, there were no statistically significant differences between the appearance group means as determined by one-way ANOVA (F (2,20) = .106, p = .900). Thus, another pre-test was conducted to explore the causes for these results.

3.1.4 Pre-test 2

The second pre-test focused on measuring the anthropomorphism of the chatbot's visual appearance. The participants of the first pre-test did not successfully differentiate between the three groups. Therefore, a different scale was used to measure the chatbot's visual appearance. The anthropomorphism in the chatbots' appearance was measured with a 5-point semantic scale from Bartneck et al. (2009). The scale ranges from 1 = "strongly disagree" to 5 "strongly agree". The scale includes 7 items, for example, "The impression of the chatbot's picture felt natural".

41 people participated in the second pre-test. Each respondent was exposed to one of the six conditions. The results of the second pre-test indicated that the participants, again, could not correctly distinguish between the human (M= 3.01, SD= .78) robot (M=2.95, SD= .92), and logo (M=3.06, SD= .81) avatar having different levels of anthropomorphism. One-way ANOVA indicated that there were no statistically significant differences between the means of the three groups (F (2,40) = .039, p= .962). To further investigate the results, a third pre-test was conducted for the chatbot avatar.

3.1.5 Pre-test 3

The third pretest was conducted to determine whether the participants can distinguish between the human, robot, and logo avatars. In Qualtrics survey, the participants were shown three different images of the avatars in After viewing each avatar, the respondent had to indicate whether the avatar shows a human (yes/no), logo (yes/no), or robot (yes/no). 35 people took part in the pre-test. 66.7% could indicate that the human avatar was a human. Additionally, 82.8% could indicate that the robot avatar represented a robot. Finally, 84.6% could indicate that the logo avatar represented a logo. Thus, it could be concluded that the participants could correctly differentiate between the different avatar types.

3.2 Main study

3.2.1 Procedure

In the main study, the participants were asked to interact with one of the chatbot conditions. First, the participants had to read a fictive scenario about an online web store that specializes in technology. In the scenario, the participant is considering buying headphones, but they want to ask some questions from the chatbot first.

The chatbot was embedded in a Qualtrics survey. The participants were presented with seven questions that they must type to the chatbot. The interaction took approximately five minutes,

Filling the survey took approximately 15 minutes. First, the participants answered demographic questions related to gender, educational status, and age. After that, the participants had to read the scenario and proceed to the interaction with the chatbot. After the interaction, the participants had to answer questions about the conversational style, visual appearance, perceived usefulness, ease of use, competence, helpfulness, attitude towards using chatbots, and trust towards chatbots. Finally, the participants could leave their e-mail addresses to volunteer for an interview. The questionnaire can be found in Appendix 5. Based on their experience the participants filled in a questionnaire.

The quantitative data file was exported to SPSS and prepared for analysis. After cleaning the data, several statistical analyses were performed, which are explained more in detail in the later section of this paper.

3.2.2 Participants

For the experiment, a total of 429 participants filled in the survey. 89 responses were deleted due to incomplete answers, and one response was deleted because of negative consent, resulting in a total of 339 respondents. The participants were recruited through online social media channels Facebook, WhatsApp, and LinkedIn. The survey was online from the 5th of November 2020 to the 29th of December 2020.

Every condition had an approximately equal number of males and females. Most of the respondents were aged between 18-24 (66.4%), followed by 25-34 (29.2%). Additionally, most of the respondents (44.0%) reported a bachelor's degree as their highest completed education, followed by high school (34.8%) and master's degree (18.3%), and a Ph.D. (2.1%). Table 4 shows the demographics across the six conditions.

Table 4

Demographics across conditions

Condition	**N**	**Age**	**%**	**Gender**	**%**
Human avatar + formal conversational style	58	18-25	65.5	Female	79.3
		25-34	31.0	Male	20.7
		35-45	0.0		
		46-54	3.4		
		55-64	0.0		
Human avatar + informal conversational style	56	18-25	14.7	Female	73.2
		25-34	19.2	Male	26.8
		35-45	33.3		
		46-54	50.0		
		55-64	0.0		
Robot avatar + formal conversational style	55	18-25	61.8	Female	74.5
		25-34	36.4	Male	25.5
		35-45	1.8		
		46-54	0.0		
		55-64	0.0		

Robot avatar + informal conversational style	54	18-25	75.9	Female	79.6
		25-34	20.4	Male	20.4
		35-45	1.9		
		46-54	1.9		
		55-64	0.0		
Logo avatar + formal conversational style	57	18-25	70.2	Female	66.7
		25-34	26.3	Male	33.3
		35-45	0.0		
		46-54	3.5		
		55-64	0.0		
Logo avatar + informal conversational style	59	18-25	66.1		
		25-34	27.1	Female	66.1
		35-45	3.4	Male	33.9
		46-54	0.0		
		55-64	3.4		

3.3 Measurements

In this section, the quantitative and qualitative measurements are described. The online experiment measured the perceived usefulness, ease of use, helpfulness, and competence of the chatbot. Additionally, the participants were asked about their trust towards the chatbot, as well as their attitude towards using chatbots in the future. Moreover, interviews were conducted to discover opinions that were not apparent from the results of the online experiment. The quantitative measures can be found in Appendix 3 and the interview protocol can be found in Appendix 4.

3.3.1 Perceived usefulness

The scale for perceived usefulness is adapted from Davis (1989) (α=0.97) and Scheerder (2018). The perceived usefulness of the used four items measuring aspects regarding the effectiveness and usefulness of the chatbot. The original scale measures PU before using the technology, from 1 (likely) to 7 (unlikely). However, as this study attempted to measure PU after using the bot, the scale was being adapted from 1 (disagree) to 7 (agree).

3.3.2 Perceived ease of use

The Perceived ease of use was measured with four items. The items on the scale measure the effort, time, and complexity of using the chatbot. The scale is adapted from Dabholkar's (1994) and Scheerder (2018) scale (α=0.86). The scale is a 7-point Likert scale ranging from 1 (disagree) to 7 (agree).

3.3.3 Perceived helpfulness

The perceived helpfulness scale was adapted from Sen and Lerman (2007), and Yin, Bond, and Zhang (2014). The original scale measured the helpfulness of online product reviews. In this study, the scale was used to measure aspects of the chatbot's helpfulness during the interaction. The scale is based on 9-point semantic differential-scaled items (α = 0.85), ranging from 1 (Not helpful at all/not useful at all/not informative at all) to 9 (Very helpful/useful/informative).

3.3.4 Perceived competence

The perceived competence was be measured with six items using a scale adapted from Cho (α= 0.99). The scale items measured the aspects of the chatbot's competence, proficiency, training, experience, and knowledge.

3.3.5 Attitude towards using chatbots

Attitude towards using the chatbot was measured with 4 items. The scale was adapted from Dabholkar (1994), measuring the respondents' feelings toward using a chatbot to contact a company.

3.3.6 Trustworthiness

The chatbot's trustworthiness was measured using a 7-point scale from Toader et al. (2019) (α = 0.91). The items measured aspects of the chatbot's sincerity, truthfulness, honesty, credibility, reliability, and overall trust in the chatbot.

3.4 Construct validity and reliability

3.4.1 Factor analysis

To evaluate the research's construct validity, a Principal Component Analysis (PCA) was conducted on the items with orthogonal rotation (varimax) with 25 items. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .92, which is 'superb', according to Field (2009). Furthermore, all KMO values for the individual items were above > .80, which is above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity χ^2 (210) = 6163.79, p < .001, indicated that correlations between the items were sufficiently large for PCA.

An initial analysis was run to obtain eigenvalues for each component. All the components had eigenvalues over Kaiser's criterion of 1 and in combination explained 72.99% of the variance. The components with an eigenvalue over 1 explain the relationship between the items the best. The factor loading with values lesser than 0.4 was disregarded as they were considered to have an insignificant effect on a factor (Field, 2009). For the dataset, factor loadings under .40 were suppressed.

The items of Perceived Helpfulness loaded as proposed in one factor. That was also true for the items for Trust and Competence. Therefore, these items in the construct were not changed. Item 4 for Perceived Ease of Use *("The chatbot is flexible to interact with"*) loaded under the same construct as the 6 items for Competence and was deleted. Moreover, Ease_of_use_4 *("Using the chatbot to contact as a company takes a lot of effort"*) showed cross-loading and was deleted from further analysis.

The Perceived Usefulness item 1 *("Using the chatbot to contact a company enables me to accomplish my goal more quickly"*) did not load under any of the other constructs and was deleted. Moreover, Usefulness item 2 ("*Using the chatbot enhances my effectiveness*") did not load to any constructs and was deleted. Usefulness item 3 *("Using the chatbot makes it easier to contact a company"*) was deleted as it loaded in the construct of helpfulness. Furthermore, Usefulness item 4 *("I*

find the chatbot useful when contacting a company") loaded under the same construct as Attitude and was merged with that construct.

The final factor analysis resulted in 21 items. To ensure reliability, Cronbach's alpha was calculated for all the remaining constructs. The Cronbach's Alpha is above .70, meaning that all the constructs can be considered as reliable. The reliability and the factor analysis can be found in Table 5.

Table 5

Factor analysis with 21 items and 5 constructs

Construct	α	Item	Components				
			1	2	3	4	5
Competence	.96	I believe the chatbot knew what it was doing	.71				
		I believe the chatbot is competent	.74				
		I think the chatbot is proficient	.71				
		I think the chatbot is trained	.79				
		I believe the chatbot is experienced	.85				
		I believe the chatbot is knowledgeable	.67				
Attitude	.91	Using the chatbot is a good idea		.79			
		Using the chatbot is a wise idea		.78			
		I like the idea of using the chatbot		.86			
		Using the chatbot would be pleasant		.82			
		I find the chatbot useful when contacting a company		.59			
Trust towards chatbots	.91	The chatbot seemed sincere during our interaction			.78		
		I felt that the chatbot was honest in our interaction			.87		
		I believe the chatbot was truthful when conversing with me			.86		
		I believe that the chatbot was credible during our conversation			.76		
Perceived helpfulness	.96	The chatbot was useful				.79	
		The chatbot was helpful				.78	
		The chatbot was informative				.79	
Perceived ease of use	.88	Using the chatbot to contact a company is complicated					.89

	Using the chatbot to contact a company is confusing					.89
	Using the chatbot to contact a company is confusing					.84
	Explained variance	7.86%	7.28%	4.91%	48.03%	4.91%
	Eigenvalue	1.65	1.53	1.03	10.09	1.03

4 Results

4.1 Multivariate analysis of variance (MANOVA)

The main effects have been tested with multivariate analysis of variance (MANOVA). To investigate the effects of the chatbot's visual appearance (avatar) and conversational style on the perceived ease of use, helpfulness, competence, and attitude towards using chatbots, a Wilk's Lambda (Λ) was performed using IBM SPSS Statistics. Before the analysis, it was investigated that all the underlying assumptions for performing MANOVA were met.

There visual appearance did not have an effect on the dependent variables, ($F(8, 666) = 1.163$, $p = .319$; Wilk's $\Lambda = 0.973$). Additionally, there was no statistically significant difference in the effects of the conversational style on the dependent variables, ($F(4, 334) = 0.751$, $p = .558$; Wilk's $\Lambda = 0.991$). Additionally, no significant results were found when exploring the interaction effect between the avatar and the conversational style ($F(8, 660) = 1.186$, $p = .305$; Wilk's $\Lambda = 0.972$).

Table 6

Results of multivariate analysis of variance

	Λ	F	p
Visual appearance	.973	1.164	.319
Conversational style	.991	0.751	.558
Visual appearance * Conversational style	.972	1.186	.305

4.2 Main effects

4.2.1 Main effects of visual appearance

The mean scores and the standard deviation of the dependent variables are displayed in Table 7, showing that visual appearance did not affect the dependent variable.

It was hypothesized that an avatar with a human appearance would affect the perceived ease of use. However, no significant effect was found for the main effect of the visual appearance on the perceived ease of use. The difference in mean scores between the human avatar the robot avatar, and the logo avatar was not significant ($F= 1.673$, $p = .189$). Thus, hypothesis 1b is not supported.

It was also hypothesized that an avatar with a human appearance would have a larger effect on the perceived helpfulness of the chatbot. A significant effect was found for the main effect of the avatar on the perceived helpfulness. The difference in the mean scores between the human avatar the robot, and the logo avatar showed a weak significance ($F=2.018$, $p=.05$), indicating that the logo avatar had the highest helpfulness mean score. Post hoc comparisons using the Tukey HSD test indicated that the mean

score for the human avatar was not significantly different than the robot or the logo, hypothesis 1c is not supported.

