

The relationship between motives for using a Chatbot and satisfaction with Chatbot characteristics: An exploratory study

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Abstract. Even though there is a growing number of studies focusing on Chatbots and artificial conversations, research lacks studies analyzing Chatbot characteristics and motives for using this technology. This displays a critical gap in the literature that the present study addresses. This work thus attempts to analyze the relationship between motives for using a Chatbot and satisfaction with Chatbot characteristics. Two questionnaires were developed, one to assess satisfaction with Chatbot characteristics, according to the Kano model and another to assessing motives for using Chatbots, based on previous qualitative research. Survey research was directed to the Portuguese population (N=258) and statistical analysis indicated that motives for using Chatbots do not seem to have a clear relationship with satisfaction with Chatbot characteristics. Furthermore, results suggest that equipping Chatbots with human-like characteristics, seems to be indifferent to Portuguese Millennials; instead, speed and accessibility of Chatbots seem to be valued, especially when using this technology for convenience purposes. A discussion on the possible implications for theory and practice on this topic is presented, and clues for future research are suggested.

Keywords: Chatbots, Artificial Intelligence, Natural Language Processing, Human-Computer Interaction

1 Introduction

Artificial Intelligence (AI) is on the rise, and it must be seen as an important IT pillar that will determine the competitiveness of companies shortly in what is commonly referred to as the 4th industrial revolution [1]. In general, three major technological trends now have come together and have led to the advancements in AI: big data, affordable high-performance computers and machine learning systems. Thus, AI is not just the future anymore it is part of our present [1].

Chatbots are dialogue systems that communicate with a user through natural language and a user interface [2]. Recently, these systems have experienced a new upswing [3].

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Researchers, entrepreneurs and individuals are using these digital helpers and see potential in improving the flow of information both inside and outside the company through the use of Chatbots [3]. Previously, customers who wanted to connect with a company either had to fill out forms or call hotlines with often long queues., generating communication that often can be one-sided, annoying and slow for the customer [4]. On the other hand, communication with friends and colleagues is increasingly taking place via messaging platforms [4]. The popularity of messaging and bot systems is steadily increasing. Since 2015, more people are using applications for communication in social networks. That is almost three billion people a day worldwide.

Consequently, a breakthrough into a new communication paradigm can be observed. Communication and interaction are increasingly controlled and determined by algorithms. Bots and messaging systems are vigorously debated and often have to serve as megatrends of the next few years. Ostensibly, it is all about new communication interfaces that bring efficiency and convenience benefits as the logical next evolutionary stage [5]. This is driven, in particular, by the advances in Artificial Intelligence, which make it possible to create learning algorithms and chatbots that can automate communication while being perceived "human-like" by the users [5].

This research aims to analyze the relationship between motives for using a chatbot and satisfaction with chatbot characteristics. Moreover, thus, to answer in what ways do motives for using a Chatbot affect the satisfaction with chatbot characteristics? If and how do the Chatbot characteristics that are valued by users vary with the motives for using them? Likewise, this interlinkage represents a gap found in the literature. Even though there is a growing number of research focusing on Chatbots and artificial conversations, the present literature review did not find of any studies analyzing the influence of various characteristics of chatbots on satisfaction.

2 Literature review

2.1 Chatbots

Chatbots, also called chatterbots, belong to the category of software agents as so-called interface agents or conversational agents. Chatbots allow humans to interact with the computer based on natural language, this can be text-based or voice-based [4, 5].

However, despite the diversity, all bots have one thing in common: they are text-based or voice-based systems that use Natural Language Processing to communicate with their users based on pre-defined rules or Artificial Intelligence. In the literature, there seems to be no general distinction or definition of Chatbot types [6, 5]. However, it can be stated that mainly two different types of Chatbots exist: rule-based-/Scripted-/Sequential bots and Intelligent (AI-based) bots.