It was hypothesized that an avatar with a human appearance would have the largest effect on the perceived competence of the chatbot. The results yielded no significant effect. The difference in the mean scores between the human avatar (M=4.83, SD=1.27), the robot avatar (M=5.00, SD=1.15), and the logo avatar (M=5.0, SD=1.12) was not significant (F=.773, p=.462). Thus, hypothesis 1d is not supported.

Additionally, it was hypothesized that a chatbot with a human avatar would have a larger effect on the attitude towards using chatbots. However, the results showed no significant effect. The difference in the mean scores between the human avatar (M=5.16, SD=1.20), a robot avatar (M=5.36, SD=1.03), and the logo avatar (M=5.28, SD=1.19) was not significant (F=.904, p=.406). Thus, hypothesis 1e is not supported. Lastly, it was hypothesized that a chatbot with a human avatar would have a larger effect on the trust towards chatbots. However, the results showed no significant effect. The differences in the mean scored between the human avatar (M=5.20, SD=1.18), robot avatar (M=5.33, SD=.97), and the logo avatar (M=5.45, SD=1.12) was not significant (F=1.592, p=.205).

Table 7

Mean and standard deviation values for the main effects of avatar

Independent variable	Dependent variable	Manipulation	Mean	SD
Avatar	**Perceived ease of use**	Human	3.00	1.55
		Robot	2.67	1.44
		Logo	2.98	1.50
	Perceived helpfulness	Human	5.54	1.29
		Robot	5.88	0.99
		Logo	5.86	0.99
	Perceived competence	Human	4.83	1.27
		Robot	5.01	1.15
		Logo	5.00	1.12
	Attitude towards using chatbots	Human	5.16	1.20
		Robot	5.36	1.03
		Logo	5.28	1.19
	Trust	Human	5.20	1.18
		Robot	5.33	0.97
		Logo	5.45	1.12

4.2.2 Main effects of the conversational style

The mean scores and the standard deviation for the main effects of conversational style on the dependent variables are shown in Table 8. The table shows that there is no significant effect for the conversational style on the dependent variables.

It was hypothesized that an informal conversational tone would have a larger effect on the perceived ease of use of the chatbot (H2b). However, no significant effect was found for the main effect of the conversational stone on the perceived ease of use. The difference in the mean scores between the

formal (M=2.86, SD=1.44) and informal (M=2.92, SD=1.56) was not significant (F=.111, p=.739). Thus, hypothesis 2b is not supported.

It was also hypothesized that a chatbot with an informal conversational tone would have a larger effect on the perceived competence of the chatbot. The results showed no significant effect for the main effect of the conversational tone on the perceived competence. The difference in the mean scores between the formal and informal was not significant (F=1.195, p=.275). Thus, hypothesis 2c is not supported.

It was hypothesized that a chatbot with an informal conversational tone would have a larger effect on the perceived helpfulness of the chatbot**.** However, the results yielded no significant effect for the main effect of the conversational tone on the perceived helpfulness of the chatbot. The difference in the mean score between the formal and informal was not significant (F=.350, p=.554). Thus, hypothesis 2d is not supported.

It was hypothesized that a chatbot with an informal conversational tone would have a larger effect on the attitude towards using chatbots. However, the results showed no significant effect for the conversational tone on the attitude towards using chatbots. The differences in the mean scores between the formal and informal were not significant (F=.102, P=.750). Thus, hypothesis 2e is not supported.

Lastly, it was hypothesized that a chatbot with an informal conversational tone would have a larger effect on the trust towards using chatbots. However, the results showed no significant effect. The difference between the mean score between the formal and informal was not significant (F=.003, p=.953).

Table 8

Mean and standard deviation values for the main effects of conversational style

Independent variable	**Dependent variable**	**Manipulation**	**Mean**	**SD**
Conversational style	**Perceived ease of use**	Formal	2.86	1.44
		Informal	2.92	1.56
	Perceived helpfulness	Formal	5.71	1.05
		Informal	5.78	1.16
	Perceived competence	Formal	4.88	1.19
		Informal	5.02	1.68
	Trust	Formal	5.33	1.0
		Informal	5.32	1.1
	Attitude towards using chatbots	Formal	5.28	1.03
		Informal	5.25	1.25

4.3 Interaction effects

There was no interaction effect between the visual appearance and the conversational style as shown in Table 6 (F= 1.186, p = .305). The results of the MANOVA analysis led to the conclusion that there was no interaction between the two independent variables. Table 9 shows the means and standard deviations for each dependent variable.

Table 9

Mean and standard deviation values for the interaction effects of avatar and conversational style

Independent variable	Dependent variable	Conversational style	Avatar	Mean	SD
Conversational style * Avatar	**Perceived ease of use**	Formal	Human	3.11	2.51
			Robot	2.55	1.40
			Logo	5.86	1.39
		Informal	Human	2.90	1.60
			Robot	2.55	1.48
			Logo	2.91	1.62
	Perceived helpfulness	Formal	Human	5.36	1.27
			Robot	5.87	0.83
			Logo	5.92	0.93
		Informal	Human	5.73	1.30
			Robot	5.83	1.34
			Logo	5.86	1.06
	Perceived competence	Formal	Human	4.82	1.31
			Robot	4.86	1.22
			Logo	4.96	1.96
		Informal	Human	4.86	1.24
			Robot	5.16	1.08
			Logo	5.05	1.82
	Attitude towards using chatbots	Formal	Human	5.15	1.05
			Robot	5.34	9.92
			Logo	5.38	1.11
		Informal	Human	5.17	1.34
			Robot	5.38	1.46
			Logo	5.20	1.27
	Trust	Formal	Human	5.05	1.95
			Robot	5.39	1.01
			Logo	5.57	0.98
		Informal	Human	5.35	1.67
			Robot	5.28	0.94
			Logo	3.35	1.70

4.4 Trust as a mediator

It was hypothesized that trust towards chatbots would mediate the dependent variables. A mediator variable is caused by the independent variable (avatar and conversational tone) and explains the cause between the independent and dependent variable. To investigate the mediating role of social presence, PROCESS v3.5 by Andrew F Hayes (model number 4) was performed. However, as there was no relationship between the independent variables and the dependent variables, no mediation takes place, meaning that hypotheses 3a to 3e are not supported.

4.5 Overview of the hypotheses

Table 10

Summary of results of the tested hypotheses

	Hypothesis	Supported
H1a	The chatbot with a human visual appearance will have a more positive effect on the **perceived usefulness** than a chatbot that is not represented by human visual appearance	No
H1b	The chatbot with a human visual appearance will have a more positive effect on the **perceived ease of use** than a chatbot that is not represented by a human visual appearance	No
H1c	The chatbot with a human visual appearance will have a more positive effect on the **perceived competence** than a chatbot that is not represented by human visual appearance	No
H1d	The chatbot with a human visual appearance will have a more positive effect on the **perceived helpfulness** than a chatbot that is not represented by a human visual appearance	No
H1e	The chatbot with a human visual appearance will have a more positive effect on the **attitude towards using chatbots** than a chatbot that is not represented by a human visual appearance	No
H1f	The chatbot with a human visual appearance will have a more positive effect on **trust towards chatbots** than a chatbot that is not represented by a human visual appearance	No
H2a	The chatbot with a human-like conversational style will have a more positive effect on the **perceived usefulness** than a chatbot that uses a technical conversational style	No
H2b	The chatbot with a human-like conversational style will have a more positive effect on the **perceived ease of use** than a chatbot that uses a technical conversational style	No
H2c	The chatbot with a human-like conversational style will have a more positive effect on the **perceived competence** of use than a chatbot that uses a technical conversational style	No
H2d	The chatbot with a human-like conversational style will have a more positive effect on the **perceived helpfulness** of use than a chatbot that uses a technical conversational style	No
H2e	The chatbot with a human-like conversational style will have a more positive effect on the **attitude towards using chatbots** than a chatbot that uses a technical conversational style	No
H2f	The chatbot with a human-like conversational style will have a more positive effect on the **trust towards chatbots** than a chatbot that uses a technical conversational style	No
H3a	The possible effects of human visual appearance and human conversational style on the **perceived usefulness** will be mediated by trust towards chatbots	No

H3b	The possible effects of human visual appearance and human conversational style on the **perceived ease of use** will be mediated by trust in chatbots	No
H3c	The possible effects of human visual appearance and human conversational style on the **perceived competence** will be mediated by trust in chatbots	No
H3d	The possible effects of human visual appearance and human conversational style on the **perceived helpfulness** will be mediated by trust in chatbots	No
H3e	The possible effects of human visual appearance and human conversational style on **the attitude towards using chatbots** will be mediated by trust in chatbots	No

5 Study 2 – An interview study

5.1 Methodology

12 semi-structured interviews (two per condition) were conducted to explore users' further opinions about the chatbot designed for this study. The interviewees were recruited through the online survey. After the participants finished the online survey, they could provide their e-mail addresses to volunteer as interviewees.

The interviews aimed to reveal additional information about how the participants feel about the different chatbots. The interviews started with an explanation of the purpose of the study. Additionally, the interviewees read the scenario for the interaction with the chatbot. Thus, before the interview, the participants interacted with one of the chatbots. The interviews lasted for approximately 15 minutes. The questions were based on the dependent variables and the chatbots' visual appearance and conversational style. Additionally, the interviewees were invited to elaborate their opinions about the interaction and the specific chatbot.

The interviews were conducted online using the messaging application Discord or Zoom. The interviews were recorded with the interviewee's permission. The audio recordings were transcribed using Microsoft Office Word. Additionally, the audio files were transcribed and coded using deductive coding. After coding, 11 categories were created: advantages, disadvantages, visual appearance, conversational style, ease of use, usefulness, helpfulness, competence, attitude towards using chatbots, trust, and transparency. The codebook can be found in Appendix 6.

5.2 Results of the interviews

The results of the interviews follow a similar pattern to the online experiment. The results indicate that the participants did not perceive the different chatbots as substantially different in their usefulness, ease of use, helpfulness, or competence. Additionally, the attitudes towards using chatbots in the future did not differ between the conditions. It was expected that a chatbot with a human visual appearance and conversational style would result in higher usefulness, ease of use, helpfulness, trust, and attitude towards using chatbots.

Almost all the participants agreed that the chatbot they were using was easy to use and gave helpful answers to their questions. However, the chatbot with a human avatar and human-like conversational style was preferred slightly more than the other variations. However, the preferences were general and not related to the dependent variables. Nevertheless, the interviews revealed some interesting things about the chatbot's appearance and conversational style. On top of the pre-defined dependent variables, the interviews yielded additional insights about transparency related to the

chatbot's nature; it seems that users would like that the chatbot discloses itself as a computer. The complete results of the interview are shown in Appendix 7.

When interacting with the chatbot with a human avatar, the interviewees appreciated the avatar depicting a human. The human avatar was described as making the interaction feel more personal and friendly, which was stated as being an important part of customer service: *"The avatar is very nice. It's like, the fact that it's a person in it. It makes it more personal. I like the icon that depicts a person. It looks like I would be talking to an actual person and that's what I am used to. I like that. I would not want to see something very mechanical."* [P1, Human/Formal].

However, two respondents stated that having a human avatar can confuse the user to think that the chatbot is a human customer service agent. It is important to note that a human avatar might make users feel tricked to think that they are talking with a human customer service agent. Moreover, two respondents stated that using an illustrated picture is better than using a photograph of a real human: *"Maybe if it is a chatbot and they have a human avatar, maybe I feel a bit tricked*." [P2, Human/Formal]. *"I prefer this. Especially when it's a chatbot, I prefer it like this and not a real image. […] Then I would feel a bit misleaded [sic]. Like, why, why use a real picture when you are not using a human?"* [P3, Human/Informal].

The participants in the robot avatar condition had mostly positive or neutral feelings about the chatbot's appearance. They stated that the robot avatar fits because they are talking with a computer and not a human: *" […] I think it fits it because it was, like, a cartoon-style robot… I thought it was cute"* [P7, Robot/Informal]. One respondent referred to the uncanny feeling that human-like robots can cause: *"I think if something really tries to be human-like so it's a bit uncanny. It's not positive. [..] if I know it's a robot, I'd rather prefer a robot." [P5, Robot/Formal]*; *"I mean, it certainly, it's nice to know when you if you talk to a bot [to see a picture of a bot]"* [P6, Robot/Informal].

The company logo avatar received mixed responses. In this condition, most of the participants would have preferred to interact with a chatbot that has either a robot or a human avatar. A logo avatar indicated that the respondent is not sure who they are talking to: *"[…] It would be more pleasant if it was some sort of figure, could either be a fictional figure as a robot or something"* [P9, Logo/Formal]. One respondent said that it is important to have the feeling that they are talking to someone: *"I would put a picture of like even if it's just like one of those in Adobe illustrator. Yeah. Flat drawings of a person or a robot. That would be better, I think, because I feel like I'm talking to something and I don't know, this is like talking to… I don't know what I'm talking to."* [P11, Logo/Informal].
Another respondent stated that having a logo avatar may be beneficial, especially because they know they were interacting with a chatbot and not a human: *"It doesn't appear to be a human that way, doesn't want to be human. That's why it's just like it's all linked to the company and not like anything or anyone in particular. Which in this case, I liked."* [P10, Logo/Formal].

The chatbot's conversational style received varied comments. First, it was clear that the interviewees appreciated that the bot answered quickly, but an instant answer in the formal conversational style was too quick. Moreover, one of the interviewees stated that it is positive that the chatbot uses personal pronouns: *"[…] Maybe it was a little bit too quick for me… almost like it read my mind. I would like to have a little bit of like, a quarter of a second…"* [P1, Human/Formal]. The formal conversational style was also depicted as unenthusiastic and inhuman, making the interaction feel unrealistic. The feelings were mostly based on the interviewees' pre-existing expectations of an interaction with a customer service agent*: "I noticed was sort of lack of enthusiasm in the bots, the sort of human traits that I missed…I think it's a part of customer service and such bots… to have a sort of sound more human in the sort sense that if it sounds too formal and I wouldn't to talk to customer service like this if I would have talked to a human.*

So it doesn't really feel the same. […] "I would like to both be more enthusiastic, have a casual tone, sort of a re-enforce or tell the customer, let the customer know that it's not a bad question to ask. I would like the bot sort of asking me, "did this answer your question"? Yeah, and then you can say "yes or no" so the chatbot knows if it if you need more information or not." [P9, Logo/Formal].

However, one respondent appreciated that the chatbot with a formal conversational style responded immediately. Interestingly, it was also apparent that the instant response made it clear that the user is talking with a chatbot: *"I liked it. It was quick. It didn't wanted [sic] to be a human to say so. Like, it takes time to type the question. No, it's just like, OK, this is the answer. Yeah. Um, which I appreciate if it's clear that it's chatbot because otherwise, you could be in doubt like somebody typing, wasn't a case here. It's just like, OK, here's your answer."* [P10, Logo/Formal].

The informal conversational style received mostly positive responses. According to the interviewees, the informal conversational style made the interaction more personal and humanlike. One interviewee liked the follow-up questions*: "I like that it has its like you human-ish touch to the answers. And it was a friendly as well."* [P11, Logo/Informal]. Another interviewee appreciated that the chatbot asked follow-up questions, which made it appear as friendly: *"[…]I also noticed that when I typed a question, like after two questions so I think, they said ''Oh, can I help, do you have any other questions, is there anything else I can help you with…?'' So it was a useful chatbot. I think the conversation style was very friendly."* [P7. Robot/Informal].

However, the emojis received mixed responses. One participant stated that the use of emojis makes the interaction less serious, which is inappropriate in a customer service setting. Interestingly, these feelings were connected to the fact that the user knew that they are talking with a computer: *"Especially if you know that it's a chatbot… I would find it really like stupid. Yeah, because that I would think, like, OK, you're not a human. And someone thought this was a good idea, which now it's just like I think emojis in like serious conversations with companies are always a little bit stupid because emojis for me are more like a fun thing. And if you're having a problem or a serious question and a company is using emojis, then I'm like, you're not taking me seriously."* [P10, Logo/Formal].

On the other hand, one stated that the use of emojis is appropriate and makes the interaction fun, especially when the chatbot's avatar is a robot: *"I just think it had a friendly demeanor despite being robotic because it didn't speak robotic. I think it was also nice that it used emojis, I thought it made it more fun and personal and I am a visual person so the emojis made it fun. I liked the conversation with the robot, I thought it was cute and fun and not traditional boring chatbot"* [P7, Robot/Informal].

An interesting new finding regarding chatbot transparency was revealed from the interviews. Many of the respondents indicated that they would like to know if they are interacting with a chatbot or a human. They stated that this would help them to adjust their expectations of the interaction. When it is clear that they are having a conversation with a computer, they would not expect to get a clear answer to all of their questions. By being able to adjust their expectations, the interactions would be less frustrating*: "I think it should be obvious, or either you're told or it should be obvious. So I couldn't mistake it for an actual human being. Where the interaction is quite different with a human being, so. Either in the name or in the or in the first message, I would prefer to know that it's a bot."* [P9, Logo/Formal]. Additionally, another interviewee stated that pretending that the chatbot is a human customer service agent violates their trust: "*That would make it worse than you're projecting, or pretending to be something that you're not. And then you're actually playing with that trust, which can go very wrong if people find out."* [P10, Logo/Formal].

One respondent mentioned who interacted with the logo avatar chatbot stated that they liked that the chatbot had no name, and was introduced as "Tech Paradise support agent". They mentioned that a chatbot with a name elicits "weird" feelings because it is clear that they are talking with a computer: *"I think, sometimes with chatbots, they like to give the chatbot an actual name. But then, it's very obvious that you're talking to a chatbot. I feel like sometimes it's a bit weird. I like that with this chatbot, it's just like the "Tech Paradise" thing, and not like pretending that you're talking to an actual person which sometimes feels a bit weird to me when you're talking with a chatbot."* [P12, Logo/Informal].

All the interviewees agreed that the chatbot was easy to use. There was no difference between the different chatbot conditions. When asked about the ease of use, the interviewees often referred to the user interface, indicating that it is user-friendly and familiar. Additionally, the interviewees recognized the chatbot avatar in the right corner of the website. One respondent would have preferred a chatbot with a message that indicates that a chatbot is available for a discussion. Additionally, the interviewees stated that using the chatbot would be a viable option to contact a company: *"Okay, because in the bottom-most like the little circle, which for me is recognizable, that that's a chat thing. Perhaps it could be like a little square or something. Textbox above it with a little arrow, like "Chat with us!" or something."* [P10, Logo/Formal]. *"[…] And I think it's very easy, if you have a question, to reach out to a chatbot…*" [P3, Human/Informal].

Most of the interviewees agreed that the chatbot appeared to be competent and trained to give the right answers. The participants mostly appreciated that the chatbot explained a bit more than the question involved: *"[…] she answered all my questions and yeah, very specific answers. I think that's very nice. So it was immediately clear what the answer was."* [P3, Human/Informal].

However, almost all the participants stated that they would not think the chatbot would be competent enough to answer difficult or personal questions. However, these opinions were based on the interviewees' previous experiences with customer service chatbots: *"Maybe if I had a different question…. Then it would rather talk to a human but I think for the questions I had it was sufficient, but if you're asking, yeah, questions about delivery times or about store opening hours or if you need or ID, I think it's fine, but I think if you have a more complicated issue, like, my package was stolen and something like that, I would want to talk to a human…"* [P7, Robot/Informal].

Moreover, the respondents stated that while using a chatbot is a good idea, they would prefer a chatbot that can direct them to a human customer support agent. Thus, it seems that while the interviewees had predominantly positive opinions about a chatbot, they would always prefer to have access to a human: *"Because I'm fine talking to chatbots, but a lot of times I go to chatbots when I want to talk to an actual person. So if there is something wrong with my order I go to the chatbot and click all the things and if ''talk to an agent'' comes up, then I click ''talk to an agent''"* [P7, Robot/Informal].

When discussing the interviewees' attitudes towards using chatbots, almost all the respondents talked unprompted about appropriate questions for a chatbot. Most of the respondents indicated that chatbots should be used only for FAQs. These opinions were formed because of negative past experiences with chatbots when asking complicated questions. The respondents indicated that their interactions with chatbots are mostly positive when they had simple questions: "*I would definitely use that if I have a question like about delivery. Those are very easy, straightforward questions which don't need human interaction at all because most of the time they're already on a frequently asked questions*

page. Yeah. And I think with most of these questions that's the case. It's just nothing special. You just want your information. And I think it could work very well for that purpose" [P10, Logo/Formal].

Most of the respondents indicated that, in general, they trust chatbots. However, they stated that they would hesitate to give their personal information to a chatbot. In this case, the interviewees would have preferred to give their personal details to a human customer service agent: "*I do think I'm also a little bit more cautious when I know when I'm talking to a chatbot than talking to a human. Yeah, I can't really tell you why. Perhaps also because it isn't like that new of a technology*" [P10, Logo/Formal]. Another interviewee suggested that a chatbot could "prove" itself to be trustworthy: *"[…]So maybe the robot would like… Prove itself by saying, I'm going to send you a text message on your phone since we know your number from the store. This will give you a code of the code will show that's like a show that we're legit and we're not trying to scam you out of your details"* [P8, Robot/Informal].

6 Discussion

The purpose of this study was to explore how the visual appearance and the conversational style of customer service chatbots influence their perceived usefulness, ease of use, helpfulness, competence, trust, and attitude towards using chatbots. More specifically, two research questions were explored:

RQ1: To what extent does the visual appearance of a customer service chatbot influence their acceptance?

RQ2: To what extent does the conversational style of a customer service chatbot influence their acceptance?

These questions were explored via an online experiment where the avatar of the chatbot was manipulated on three levels (human, robot, logo) and the conversational style was manipulated on two levels (formal/informal). It was expected that a chatbot with a humanlike avatar and a humanlike conversational style would increase its perceived usefulness, ease of use, helpfulness, competence, and attitude towards using chatbots. It was also expected that trust towards chatbots would mediate this relationship. However, none of the hypotheses were supported. To elaborate on the possible reason for these findings, 12 semi-structured online interviews were conducted.

The interviews revealed that across all the chatbots, their perceived usefulness, ease of use, helpfulness, trust, competence, and attitude towards using chatbots did not have considerable differences. However, the interviewees presented interesting opinions about the chatbots' conversational style and appearance, especially linked to trust. Additionally, the interviews revealed that transparency about the service agent's nature is an important aspect in an online customer service setting. In other words, the chatbot should disclose itself as a computer at the beginning of the conversation.

Even though chatbot transparency was not explored in the first study, the qualitative findings revealed important information about users' need for transparency in an interaction with a chatbot. First, some of the interviewees stated that they would want to know whether they are talking with a human or a computer. While the interviewees said that almost, in any case, they would prefer a chatbot that incorporates humanlike traits, it should be clearly stated that they are not talking with a human.

Some authors advise against disclosing chatbots' identity (De Cicco, Lima da Costa e Silva, & Palumbo, 2020) due to users' tendency to trust computers less than humans. However, Mozafari, Weiger,

and Hammerschmidt (2021) state that not disclosing chatbot's identity might be problematic, as "This, in turn, is problematic for service providers, as they want to avoid negative user reactions, but will be obligated to disclose chatbot identity sooner or later" (p. 2916). Mozafari, Weiger, and Hammerschmidt (2020) refer to this as the "chatbot disclosure dilemma". Mozafari and colleagues (2020) note that the focus of disclosing should shift from "whether to *how* to disclose chatbot identity" (p. 2916).

In the same light, most of the participants reported feeling uncomfortable when disclosing personal information (such as their username or phone number) to a chatbot. Additionally, the interviewees would prefer to discuss private matters with a human customer service agent. The findings are not surprising, as several studies have noted that people do not fully trust artificial intelligence, even when delivering better quality service than human agents (Dietvorst, Simmons, & Massey, 2015). Dietvorst and colleagues (2015) refer to this as algorithm aversion, where humans lose confidence in algorithms quicker than humans. For example, when a GPS makes a mistake in navigating, humans lose confidence in the technology faster than a human error.

While the qualitative findings of this study indicated that disclosing the chatbots' identity is beneficial for trust and the quality of the interaction, it cannot be concluded that this would be the case with a bigger sample. Nevertheless, these results raise an interesting opportunity to further explore how chatbots should disclose themselves in a customer service setting.

During the interviews, the participants revealed that the chatbot (regardless of the condition) came across as a competent agent who gave clear, detailed, and complete answers. In fact, there were no differences in the perceived ease of use, usefulness, trust, or helpfulness between the chatbots. Similarly, the participants had mostly favorable attitudes towards using chatbots in the future to contact a company. Most frequently, the interviewees' focus was on the content of the answer rather than the visual appearance or the conversational style.

Most of the interviewees stated that they trust the chatbot to be competent with simple interactions, such as asking about delivery times. While earlier studies have noted that anthropomorphic chatbots might increase users' expectations of their capabilities (Luger & Sellen, 2016) the interviewees seem to hold realistic expectations of their competence. These findings are like those of Følstad and Skjuve (2019) who found that users hold rather realistic expectations of chatbots' capabilities, expecting them to handle simple questions. Thus, it seems that it is important to focus on designing interactions that satisfy users' expectations of the chatbot's abilities. In other words, the chatbots' visual appearance and conversational style do not seem to influence how competent they are perceived.