The first type offers guided communication, using an existing set of pre-formulated rules and answers. Rule-based bots have an informative character. Since no artificial intelligence is used here, an open dialogue with them is not possible or at least only very limited. The programming effort is comparatively low [6]. Unlike the rule-based bots, the second type uses Artificial Intelligence techniques such as Machine Learning and NLP to understand enquiries. These bots learn the language much like a child and can create cross-references and recognise meaningful connections. They find answers to open questions and understand customer concerns, even without them having to be programmed exactly like that [6].

In the present work, the term "Chatbot" is used for all programs that enable natural language interaction. No matter if these are personified, whether the input works via

keyboard, microphone or touchscreen. In addition to the language, additional elements of the communication are interpreted and integrated into the communication.

2.2 Chatbot characteristics

2.2.1 Emotion

A Chatbot uses natural language to interact with its opponent. It must be mentioned here, that the connection between language and emotion is still widely discussed today. While common sense suggests that language has nothing to do with emotion, it is evident that statements from other people affect our emotions. Likewise, humans use their words to describe their own emotions or those of others. Accordingly, it is believed that “this is the extent of the relationship between language and emotion” [7]. In this study *Happiness*, *Sadness* and *Empathy* are considered in this dimension.

2.2.2 Personality

Another trait that needs to be considered is the perception of users regarding the human body as a channel of communication, represented by an avatar in a Chatbot. There are several definitions of the term avatar. Bahosky and colleagues [8] describe it as “a pictorial representation of a human in a chat environment” (p. 8), whereas Loos [9] characterises avatars as “a representation of the user as an animated character in virtual worlds” (p. 17).

Studies and researches show that "human-like" behaviours associated with computer technology have an impact on the perception of the user. Due to language production, alternating conversation and reciprocal responding, users tend to personalise these technologies [10]. In this category: *Humour* and *Avatar* were considered.

2.2.3 Conversational abilities

A growing body of literature has examined artificial conversations regarding human-chatbot interaction. [11] for instance conducted a comparison between human-human online conversations and human-chatbot interactions and concluded that the interactions with a Chatbot had longer durations with shorter messages than the conversations between humans. Furthermore, their study points out that the communication with Chatbots “lacked much of the richness of vocabulary [...]and exhibited greater profanity” [11] (pp. 245). In this area, *Context Awareness* and *Common speech* were considered.

2.2.4 Efficiency

Chatbots are about new communication interfaces, which are bringing the next evolutionary step to efficiency and convenience benefits [12]. A significant advantage of using Chatbots is that companies can offer their services where most users are, such as in the messaging and social network apps [4]. The demands on the speed and competence of information have increased continuously in recent years [12]. Real-time service, as a customer's claim, has become a commonplace and indispensable part of effective service (Buttle & Maklan, 2015). As mentioned online and mobile communication has become a matter of course. Moreover, with that, additional expectations go along with the communication [12]. In this area, *Speed*, *Accessibility* and *Text vs. Voice* were surveyed.

2.3 Model

Given the literature review findings, this paper proposes the following model:

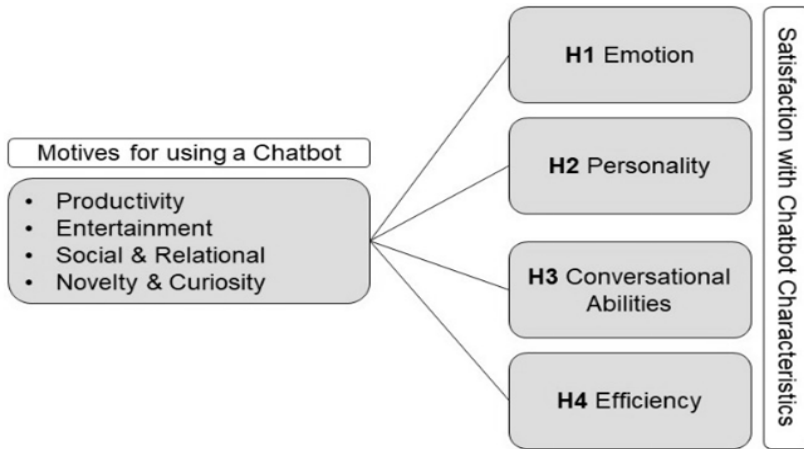


Fig. 1. Proposed model of the present study.