When users already hold rather realistic expectations of chatbots' abilities, they might not expect the visual appearance or conversational style to have enough influence to change their pre-existing beliefs. Consequently, customer service chatbots' competence might be largely based on the correct answers and interpretations of the users' inquiries.

These findings correlate with those of Nordheim, Følstad, and Bjørkli (2019) who said that "Chatbot expertise concerns the provision of accurate and relevant information; in short, a correct answer" (p. 325). These findings may be again explained by the users' goal orientation chatbot's ability to answer simple inquiries seems to be enough to satisfy users (Følstad & Skjuve, 2019). Similarly, the factor analysis showed that the perceived helpfulness of the chatbot explained nearly half (48.03%) of the variance, implying that perceived helpfulness plays a big role in users' perceptions of a chatbot. In fact, the interviewees agreed that all the chatbots were helpful. The answers were closely related to the chatbot's competence; when probed, they said that the chatbot was able to answer their questions sufficiently. Therefore, it seems that users place less importance on how a chatbot conveys information, but what the content of the answer is, as suggested by Følstad & Skjuve (2019).

These findings also correlate with those of Følstad and Brandtzaeg (2017) who studied users' motivation for using chatbots. The authors found that users prefer chatbots that provide the necessary help because users have a high preference for efficient, productive interactions with chatbots. They recommend designing a chatbot that supports productivity by adding social elements to the conversation, supporting users in finishing their tasks in a manner that is enjoyable and social (Følstad & Brandtzaeg, 2017). Thus, while users might be largely task-oriented, adding limited human elements to the interaction does not seem to be counterproductive to their perceived helpfulness.

It may be that users still expect some level of human elements in the interaction, but do not want the chatbot to appear "fake" or try too hard to be a human. This can be partly explained by the uncanny valley effect (Ciechanowski et al., 2019). The uncanny valley effect refers to the phenomenon where a too-humanlike robot elicits unpleasant feelings in humans (Mori, Macdorman, Kageki, 2012).

When it comes to the visual appearance of the chatbot, the interviewees preferred a chatbot with a human or a robot avatar. The human avatar created a "personal" feeling to the interaction. Interestingly, one respondent preferred the logo avatar, as it "did not pretend to be a human". Indeed, the participants also stated that a human avatar might trigger the uncanny valley effect as the chatbot is not a real human. Additionally, the interviewees stated that the robot avatar was suitable for the interaction, as it was clear that the chatbot is a computer. It was appreciated that the robot avatar fit the interaction; the chatbot responded too quickly to be a human. Consequently, it was clear that the participants were not interacting with a human. Thus, the robot avatar was assumed to be a good fit.

Aside from the avatar, the interviewees appreciated the familiarity of the chatbot's user interface (UI), indicating that a familiar chat platform might make the chatbot easy to use. These findings are also reported by Nordheim, Følstad, and Bjørkli (2019) who found that users reported familiar chatbot interface and dialogue as easy to use. While not directly linked to the perceived ease of use, Jain, Kumar, Kota, and Patel (2018) reported similar findings, stating that users prefer using chatbots that use a familiar, turn-based messaging interface. Thus, it may be that the chatbots UI plays a bigger role in the perceived ease of use than its avatar and conversational style. It may be that when customers look for a chatbot in a webpage, they pay more attention to the chat interface than the appearance of the chatbot. For example, if the UI resembles that of familiar messaging interface such as Facebook, users might feel that the chatbot is easier to operate than a chatbot with an unfamiliar interface. This, in turn, could be linked to users' goal-oriented behavior in customer service situations.

These findings correlate with those of Følstad and Skjuve (2019) who studied differences in user satisfaction between a customer service chatbot with a human and a robot avatar. The authors found a few interesting things. First, while the participants reported having an increased user experience with a human avatar chatbot, they were concerned that a human-like avatar could trick users into thinking that they are talking with a human. Second, the participants did not generally find the chatbot avatars important to their overall experience. Third, the findings revealed that a robot avatar could help signify the fact that the users are talking with a computer (Følstad & Skjuve, 2019). As Følstad and Skjuve (2019) suggest, chatbot appearance might play a smaller role in the customer service context than previously suggested.

Regarding the conversational style of the chatbot, even though no statistically significant results were found, the results of the interviews indicated that the informal conversational style was slightly preferred to the formal conversational style. These findings have been confirmed by other studies (Kim, Lee, & Gweon, 2019). Thus, it seems that users would like to have an interaction that mimics a conversation

with a human; the interviewees in the formal conversational condition wished the chatbot would have been friendlier, more enthusiastic, and ask follow-up questions.

Drawing upon McCallum and Harrison's (1985) ideas, "Service encounters are first and foremost social encounters" (p. 35). These findings are supported by Verhagen et al. (2014) who found that bots with socially-oriented conversational styles lead to a higher satisfaction than task-oriented bots. Therefore, a chatbot with an informal, humanlike conversational style can foster a shared feeling of human contact between the chatbot and the customer (Vergahen et al., 2014). Thus, while the chatbots' most important task should be problem-solving, humanlike conversational elements can promote positive feelings about the interaction (Verhagen et al., 2014).

While the interviewees appreciated the informal conversational style, it should be noted that emojis should be approached with caution. The use of emojis can make the conversation fun but is not appropriate in a serious situation. These findings go in line with those of Derks, Bos, and von Grumbkow (2007) who studied the influence of emojis in Internet communication, differentiating between task-oriented and social context. The authors found that emojis are used less in task-oriented and negative contexts (Derks, Bos & von Grumbkow, 2007). Customer service context is often task oriented (Følstad & Skjuve, 2019) and involves uncertainty (Ribbinj, van Riel, Lijander, & Streukens, 2004), so emojis can be considered as an unnecessary distraction.

Earlier studies have noted that people prefer chatbots that look and act like a human (Nowak & Rauh, 2006). However, this preference might not translate to more favorable attitudes towards using chatbots. As Erickson (1997) stated, fake humanness may interfere in what matters: getting assistance from the chatbot. Even though Erickson (1997) said that chatbot designers might not any other choice than designing human-like chatbots, it could be possible that the most important aspect of human-chatbot interaction is that it can effectively help the users.

Thus, it seems that while users may be largely task-oriented, it is important that the chatbot incorporates at least some elements of human-like conversation. The interviewees appreciated that the informal chatbot asked further questions and confirmed that it understood the question. Moreover, the use of personal pronouns was noted as a positive quality, as it created a personal feeling to the interaction and made the participant feel heard. Considering chatbot design, these findings might imply that a chatbot's textual content and the type of interaction are more important than their appearance or conversational style. Thus, it might be interesting to focus on *what* the chatbot writes instead of *how* it is written. In conclusion, users hold positive attitudes towards using chatbots if they are friendly, efficient, and do not try to act too much like humans and are limited to simple interactions.

6.1 Theoretical implications

This work contributes to existing knowledge of the design and the role of anthropomorphism in customer service chatbots by providing quantitative and qualitative data. While the results of the quantitative data derived from the online experiment did not yield statistically significant results, the interviews revealed important aspects of how different chatbots are perceived.

First, the interviews revealed that users attribute certain humanlike characteristics to computers, even when they know they are talking with a computer. For example, the participants referred to the chatbot with gender pronouns, described it as "friendly", or "lacking empathy". These findings are consistent with the CASA paradigm (Reeves & Nass, 1996, Nass & Moon, 2000). Thus, users anthropomorphize chatbots, as the Computers as Social Actors (CASA) (Reeves & Nass, 1996; Nass & Moon, 2000) paradigm suggests. According to the CASA paradigm, humans apply social rules to computers even when they know they are interacting with a computer.

However, there is a limit to how much a chatbot should act like a human, as a too humanlike robot might trigger the uncanny valley effect (Ciechanowski et al., 2019).

Second, none of the chatbots were held on particularly higher expectations than the other, regardless of their anthropomorphic qualities. This finding is contrary to previous studies that have suggested that users hold humanlike chatbots to higher expectations (Gnewuch et al., 2017). However, these results reflect those of Følstad & Skjuve (2019) who point out that users hold rather realistic expectations towards chatbots' abilities.

Third, it seems that a chatbot avatar plays a smaller role in user acceptance than previously thought, as suggested by Følstad & Skjuve (2019). Thus, users might pay more attention to a chatbot's conversational style, and expect it to be humanlike, but only to a certain extent. For example, the informal conversational style was mostly preferred to the formal conversational style. However, the use of emojis received mixed messages, some claiming that the chatbot seemed fake.

Finally, these findings can be used by scholars when studying the role of anthropomorphism in chatbot acceptance. The findings of this research showed that a customer service chatbot with a human avatar and informal, human-like conversational style does not result in higher perceived ease of use, usefulness, helpfulness, competence, or trust. Additionally, it was found that attitudes towards using chatbots are not based on their appearance or conversational style.

In conclusion, the acceptance of customer service chatbots is largely based on users' goal orientation. This can also be reflected in the importance of perceived helpfulness from the online experiment. Thus, more research should be conducted to find out what kind of chatbot satisfies the need to efficiently resolve users' inquiries. For example, further studies could compare different answer styles and message lengths to explore what is the best way to deliver information to customers.

6.2 Practical implications

The results of the online experiment show that an anthropomorphic visual appearance or conversational style does not significantly influence a chatbot's perceived ease of use, helpfulness, competence, trust, or attitude towards using chatbots.

The interviews shed light on how users feel about chatbots that have different anthropomorphic levels. The chatbot with either a human or a robot avatar was preferred over a logo avatar, and the informal conversational style was slightly preferred over the formal conversational style. In other words, it seems that a figure is more inviting to the users than just a logo. It seems that users are accustomed to the feeling of talking to someone via chat, and a company logo is not enough to trigger that feeling, whereas even a robot avatar can satisfy that. Thus, chatbot designers would benefit from designing a chatbot that has an avatar with a human or a robot. It is not recommended to use an avatar with only a company logo and formal conversational style, as it might create a feeling of disconnection in the customer service situation.

When it comes to the conversational style of a chatbot, chatbot designers should focus on friendliness, asking follow-up questions, and addressing the user with personal pronouns. For example, the chatbot can ask "Do you need any more help?". Additionally, the use of emojis should be limited, and they should not be used when the user is trying to tackle a serious matter. An overly friendly chatbot might annoy the users, while a too machinelike approach leaves the users in need of human empathy and human touch.

Another interesting finding from the interviews is that chatbot users would like to know whether they are talking with a chatbot or with a human customer support agent. Transparency is important because customers have different expectations from humans and computers. Therefore, chatbot designers should consider including a clear message in the chatbot's introduction, indicating that the

customer is talking with a computer. When the customers know that they are not talking with a human, they do not expect to have perfect answers from the bot.

Lastly, the top priority of chatbots should be resolving user inquiries. Thus, the chatbot should not converse in a way that might hinder users' goals for solving problems. For example, a too chatty chatbot might be perceived as annoying, as customers do not expect to have a completely humanlike conversation with a chatbot; they are there to solve a problem for the customer.

6.3 Limitations

The first limitation of this study relates to the online experiment. The participants had an interaction with the chatbot during the experiment. However, they were given a list of questions and they could not modify the questions in any way. Such an interaction might feel too scripted to elicit meaningful feelings about the chatbot. As many of the interviewees said, their experience with a chatbot in real life has been different from the chatbot in the online experiment. In this case, the chatbot could not give any wrong answers or get confused, because the interaction was programmed to be successful every time. Consequently, even though the results from the online experiment were not significant, the interviewees liked the interaction with the chatbot regardless of the condition. However, with a small sample size, caution must be applied, as the findings might not be generalizable.

An additional limitation is the measurements used for this study. While the original scales were reliable, perceived usefulness and perceived helpfulness were closely related to each other. Future studies should focus on revising a scale that appropriately measures the chatbots' perceived usefulness.

The interview sample poses a few limitations. First, only two people were interviewed per chatbot condition. More interviews should be conducted to better understand how users feel about different customer service chatbots. Moreover, the interviews were conducted online because of COVID-19 restrictions. Therefore, it is possible that some nonverbal cues were missed in the interview process. Lastly, the interviews were coded by one person. Two or more coders would allow for testing interrater reliability, and thus increasing the reliability of the qualitative results.

6.4 Recommendations for future research

To increase the ecological validity of future studies, it is recommended to allow users to phrase a question in their own words based on a pre-determined scenario. This might be challenging as a chatbot with more sophisticated AI is required.

Another recommendation for future research would be to include chatbot disclosure as a variable. This was an important aspect to the interviewees and might significantly change how the chatbot's avatar and conversational style are perceived. Additionally, future research could test the same variables in different contexts. It seems that users are task-oriented when using customer service chatbots. However, it might be interesting to explore whether the visual appearance and conversational style matter in other fields, such as marketing or the travel industry.