Source: Own processing.

Thus, the following hypotheses are derived from the model:

- H1: The motives for using a chatbot influence satisfaction with the chatbot emotion.
- H2: The motives for using a chatbot influence satisfaction with the chatbot personality.
- H3: The motives for using a chatbot influence satisfaction with the chatbot conversational abilities.
- H4: The motives for using a chatbot influence satisfaction with the chatbot efficiency.

3 Method

For the investigation of the hypotheses and research questions, a quantitative survey in the form of a questionnaire was chosen. To collect a larger sample in a timely and cost-effective manner, an online survey was conducted. The questionnaire was created with the service SurveyMonkey and made available online to the subjects.

To test and evaluate the questionnaire, a pre-test with talked discussion with a group of ten Portuguese Millennials was conducted before the main survey. This procedure aimed to find out if the questions are understandable for the subjects, if there are technical problems, useful comments and how long it takes to answer the questionnaire. As a result of the pre-test, some statements were adjusted for a better understanding of the items and four new questions concerning the participants' experiences made with a Chatbot were included. A convenience sample was gathered, since the survey was sent to university undergraduates, master-level students and alumni of the faculties of Economics and Engineering of the University of Porto, in Portugal and shared in social media (Facebook and LinkedIn platforms mainly). Only the Portuguese version of the survey was emailed and shared so that Portuguese could answer the survey with negligible linguistic barriers and in order to preselect and filter the target group.

Structure-wise the survey was composed of 52 items. The first six items are related to demographic information; four items concern the participants' experiences with a Chatbot 20 items are about the participants' motives of using a Chatbot and 20 items refer to the satisfaction with Chatbot characteristics. The survey also included two open questions, with the intention of allowing the participants comments, as well as email address, in case interest in receiving a summary of the survey results.

3.1 Assessing satisfaction

In this work we subscribe to the Kano model, which is a feature-oriented process and refers to product, service or interaction characteristics, judged by the user [13]. This model is based on the two-factor theory and tries to determine the attributes that drive satisfaction [13]. The concerning attributes are classified according to their impact on satisfaction. There are three types of attributes that cause different levels of satisfaction [14]:

- *Must-be attributes*: the minimum criteria that must be fulfilled by a product, service or interaction. As a result, dissatisfaction is created in the event of non-fulfilment and neutral attitude upon fulfilment. Consequently, the satisfaction cannot be significantly improved if the performance level of a "Must-be" attribute continues to increase beyond the level expected by the customer or user [15].
- *One-dimensional attributes*: expected criteria and are thus explicitly requested. There is a linear relationship between the level of confirmation and satisfaction. This means that as the degree of fulfilment increases, satisfaction increases and vice versa. In highly competitive markets, only products or services that have high levels of performance attributes have a chance. As a result, performance attributes also play a prominent role in corporate communications. In many product areas, this attributes category serves above all to differentiate it from the competition [15].
- *Attractive attributes*: "Attractive" attributes are not expected and therefore not explicitly formulated and demanded. If a corporation succeeds in equipping its product with these attributes, this measure leads to positive disconfirmation and thus to a high level of satisfaction. Otherwise, there will be no sense of dissatisfaction when all the "Must-be" and "One-dimensional" attributes have the level of performance defined by the customer [15].

In addition, "Indifferent" and "Reverse" attributes are also of relevance in the Kano model. In the case of "Indifferent" attributes, there is no influence on the satisfaction, regardless of the fulfilment or non-fulfilment of the product characteristic. The "Reverse" attributes describe a category indicating that respondents do not desire the requested product feature and, in the presence, even leads to dissatisfaction [14].