To get the most out of customer service chatbots, it should be explored how chatbots can handle different types of inquiries as efficiently as possible. Thus, future research could incorporate task complexity as one of the variables. It could be that differently anthropomorphic chatbots are better suited for complex interactions.

7 Conclusion

This research aimed to explore how text-based customer service chatbots' visual appearance and conversational style influence their perceived ease of use, helpfulness, and competence. Additionally, it was investigated how the visual appearance and conversational style influence users' trust towards chatbots and attitude towards using chatbots in the future. These effects were explored with mixed-method research, employing an online experiment and semi-structured interviews.

The findings of the online experiment revealed no significant effects of the chatbots' visual appearance or the conversational style on the dependent variables. The interview results revealed that while the users slightly preferred a chatbot with a human or a robot avatar and a human-like, informal conversational style. However, the preference was not strictly related to their perceived ease of use, usefulness, helpfulness, competence, trust, or attitude towards using chatbots.

When it comes to the visual appearance of a chatbot, it is recommended to use either a human or a robot avatar. The participants preferred illustrated pictures to realistic pictures of humans or robots. Additionally, the conversational style of a chatbot should be friendly and casual, but not incorporate too many emojis to make the chatbot appear too humanlike, triggering the uncanny valley effect.

Additionally, chatbot users need transparency. Therefore, it is recommended that the chatbot discloses itself at the beginning of the interaction. While users do not seem to hold anthropomorphic chatbots on higher standards, their previous experiences dictate their expectations of chatbot interactions. However, further studies are needed to determine what is the optimal way for a chatbot to disclose itself. Lastly, it seems that users prefer chatbots when handling simple, FAQ-type questions and prefer a human customer service agent for complex situations.

These findings offer interesting opportunities for further research. Based on the discoveries made in this study, chatbot professionals should focus on creating a chatbot that can hold efficient, friendly conversations and handle users' inquiries. While an illustrated human or robot chatbot avatars might not negatively influence the interaction, users focus more on problem-solving than the chatbot's appearance.

8 References

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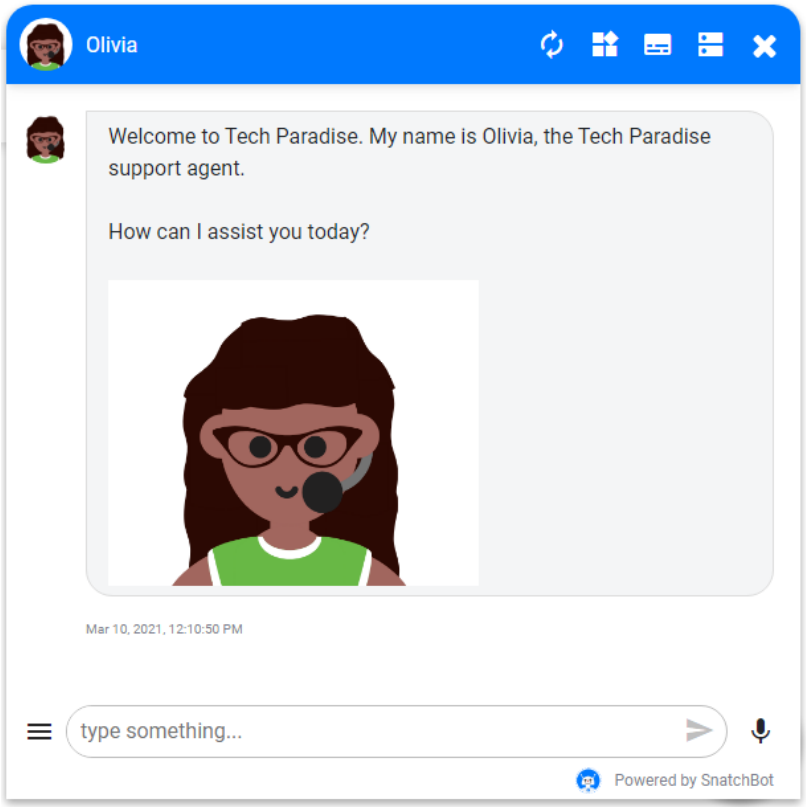
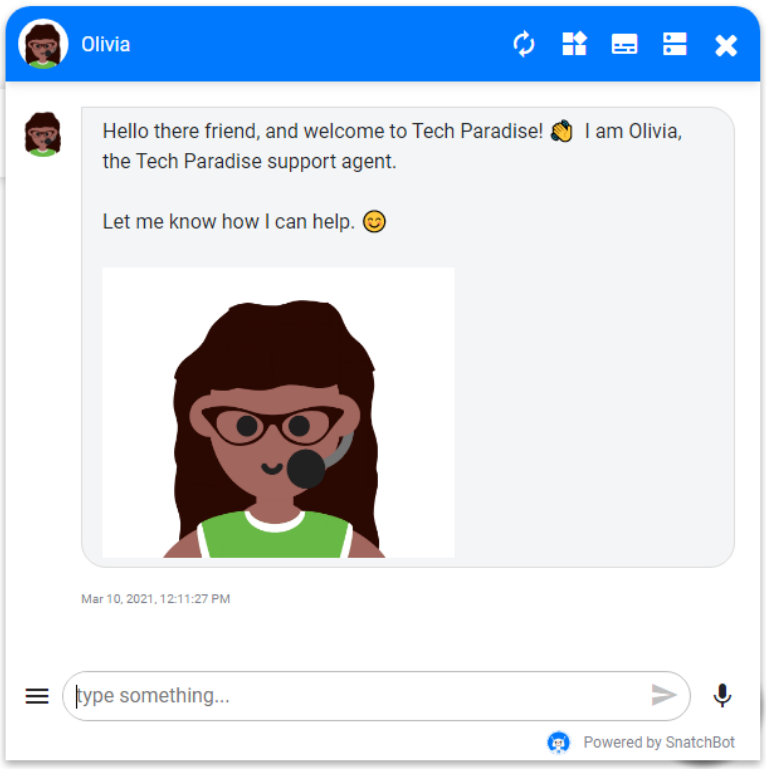
9 Appendix 1: Conditions

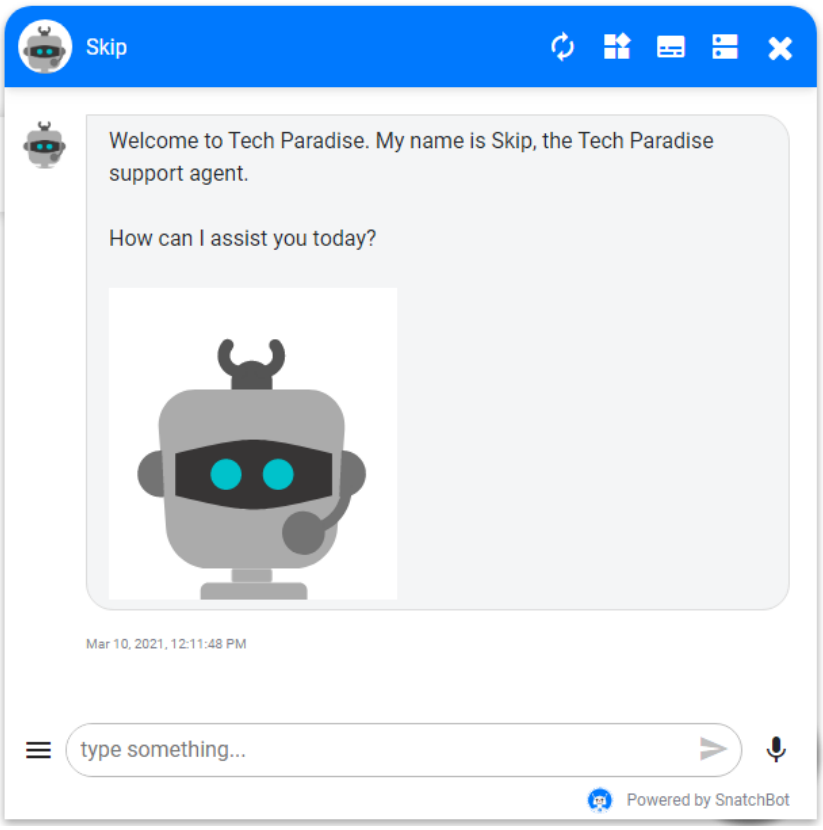
9.1 Condition 1: Human avatar + formal conversational style



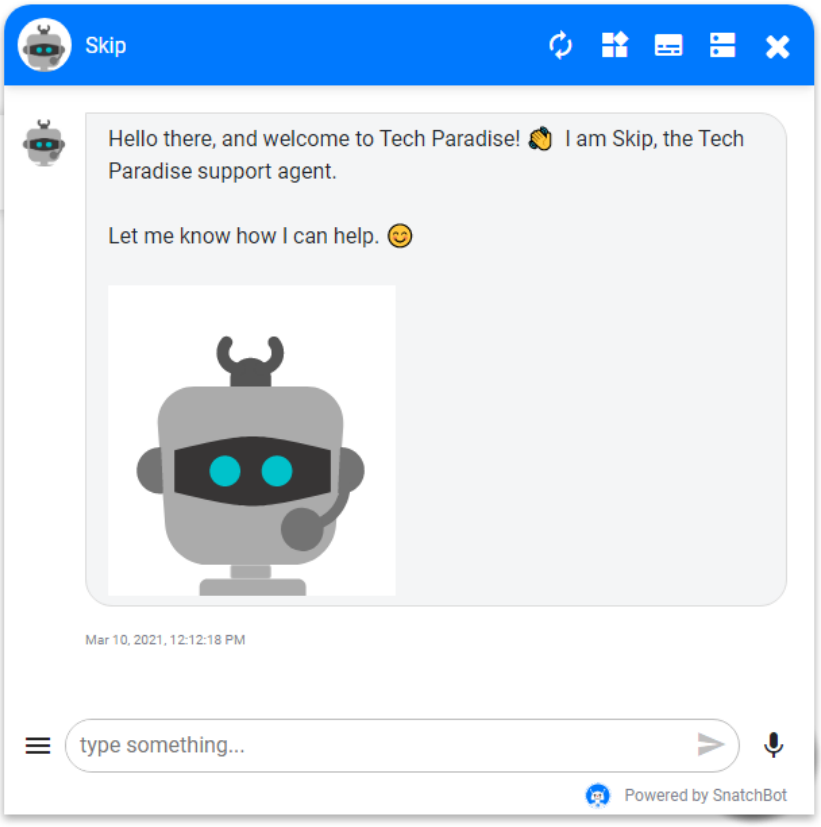
9.2 Condition 2: Human avatar + Informal conversational style



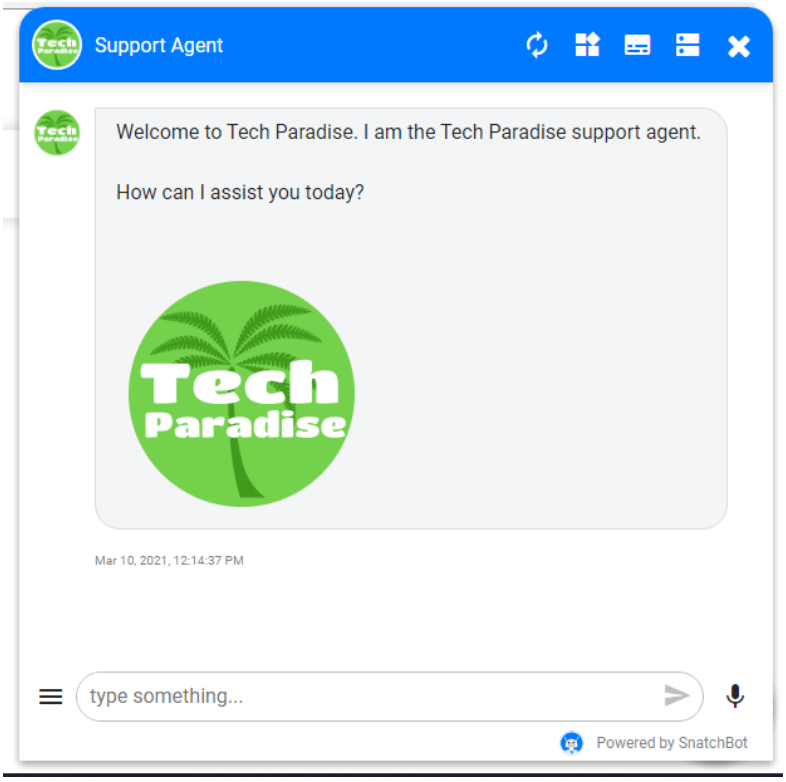
9.3 Condition 3: Robot avatar + Formal conversational style



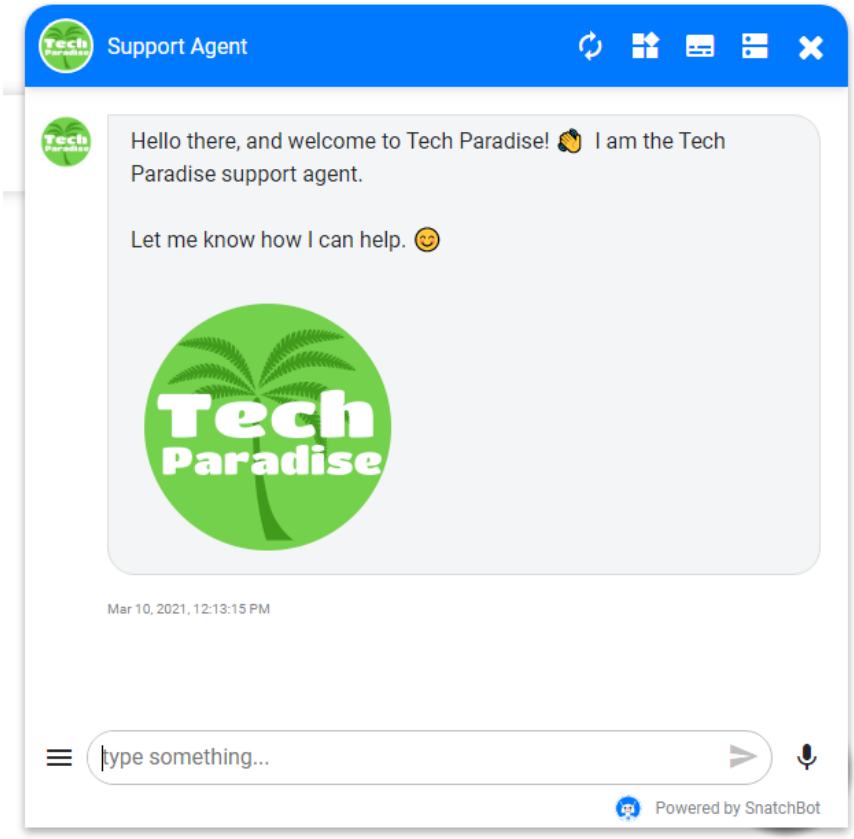
9.4 Condition 4: Robot avatar + Informal conversational style



9.5 Condition 5: Logo avatar + Formal conversational style



9.6 Condition 6: Logo avatar + Informal conversational style



10 Appendix 2: Chatbot conversations: Formal and informal style

10.1 Formal

	Customer	**Bot**
Greetings		Welcome to Tech Paradise. My name is Skip, the support bot. How can I assist you today?
Tracking order	How can I track my order?	If the order has been sent to you using a trackable service, the delivery is traceable. You will receive a shipping confirmation email from our warehouse once the order is on the way. Click on the tracking link in the email to view the up-to-date tracking.
Shipping time	How long is the shipping time?	If you place your order before 23:59, you will receive the order the next day. Otherwise, the shipping time is 1-2 days.
Pick up an item in a store	Can I reserve a product online and pick it up in a store?	If the product you reserved online is in stock, it can be collected the same day in a Tech Paradise store. When reserving a product, indicate which store you would like to retrieve it from. If your chosen item is out of stock, it is possible to reserve it online and pick it up once it's back in stock.
Return	Can I return an item to a store?	You can return most items purchased at any Tech Paradise store for a full refund within 30 days of purchase.
Exchange	Can I exchange my order to a new item?	It is possible. If you know the product you would like to exchange for, you can reserve it on our website. Please note that it is not possible to exchange products after 30 days of purchase.

Payment	When do I have to pay when I pick up an item from a store?	Payment is only required when the item is acquired in one of Tech Paradise stores.
Identification	Do I need an ID with me when I pick up from a store?	Yes, an identification card is required. Please bring an ID card and the order number to the store when picking up your items.

10.2 Informal

	Customer	**Bot**
Greetings		Hello there friend, and welcome to Tech Paradise! 👋 I am Olivia, the support-bot. Let me know how I can help. 😊
Tracking order	How can I track my order?	If your order has been sent to you using a trackable service, you can follow the journey to its new home! 🚚 After purchasing a product, you'll receive an email from us with a tracking link so you can be up to date 24/7. 📦
Shipping time	How long is the shipping time?	Well, if you order before 23:59, you'll receive your order the next day! 📅 Otherwise, the shipping time is 1-2 days. Super fast, right? 🚚
Pick up an item in a store	I ordered an item online. Can I pick it up in the store?	Absolutely! 👍😊 If the product you want is in stock, you can pick it up the same day in one of our stores. Just indicate which store you want to visit in your shopping cart. 🛒 If that item happens to be out of stock in your selected

		store, you can easily reserve it and just pick it up the next day.
Return	Can I return it to a Tech Paradise store in my town?	Sure you can! 👍👍 You can return items to any Tech Paradise physical store for a full refund within 30 days of your purchase. As simple as that! 🛒
Exchange	Can I exchange my online order to a new item?	Of course! Know which product you'd like to exchange for? Great! You can reserve it on the website before coming to the store. Remember to do this within 30 days of purchase! 🗓️
Payment	When do I have to pay when I pick up an item from a store?	There is no need to pay until you pick up the item. This includes products you have reserved online 📦
Identification	Do I need an ID with me when I pick up from a store?	Yes, make sure you bring an ID card and the order number. Then everything will go smoothly, and you'll receive the items in no time! 🏃💨

11 Appendix 3: Measures

Attitude towards using	Dabholkar (1994) How would you describe your feelings toward using chatbots to contact a company? (1) good-bad (2) pleasant-unpleasant (3) harmful-beneficial (4) favorable-unfavorable
Perceived usefulness	Davis (1989); Scheerder (2018) Using the chatbot to contact a company enables me to accomplish my goal more quickly Using the chatbot enhances my effectiveness Using the chatbot makes it easier to contact a company I find the chatbot useful when contacting a company
Perceived ease of use	Davis (1989); Scheerder (2018) Using the chatbot to contact a company is complicated Using the chatbot to contact a company is confusing Using the chatbot to contact a company takes a lot of effort The bot is flexible to interact with
Perceived expertise	Toader et al. (2019) I felt that the chatbot knew what he/she was doing I believe that the chatbot is competent I think the chatbot is proficient In my opinion, the chatbot is trained In my opinion, the chatbot is experienced I believe the chatbot is knowledgeable
Perceived helpfulness	Yin, Bond & Zhang (2014); Sen & Lerman (2007) The chatbot was helpful The chatbot was useful The chatbot was informative
Trust	Toader et al. (2019) The chatbot seemed sincere during our interaction. I felt that the chatbot was honest in our interaction. I believe the chatbot was truthful when conversing with me. I believe that the chatbot was credible during our conversation.

12 Appendix 4: Interview Protocol

Introduction		
I want to thank you for taking the time to meet with me today. I would like to talk to you about your perceptions of a customer service chatbot. The interview should take a max of 30 minutes, including the interaction with the chatbot. If you agree, I will be recording the session because I do not want to miss any of your comments. All your responses will be kept confidential. This means that your interview responses will not be shared with anyone outside of this research team, and I will ensure that any information I include in the report does not identify you as the respondent. Remember, you do not have to talk about anything you don't want to. If you feel uncomfortable, or do not want to continue the interview, please let me know, and we can stop. Do you have any questions about what I have just explained?		
Theme	**Questions**	**Remarks**
Small talk	**Hello, how are you doing?**	
Explain the bot and the scenario	**In this scenario, you are talking to a customer service chatbot. You're considering buying a pair of headphones from an online web store, but you want to ask a couple of questions first.**	
General feelings about the interaction	How did you feel during the interaction with the chatbot? Is there something that you particularly liked about the chatbot? Is there something that you particularly disliked about the chatbot?	
Avatar	How do you feel about the chatbot's appearance?	
Conversational style	How do you feel about the way the chatbot converses with you?	
Ease of use	Do you feel that the chatbot was easy to use?	
Helpfulness	Do you feel that the chatbot was helpful? (e.g. it did not give random answers that did not fit the question)	
Competence	Do you feel that the chatbot knew what it was doing?	
Trust	Does the chatbot seem trustworthy? You can think of its appearance, the way it converses with you	

Attitude towards using chatbots in the future	Would you consider a future interaction with this chatbot? Why/why not?	
Additional comments	Would you like to add something else?	

13 Appendix 5: Questionnaire

Start of Block: Introduction

Q1 WELCOME

You are invited to participate in a web-based online survey on customer service chatbots. This study explores how chatbots can be designed to offer the best customer service experience for people.

This research project is being conducted by Katja Raunio, a student at the University of Twente, Netherlands. The survey takes about 10 minutes to complete. **Please do not use a mobile phone to fill this survey.**

PARTICIPATION

Your participation in this survey is voluntary. You may refuse to take part in the research or exit the survey at any time without penalty. You are free to decline to answer any particular question you do not wish to answer for any reason.

You will receive no direct benefits from participating in this research study. However, your responses may help us to learn more about the best design for customer service chatbots.

CONFIDENTIALITY

Your survey answers will be sent to Qualtrics where data will be stored in a password-protected electronic format. Personal information, such as gender and age will be collected for demographic purposes. We do not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study.

At the end of the survey, you will be asked if you are interested in participating in an additional interview online. If you choose to provide contact information such as your phone number or email address, your survey responses may no longer be anonymous to the researcher. However, no names or identifying information would be included in any publications or presentations based on these data, and your responses to this survey will remain confidential.

CONTACT

If you have questions at any time about the study or the procedures, you may contact Katja Raunio

[k.m.raunio@student.utwente.nl].

Q2 ELECTRONIC CONSENT

Please select your choice below. You may print a copy of this consent form for your records. Clicking on the “Agree” button indicates that · You have read the above information · You voluntarily agree to participate · You are 18 years of age or older

- ○ Agree (1)
- ○ Disagree (2)

End of Block: Introduction

Start of Block: Before you start

Q3

The aim of this study This study aims to explore how the design of a customer service chatbot influences users' perceptions of them.

What is a chatbot?

A Chatbot is an Artificial Intelligence (AI) software application that can simulate a conversation with people.

In online customer service, chatbots often work alongside human customer service agents, answering peoples' questions, and addressing their concerns.

Procedure

In this survey, you will have a short interaction with a chatbot. You will ask the chatbot six questions.

After the interaction, you will be presented with two additional questions about the chatbot's **picture** and its **conversational style.**

On the next page, you will be presented with a scenario. Please read it carefully before proceeding to the interaction with the chatbot.

End of Block: Before you start

Start of Block: Demographics

Q33 What is your gender?

- ○ Male (1)
- ○ Female (2)
- ○ Other (4)

Q34 What is your highest level of obtained education?

- ○ Less than high school (1)
- ○ Vocational education (7)
- ○ High school (2)
- ○ Bachelor (3)
- ○ Master (4)
- ○ Doctorate (PhD) (5)
- ○ Other (6)

Q35 What is your age?

- ○ 18-24 (2)
- ○ 25-34 (3)
- ○ 35-45 (4)
- ○ 46-54 (7)
- ○ 55-64 (5)
- ○ 65+ (6)

Q37 Proceed to the scenario

○ Proceed (1)

End of Block: Demographics

Start of Block: Scenario

Q5 **The scenario** Imagine that you are considering purchasing an item from an electronics webshop.

Before making the final decision, you want to ask a few questions regarding the order, delivery, and the store's return policy. You decide to head to the store's website and notice that a chatbot is available to help you.

Q6 I have read the scenario

○ Proceed to the interaction with the chatbot (1)

End of Block: Scenario

Start of Block: H/F

JS

Q7 window.sntchChat.Init(113285) Interaction with the bot
The chatbot will appear to the right side of the screen.
Press the chatbot's image to start the conversation.
Then, ask the chatbot the following questions in the order they are presented in the list below.
Questions
How can I track my order?
How long does the delivery take?
I want to order an item online and pick it up in the store.
Can I do that?
Can I exchange or return online purchases in a store?

When do I have to pay when I pick up an item from a store?
Do I need an ID with me when I pick up an item from a store?

Q38 Proceed to questions

Proceed (1)

End of Block: H/F

Start of Block: H/IF

JS

Q8 window.sntchChat.Init(113281) Interaction with the bot The chatbot will appear to the right side of the screen.
Press the chatbot's image to start the conversation.
Then, ask the chatbot the following questions in the order they are presented in the list below. Questions How can I track my order?
How long does the delivery take?
I want to order an item online and pick it up in the store.
Can I do that?
Can I exchange or return online purchases in a store?
When do I have to pay when I pick up an item from a store?
Do I need an ID with me when I pick up an item from a store?