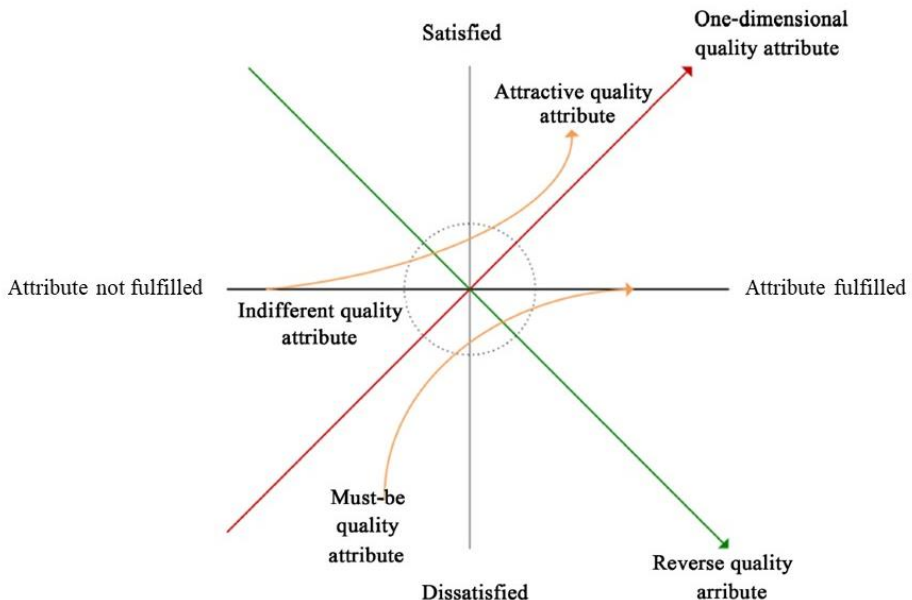


Fig. 2. Kano Model.

Source: Huang (2017) [16].

3.2. Sample

This study includes a sample of 258 valid responses, of which 126 (49%) identified as female and 131 (51%) identified as male. Most of the respondents were under 26 years old, totalizing over half of the sample (M = 25.36; SD = 4.37; Min = 18; Max = 38).

Most respondents report being familiar or very familiar with chatbots (65%), whereas 24% are a little familiar with this technology and 10% of respondents report not being familiar at all with chatbots. Regarding previous experience with chatbots, most respondents (54%) indicated a regular or very regular use of chatbots, 27% reported a rarely or sometimes using chatbots and 10% had no experience with chatbots. Most respondents 45% are curious or very curious about this technology, 47% are little or somewhat curious about chatbots and 8% are completely uninterested on the theme.

4 Results

The level of overall motives of the entire sample group to use Chatbots in general are Convenience (M=3,69), Exploring (M=2,96) and Social (M=1,87).

The evaluation displays that all analysed characteristics could be classified as indifferent-attributes and thus have no direct impact on satisfaction or dissatisfaction.

Table 1. KANO Model Assessment of CB characteristics.

| Characteristic | A | O | M | I | R | Q | Dominant Category |
|-------------------|----|----|----|-----|----|----|-------------------|
| Happiness | 15 | 0 | 14 | 201 | 15 | 13 | Indifferent |
| Empathy | 16 | 3 | 14 | 201 | 14 | 10 | Indifferent |
| Sadness | 2 | 1 | 3 | 195 | 45 | 12 | Indifferent |
| Humor | 17 | 12 | 11 | 186 | 25 | 7 | Indifferent |
| Avatar | 11 | 3 | 21 | 206 | 11 | 6 | Indifferent |
| Context Awareness | 21 | 20 | 29 | 166 | 10 | 12 | Indifferent |
| Common Speech | 26 | 21 | 20 | 174 | 11 | 6 | Indifferent |
| Speed | 35 | 69 | 27 | 121 | 1 | 5 | Indifferent |
| Accessibility | 29 | 65 | 30 | 123 | 3 | 8 | Indifferent |
| Text Based | 15 | 11 | 18 | 194 | 9 | 11 | Indifferent |

A= Attractive quality attribute; O= One-dimensional quality attribute; M= Must-be quality attribute; I= Indifferent quality attribute; R= Reverse quality attribute; Q= Questionable.

Source: Own processing.

5 Discussion

This work has dealt with the research question in what ways motives for using a Chatbot may affect the satisfaction with Chatbot characteristics and if and how Chatbot characteristics that are valued by users vary with the motives for using them. All of the determined Chatbot characteristic were perceived as "Indifferent" attributes by the respondents, thus meaning that all of the original hypotheses should be rejected. This result may reflect that perhaps the elements we found in the literature might not be relevant for the subjects we surveyed.