Q39 Proceed to questions

Proceed (1)

End of Block: H/IF

Start of Block: R/F

JS

Q9 window.sntchChat.Init(113729) Interaction with the bot
The chatbot will appear to the right side of the screen.
Press the chatbot's image to start the conversation.
Then, ask the chatbot the following questions in the order they are presented in the list below.
Questions
How can I track my order?
How long does the delivery take?
I want to order an item online and pick it up in the store.
Can I do that? Can I exchange or return online purchases in a store?
When do I have to pay when I pick up an item from a store?
Do I need an ID with me when I pick up an item from a store?

Q40 Proceed to questions

○ Proceed (1)

End of Block: R/F

Start of Block: R/IF

JS

Q10 window.sntchChat.Init(113720) Interaction with the bot
The chatbot will appear to the right side of the screen.
Press the chatbot's image to start the conversation.
Then, ask the chatbot the following questions in the order they are presented in the list below.
Questions
How can I track my order? How long does the delivery take? I want to order an item online and pick it up in the store.

Can I do that? Can I exchange or return online purchases in a store? When do I have to pay when I pick up an item from a store? Do I need an ID with me when I pick up an item from a store?

Q41 Proceed to questions

Proceed (1)

End of Block: R/IF

Start of Block: L/F

JS

Q11 window.sntchChat.Init(133186) Interaction with the bot
The chatbot will appear to the right side of the screen.
Press the chatbot's image to start the conversation.
Then, ask the chatbot the following questions in the order they are presented in the list below.
Questions
How can I track my order?
How long does the delivery take?
I want to order an item online and pick it up in the store.
Can I do that?
Can I exchange or return online purchases in a store?
When do I have to pay when I pick up an item from a store?
Do I need an ID with me when I pick up an item from a store?

Q42 Proceed to questions

Proceed (1)

End of Block: L/F

Start of Block: L/IF

JS

Q12 window.sntchChat.Init(133188) Interaction with the bot

The chatbot will appear to the right side of the screen.

Press the chatbot's image to start the conversation.

Then, ask the chatbot the following questions in the order they are presented in the list below.

Questions

How can I track my order?

How long does the delivery take?

I want to order an item online and pick it up in the store.

Can I do that?

Can I exchange or return online purchases in a store?

When do I have to pay when I pick up an item from a store?

Do I need an ID with me when I pick up an item from a store?

Q43 Proceed to questions

- ○ Proceed (1)

End of Block: L/IF

Start of Block: Overall appearance

Q13 When I think about the chatbot's **conversational style**, I think it felt...

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Alive (1)	○	○	○	○	○	○	○
Lively (2)	○	○	○	○	○	○	○
Natural (3)	○	○	○	○	○	○	○
Interactive (4)	○	○	○	○	○	○	○
Humanlike (5)	○	○	○	○	○	○	○
Lifelike (6)	○	○	○	○	○	○	○

End of Block: Overall appearance

Start of Block: Conversational style

Q14 When I look at the chatbot's **picture**, I think it felt...

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Alive (1)	○	○	○	○	○	○	○
Lively (2)	○	○	○	○	○	○	○
Natural (3)	○	○	○	○	○	○	○
Interactive (4)	○	○	○	○	○	○	○
Humanlike (5)	○	○	○	○	○	○	○
Lifelike (6)	○	○	○	○	○	○	○

End of Block: Conversational style

Start of Block: Perceived usefulness

Q15 Do you think the chatbot was **useful**?

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Using the chatbot to contact a company enables me to accomplish my goal more quickly (1)	○	○	○	○	○	○	○
Using the chatbot enhances my effectiveness (2)	○	○	○	○	○	○	○
Using the chatbot makes it easier to contact a company (3)	○	○	○	○	○	○	○
I find the chatbot useful when contacting a company (4)	○	○	○	○	○	○	○

End of Block: Perceived usefulness

Start of Block: Perceived ease of use

Q16 Do you think the chatbot was **easy to use**?

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Using the chatbot to contact a company is complicated (1)	○	○	○	○	○	○	○
Using the chatbot to contact a company is confusing (2)	○	○	○	○	○	○	○
Using the chatbot to contact a company takes a lot of effort (3)	○	○	○	○	○	○	○
The chatbot is flexible to interact with (4)	○	○	○	○	○	○	○

End of Block: Perceived ease of use

Start of Block: Perceived expertise

Q17 Do you think the chatbot was **competent**?

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I felt that the chatbot knew what it was doing (1)	○	○	○	○	○	○	○
I believe that the chatbot is competent (2)	○	○	○	○	○	○	○
I think the chatbot is proficient (3)	○	○	○	○	○	○	○
In my opinion, the chatbot is trained (4)	○	○	○	○	○	○	○
In my opinion, the chatbot is experienced (5)	○	○	○	○	○	○	○
I believe the chatbot is knowledgeable (6)	○	○	○	○	○	○	○

End of Block: Perceived expertise

Start of Block: Perceived helpfulness

Q18 Do you think the chatbot was **helpful**?

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
The chatbot was helpful (1)	○	○	○	○	○	○	○
The chatbot was useful (2)	○	○	○	○	○	○	○
The chatbot was informative (3)	○	○	○	○	○	○	○

End of Block: Perceived helpfulness

Start of Block: Attitude

Q19 How do you feel about using a chatbot in the future?

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Using the chatbot is a good idea (1)	○	○	○	○	○	○	○
Using the chatbot is a wise idea (3)	○	○	○	○	○	○	○
I like the idea of using the chatbot (4)	○	○	○	○	○	○	○
Using the chatbot would be pleasant (5)	○	○	○	○	○	○	○

End of Block: Attitude

Start of Block: Trust

Q20 Do you feel like the chatbot was **trustworthy**?

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
The chatbot seemed sincere during our interaction (1)	○	○	○	○	○	○	○
I felt that the chatbot was honest in our interaction (2)	○	○	○	○	○	○	○
I believe the chatbot was truthful when conversing with me (3)	○	○	○	○	○	○	○
I believe that the chatbot was credible during our conversation (4)	○	○	○	○	○	○	○

End of Block: Trust

Start of Block: Interview request

JS

Q21 If you would like to participate in an online interview about your interaction with the chatbot, please leave your email address below.

_____

End of Block: Interview request

14 Appendix 6: Codebook interviews

15 Appendix 7: Interview results

15.1 Human avatar + formal conversational style

Results H/F	
General feelings	**How did you feel during the interaction with the chatbot?**
P1	- Very quick, detailed - Almost like she read my mind
P2	- Nice design - Easy to use - Replies fast
Likes	**Is there something that you particularly liked about the chatbot?**
P1	- It was very quick and very detailed
P2	- Answers were very specific, immediately clear what the answer was
Dislikes	**Is there something that you particularly disliked about the chatbot?**
P1	- I would like to have more time [for the bot to answer], like quarter of a second
P2	- Nothing, but opinion might be different if could ask questions with own words
Appearance	**How do you feel about the chatbot's appearance?**
P1	- Like the fact that it has a person, feels more personal and comfortable - Makes the interaction feel more personal
P2	- It's nice, it's realistic to use an an illustrated avatar instead of real person
Conversational style	**How do you feel about the way the chatbot converses with you?**
P1	- She is too quick - Gives more than just an answer to the question, has a real conversation - Does not only have buttons, or keywords - She is personal, and not direct, she gives more than just instructions
P2	- It's very clear - It was clear that it was a bot and not a human
Ease of use	**Do you think the chatbot was easy to use?**
	- It was easy to use, but it would be useful to get access to more information

	- Yet, it was immediately clear how to use the bot
Helpfulness	**Do you feel that the chatbot was helpful during the interaction?**
P1	- I like the answers, but I would like to see some links where I can get additional information if I want it
P2	- Gave an answer to all the question, answer was immediately clear
Competence	**Do you feel that the chatbot was competent when giving you answers to your questions?**
P1	- It was very competent. The answers were well organized and clear
P2	- Yes, it was very specific
Trust towards chatbots	**Do you trust this chatbot?**
P1	- Yeah, when I don't know where to look for things.
P2	- Yeah, it's trustworthy. But the questions I ask the chatbotand yeah, I don't know how it is when I use another question
Attitude towards using chatbots	**Would you consider a future interaction with this chatbot?**
P1	- Yes, for simple questions. If it's more personal [unique] situation, I would like to talk to a human
P2	- Yeah, I'm very positive. But again, I don't know how it is with other questions or maybe considerations, I will have, but for now it's very positive.

15.2 Human avatar + informal conversational style

Results H/IF	
General feelings	**How did you feel during the interaction with the chatbot?**
P3	- She was really fast in replying and I really liked it.
P4	- I like the information's nice
Likes	**Is there something that you particularly liked about the chatbot?**
P3	- It was very quick and very detailed
P4	- I also I like to think that in the thing itself, in the window itself, it says the timestamps
Dislikes	**Is there something that you particularly disliked about the chatbot?**

P3	- Well, yeah, her replies were that fast so of course you don't know it's a human…
P4	- No, nothing
Appearance	**How do you feel about the chatbot's appearance?**
P3	- I prefer this. Especially when it's a chatbot, I prefer it like this and not a real image. - Like, why, why use a real picture when you are not using a human?
P4	- You instantly know it's a bot, which can be bad
Conversational style	**How do you feel about the way the chatbot converses with you?**
P3	- I usually like it when it's taking a bit longer
P4	- I guess it's good because the responses I would think the responses are made by a person and they've put some effort into trying to make the bot sophisticated and as user friendly as possible.
Ease of use	**Do you think the chatbot was easy to use?**
P3	- It was very easy to find, type, and ask more questions… And I think it's very easy, if you have a question, to reach out to a chatbot…
P4	- Yes, it was
Helpfulness	**Do you feel that the chatbot was helpful during the interaction?**
P3	- Yes, I'd like to give him some details and let a human take over
P4	- It didn't persuade me to change to bots
Competence	**Do you feel that the chatbot was competent when giving you answers to your questions?**
P3	- Yeah, absolutely. It… she was, she answered all my questions and yeah, very specific answers. I think that's very nice.
P4	- It can't probably help with more complicated questions
Trust towards chatbots	**Do you trust this bot?**
P3	- I don't actually know who I trust more…[human or a robot] I think, both have benefits and downsides. Still, I would like to know. I think both can handle it the right way. Of course, humans can make mistakes more often.
P4	- Probably not. It's a bot that… For every question they ask, even simple ones, you

	know, when you…when you go online and you enter into a room and somebody starts chatting with you and it's obviously a bot. I mean, that's bad, because, you know instantly that it's a bot.
Attitude towards using chatbots	**Would you consider a future interaction with this chatbot?**
P3	- Yes, definitely
P4	- Probably I would search for myself because I'm used to it. - If if the bots were as sophisticated as [other bots]. Yeah. Then I would reconsider. Like, seriously reconsider.

15.3 Robot avatar + formal conversational style

Results R/F	
General feelings	**How did you feel during the interaction with the chatbot?**
P5	- General feelings. Yeah. Um, I think it felt like a bot.
P6	- Responses were a bit quick
Likes	**Is there something that you particularly liked about the chatbot?**
P5	- it was quick responding and didn't take long.
P6	- , I think it was a pretty normal bot , so I'm quite neutral about it.
Dislikes	**Is there something that you particularly disliked about the chatbot?**
P5	- Maybe it could have been more elaborate on the answers - […] For example, like could to give any more shipping options or could have given more payment options. - So just instead of being very razor accurate, it should be more broad.
P6	- [the quick responses] kind of shows or makes it feel like it doesn't really think about what you're asking. That usually means that the bot is not really, um, intelligent

Appearance	**How do you feel about the chatbot's appearance?**
P5	- You know, it's it's a robot dude. OK, if I if I know it's a robot, I'd rather prefer a robot. - I think I think if something really tries to be human, like so it's a bit uncanny. It's not not positive. I think so in this case it was a robot.
P6	- It looks like a bot to me. I mean, it's certainly…, it's nice to know when you if you talk to a bot
Conversational style	**How do you feel about the way the chatbot converses with you?**
P5	- I think things like response time was roboty. I think that's appropriate. - So it was a business orientated, I think. It didn't chit chat - […]I don't go to a customer service to chit chat. I want answers to my stuff. - [emojis] I don't think that adds any value to the chatbot. But now for customer service, I think in my opinion, it's not, um. It's unnecessary.
P6	- I think it was fine, it was pretty straightforward.
Ease of use	**Do you think the chatbot was easy to use?**
P5	- Yeah, it was pretty easy to do. Mm hmm.
P6	- Yes, it's just a normal chat window. So it is what you're used to.
Helpfulness	**Do you feel that the chatbot was helpful during the interaction?**
P5	- Yes, but again quicker, precise answers to my question.
P6	- I mean, it answered the question so that's always good
Competence	**Do you feel that the chatbot was competent when giving you answers to your questions?**
P5	- I think was competent enough for the questions that were asked.
P6	- I mean, is competent in answering the questions that I asked about if I have any difficult questions or I mean, usually I'd rather to talk to a customer support agent

Trust	**Do you trust this chatbot?**
P5	- I trust chatbots as far as I trust myself asking specific enough questions. So if I can ask a question specific enough. Yeah, then I trust it. I think at first it's just as much, if not more than human most of the time.
P6	- With simple questions that it can look up from, um, its configuration, yes, but with more advanced questions… no
Attitude towards using chatbots	**Would you consider a future interaction with this chatbot?**
P5	- I mean, it was the first line of connection and the quickest way I would do it.
P6	- Yeah, it's fine. If if I wouldn't know where to find the answer and it was a simple question, I would use it.