Perhaps the literature around this topic has taken a somewhat “human-centric approach” (in the sense that chatbots are conceptualized as ideally mimicking human affect, speech and appearance/avatar) but in fact chatbot users might not be looking for a humanoid bot anymore than people don’t tend to expect their robot vacuum cleaners (e.g. Roomba) to look or behave like a human. Thus, we believe that these results might reflect a different conceptualization of what a chatbot is and should do in the users’ perspective.

In line with these findings, subjects reported that "Emotion" or "Personality" traits were not relevant. Characteristics like happiness, sadness or empathy do not seem to cause an increase in satisfaction. Instead, the sample group valued Efficiency-related characteristics as important. This is confirmed through the analysis of the relationship between the motives and characteristics. All three motive dimensions display a positive effect on satisfaction in relation with Characteristics Accessibility and Speed. Another key finding is the absence of Entertainment as a motive to use Chatbots. While in the study by Brandtzaeg, and Følstad [17] the dimension "Entertainment" was assessed as an important motive, this dimension did not seem to make sense in the Portuguese population, rather, 3 new dimensions could be defined that can be used to capture motives for using a Chatbot, namely, Convenience, Exploring and Social, where the motives to use Chatbots for convenience purposes thereby displays the highest value.

With regards to the experience with Chatbots, the majority of the respondents (54%) reported having already had experienced interaction with a Chatbot, meaning nearly half the sample was referring to chatbots from an inexperienced or novice level perspective. The majority of participants reported only rarely using chatbots, despite indicating curiosity about the topic, which is confirmed in the literature [17]. Further confirming this idea, “exploring” could be identified as one of the three key dimensions regarding the motives to use a Chatbot. Contrary to other authors and developers who highlight the relevance of avatars, emotions, personality in chatbots and describe these characteristics as essential [6, 10], claiming that the goal must be to equip chatbots with human-like attributes to generate a successful interaction [12], it was interesting to realize that our sample does not seem to consciously value these aspects, but rather consider speed and accessibility as important features, delegating all other characteristics as indifferent in the Kano model.

6 Conclusions

Based on the research within this work it can be stated that Chatbot characteristics and motives for using this technology have been overlooked and only partly investigated in the literature which seems to focus more on the technical issues and less on perceptions of the user. There is still a gap in studies that address the implications of this technology and customer reactions to it, despite a growing interest in chatbot technology for experts, researchers, and companies [12], associated with a blooming expansion in the field of Artificial Intelligence in general and Natural Language Processing in particular.

Thus, this work aimed at exploring the relationship between Chatbot characteristics and motives for using them. Results show that characteristics such as efficiency and accessibility are of particular relevance to the selected target group. In general, subjects seemed to regard almost all of the other indicated characteristics as indifferent. One reason for this could be the prevalence of little knowledge of Chatbots and their preparation, namely that people might not realize that they are speaking or texting with a Chatbots or a virtual agent, something well documented in the literature.

It seems like the Chatbot technology serves mostly to obtain information quickly and efficiently and personality, emotions or an avatar have little relevance for the inquired subjects. These features contribute to increase costs associated with chatbots in terms of research and development as well as time to conclude projects; rather, our inquired users

seem to be operating in a different paradigm where the features that really matter are speed and accessibility, contrary to a human-computer-interaction "humanoid" approach.

6.1 Limitations of the study and future research

The present study tried to create a framework for assessing chatbot consumer satisfaction and reasons for using chatbots. The methodology used proposed a novel approach to these elements by using the KANO model, but the way the scale was constructed did not allow for extensive statistical testing. Instead in future research we propose the scale be used with a 5-point Likert scale for the dimensions of the Kano model, in order for statistical procedures of scale validation to take place. The model should be further tested with a larger population size in order to acquire further validation and, ideally, further convergent and discriminant validity procedures should be undertaken. Another limitation was that a large portion of the sample did not have much experience with chatbots, which should be a variable that future studies should control for.

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