15.4 Robot avatar + informal conversational style

Results R/IF	
General feelings	**How did you feel during the interaction with the chatbot?**
P7	- so the first thing I noticed was, well, I though the chatbot was friendly.
P8	- Uh, It's a bit wordy.
Likes	**Is there something that you particularly liked about the chatbot?**
P7	- The friendliness, I think it made it more personal.
P8	- Seems very fast
Dislikes	**Is there something that you particularly disliked about the chatbot?**
P7	- Nothing came to my mind, I like this chatbot…
P8	- [wordiness] I don't think it is for the general public, but for me personally, yeah.
Appearance	**How do you feel about the chatbot's appearance?**

P7	- I thought it was cute. I think it fits it because it was , like, a cartoon style robot. Like it… I just think it had a friendly demeanor despite being robotic
P8	- I don't have any feelings towards him.
Conversational style	**How do you feel about the way the chatbot converses with you?**
P7	- despite being robotic because it didn't speak robotic… It was designed nicely. - He or she, or it… used a lot of emojis and exclamation points, I also noticed that when I typed a question, like after two questions so I think, they said ''Oh, can I help, do you have any other questions, is there anything else I can help you with…?'' So it was a useful chatbot. I think the conversation style was very friendly.
P8	- Shorter answers, or even using bullet points would be better.
Ease of use	**Do you think the chatbot was easy to use?**
P7	- so it was really easy to use and it had quick and accurate responses.
P8	- Yes, it was easy
Helpfulness	**Do you feel that the chatbot was helpful during the interaction?**
P7	- I thought that they [answers] were very detailed, I mean I think sometimes chatbots they can just respond one word or one sentence, but this, like, had all the information there
P8	- It and answered exactly what I needed to know.
Competence	**Do you feel that the chatbot was competent when giving you answers to your questions?**
P7	- I think it knew what it was doing. I think it's fine, but I think if you have a more complicated issue, like, my package was stolen and something like that, I would want to talk to a human…
P8	- It seems like it picked up quite well what I was asking
Trust towards chatbots	**Do you trust this chatbot?**
P7	- Yeah, but I also think it depends on my issue. Because I'm fine talking to chatbots, but a lot of times I go to chatbots when I want to talk to an actual person.

P8	- […]So establishing some sort of trust [is important] Yeah. So maybe the robot would like. Prove itself by saying, I'm going to send you a text message on your phone, since we know your number from the store. This will give you a code of the code will show that's like a show that we're legit and we're not trying to scam you out of your details. -
Attitude towards using chatbots	**Would you consider a future interaction with this chatbot?**
P7	- yeah, but I also think it depends on my issue. Because I'm fine talking to chatbots, but a lot of times I go to chatbots when I want to talk to an actual person. So if there is something wrong with my order I go to the chatbot and click all the things and if ''talk to an agent'' comes up, then I click ''talk to an agent''
P8	- If it's not an urgent matter, then I would definitely speak to a bot because I have less anxiety talking to a robot than a human

15.5 Logo avatar + formal conversational style

Results L/F

General feelings	**How did you feel during the interaction with the chatbot?**
P9	- yeah, interactions were good.
P10	- Nothing special, to be honest. It's, it's clear it gave the information that I wanted
Likes	**Is there something that you particularly liked about the chatbot?**
P9	- It was actually more straight to the point than my personal experience with human customer service.
P10	- I liked it. It was quick. It didn't wanted to be a human to say so. Like, it takes time to type the question. No, it's just like, OK, this is the answer. Yeah. Um, which I appreciate if if it's clear that it's chatbot because otherwise you could be in doubt

	like somebody typing wasn't a case. It's just like, OK, here's your answer.
Dislikes	**Is there something that you particularly disliked about the chatbot?**
P9	- I noticed was sort of lack of enthusiasm in the bots, the sort of human traits that I missed, sort of
P10	- Nothing special comes to mind
Appearance	**How do you feel about the chatbot's appearance?**
P9	- It would be more pleasant if it was some sort of figure, could either be fictional figure as a robot or something
P10	- Yeah, yeah, well, I like it, as I said before, it doesn't appear to be a human that way, doesn't want to be human. That's why it's just like it's all linked to the company and not like anything or anyone in particular. Yeah. Which in this case, I liked.
Conversational style	**How do you feel about the way the chatbot converses with you?**
P9	- Well, these messages, they were very concrete and to the point that maybe if I were to ask further questions on a topic like how can I check my order? Either the bot would have know the answer or refer me to a frequently ask questions. I I personally think I would rather, if it's more elaborate to have a Web page than a bot explaining it to me. - Well, like I said, the casual tone, the things I said in the beginning, that I would like to both be more enthusiastic, have a casual tone, sort of a re enforce or how do you say that? Uh. Tell the customer, let the customer know that it's not a. A bad question to ask. Of course you can, and this to this, it's more of like a tone. I don't know how to describe it. Yeah, maybe I would add. The bot's sort of asking me, did this answer your question? Yeah, and then you can say yes or no, exactly, so the chatbot knows if it if you need more information or not. - […] Especially if you know that it's a chatbot… I would find it really like stupid. Yeah, because that I would think, like, OK, you're not a human. And someone

	thought this was a good idea, which now it's just like I think emojis in like serious conversations with companies are always a little bit stupid, because emojis for me are more like a fun thing. And if you're having a problem or a serious question and a company is using emojis, then I'm like, you're not taking me seriously.
P10	- I like that in several questions that were different paragraphs just say so. So it gives you a little bit ease of reading. Yeah, and not like too much text crammed into one small space. And. I also like the. It just directs the sentence to you, like, for example, you are only required to pay in the physical store. Yeah. So it talks to you. Yeah. That talk to you like it. Yeah. It feels a little bit more centered around you, which is of course the case because you wasn't the problem or you are. But that's why I liked it. OK, you recognize that it's there for you to say so.
Ease of use	**Do you think the chatbot was easy to use?**
P9	- Yeah, maybe where I can imagine a scenario where both would have the general information and then redirect to the frequently asked questions for more information on the subject.
P10	- It's OK because in the bottom most like the, the little circle, which for me is recognizable, that that's a chat thing. Perhaps it could be like a little square or something. Textbox above it with a little arrow like “Chat with us!” or something.
Helpfulness	**Do you feel that the chatbot was helpful during the interaction?**
P9	- they gave all the answers that I would have wanted, there was no unanswered question in that sense.
P10	- Yes, those are very easy, straightforward questions which don't need human interaction at all because most of the time they're already on a frequently asked questions page. Yeah. And I think with most of these questions that's the case. It's just nothing special. You just

	want your information. And I think it could work very well for for that purpose.
Competence	**Do you feel that the chatbot was competent when giving you answers to your questions?**
P9	- Yes, it was actually more straight to the point than my personal experience with human customer service.
P10	- Yeah, it just yeah, it just gave the answer, yeah, no, that's good, but also like perhaps even a little bit more than you asked, which I like, because in the first question, like, how can I track my order it just said like, OK, you if you are using a trackable service, the delivery is traceable, and I was like OK that's already the answer. But then you get like even more details
Trust towards chatbots	**Do you trust this chatbot?**
P9	- I'd [give my personal information] if it was required, yes, yeah, if he would ask you, yeah.
P10	- […] for example, when there's also personal information which is dealt with or you have to give like all types of information that you can look in the database for stuff about you or your order or stuff like that. And I'm also a bit like. Yeah, like the computer has to do that. All Yeah. Of course that person is also yeah. You can also have the wrong person and that also could go wrong.
Attitude towards using chatbots	**Would you consider a future interaction with this chatbot?**
P9	- Yeah, probably
P10	- Yeah. It's not a problem if it works like like this chatbot for example. Yeah. I would definitely use that if I have a question like about delivery.

15.6 Logo + informal conversational style

Results L/IF	
General feelings	**How did you feel during the interaction with the chatbot?**
P11	- I felt like it answered my question sufficiently. And it was a friendly as well, so I didn't feel I didn't feel any negative feelings towards it, I guess.
P12	- Yeah, good. I think. It's clear what the chatbot is telling me and it's a kind tone.

Likes	**Is there something that you particularly liked about the chatbot?**
P11	- I felt like the responses were kind of they weren't too much to the point. There are some words in there to make it feel more, I guess, human, I don't know.
P12	- [liked the kind tone] Yes, I think so.
Dislikes	**Is there something that you particularly disliked about the chatbot?**
P11	- Nothing to say about it, the responses were long
P12	- No, no I don't think so. I believe that a little less emoticons would be fine.
Appearance	**How do you feel about the chatbot's appearance?**
P11	- If I look at the design of the avatar, I don't think it's really suitable. - because I wouldn't call it like usually I see a profile picture as a quote unquote person, you know, it's supposed to be a chatbot, but here but even here, I would put a picture of like even if it's just a like a what's called like one of those Adobe illustrator. Yeah. Flat drawings of a person or like. Yeah. A robot or a person. That would be better, I think. OK, because I feel like I'm talking to something and I don't know, this is like talking to I don't know what I'm talking to.
P12	- Yeah, it's not a logo I would choose personally. But it's not… as an avatar, the little picture, it's fine. It indicates who you are talking to, sort of. That's nice. You know you're talking to someone from Tech Paradise.
Conversational style	**How do you feel about the way the chatbot converses with you?**
P11	- I like to I think that's a little bit to the customer experience and also, quote unquote, human touch. I don't know. - I like that it has its like you human-ish touch to the answers. And it was a friendly as well.
P12	- I think the tone is fine to be honest. I think there are a lot of emoticons in the text, which is not annoying but not something I would personally use when talking to a chatbot. But yeah. That's something that caught my eye.

	- Well, I think, sometimes with chatbots, they like give the chatbot an actual name. I like that with this chatbot, it's just like the "Tech Paradise" thing, and not like pretending that you're talking to an actual person which sometimes feels a bit weird to me when you're talking with a chatbot. - Sometimes the answers are quite long but you get the answer in a matter of seconds. Which is fine, because when you are talking with a chatbot, I think it's nice to immediately have an answer. But then, you know, it's sort of obvious that you are talking to a chatbot so there is no need for me to pretend that I am talking to an actual person.
Ease of use	**Do you think the chatbot was easy to use?**
P11	- it was very user friendly to use indeed.
P12	- Yes, definitely. [opening the chat] was easy.
Helpfulness	**Do you feel that the chatbot was helpful during the interaction?**
P11	- Definitely felt like it was helpful. The only thing is that one of the responses was massive, in my opinion. Yeah. Yeah. I told you about. Yeah.
P12	- Especially with some of the questions they sort of tell you a little bit of extrta information which is nice because the information you get other than just the pure answer is useful.
Competence	**Do you feel that the chatbot was competent when giving you answers to your questions?**
P11	- It felt like as a I don't know, as a programmer, I find it difficult to say that if you pull a predetermined question into like and it's going to give you a predetermined answers. Right? - So I find it difficult to say, like, yeah, it was competent because I see competency as something like it solves problems, uh, like dynamically maybe even…
P12	- Well I think with this, uh, a chatbot, it's quite obvious that you're not talking with a human. Because sometimes the answers are quite long but you get the answer in a matter of seconds.
Trust towards chatbots	**Do you trust this chatbot?**

P11	- I don't know if I would give it my personal information. Why is that? Because maybe the pretense of the situation, like I actually have no idea what side I'm on at the moment.
P12	- Yeah, I think, it's a good robot.
Attitude towards using chatbots	**Would you consider a future interaction with this chatbot?**
P11	- Uh, sometimes, like if I know the company, like I think Microsoft actually uses them as well, like they used to filter out common problems first. And if the chatbot can't help you, then you get redirected to a like a real person.
P12	- Yes, as long as companies consider how they use a chatbot [choosing the tone and the image should be congruent with the brand's image]