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Chatbots have been around for decades. However, the real buzz about this technology did not start before the spring of 2016. Two reasons for the sudden and renewed interest in chatbots were (1) massive advances in artificial intelligence (AI) and (2) a major usage shift from online social networks to mobile messaging applications such as Facebook Messenger, Telegram, Slack, Kik, and Viber. The first of these reasons holds promise that intelligent chatbots may well be within reach. Then second concerns service providers' need to reach users in the context of mobile messaging. However, in spite of these drivers, current chatbot applications suggest that conversational user interfaces still entail substantial challenges, in general as well as for the field of human-computer interaction (HCI). Chatbots imply not only a change in the interface between users and technology; they imply changing user dynamics and patterns of use.

We have previously outlined the potential implications and opportunities that chatbots hold for the field of HCI[1]. In this article we dig into what we see as a key challenge with chatbots from a user-centred perspective. Developers and designers have an urgent need to know more about how people experience chatbots and to understand what motivates future use of chatbots in terms of user needs. We need, therefore, to ask how chatbots resonate with users' needs and desires and, in turn, how these same needs and desires evolve as users get more experience with chatbots.

The word chatbots is a derivative of "chat robots," understood as machine agents that serve as natural language user interfaces to data and services through text or voice. Chatbots allow users to ask questions or make commands in their everyday language and to get the needed content or service in a conversational style. If chatbots gain the expected popular uptake, this technology will dramatically change the way people interact with data and services online. It has been predicted that such a conversational disruption may reduce service providers motivation to invest in apps and rather prioritize chatbots as a channel for reaching out to users. As one messaging platform provider, Kik, claims on its developer site: "First there were websites, then there were apps. Now there are bots."

On average, people are increasingly spending more time on messaging platforms. Facebook Messenger, for example, is reported to have had more than 1.2 billion active users per month in 2017. As people spend more time on messaging platforms, chatbots may be the way to reach customers. This fundamental change in online user behavior has propelled every major company to take on chatbots. Not only the typical technology giants such as Google, Amazon, Facebook, or LinkedIn, but also consumer service companies such as Starbucks, British Airways, and eBay now aim to reach their customers through chatbots. Gartner presented, as a top strategic prediction for 2018 that "more than 50% of enterprises will spend more per annum on bots and chatbot creation than traditional mobile app development" by 2021.[2]

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[1] Følstad, A., & Brandtzaeg, P. B. (2017). Chatbots and the new world of HCI. interactions, 24(4), 38-42.
[2] Gartner top strategic predictions for 2018: https://www.gartner.com/smarterwithgartner/gartner-top-strategic-predictions-for-2018-and-beyond/

Current chatbots often fail

The vison of a compelling conversational interface is not easily attainable. We know that a key success factor for chatbots and natural language user interfaces is how well they can support user needs in the conversational process seamlessly and efficiently. However, while chatbots may potentially increase individual flexibility, expand opportunities for information retrieval and learning, and compensate for limitations in digital competence, current chatbots often fail[3]. One possible explanation is the difficulty in designing for open-ended conversations because chatbot capabilities seldom capture all the various ways in which the user might want to engage. There has also been a substantial technology push in chatbot development and a lack of concern for how people use chatbots and for what purpose, potentially leaving users frustrated. We are currently witnessing a rush of businesses and organizations vying to be the first to deploy chatbots in their particular service domain. In this early phase of chatbot deployment, chatbot initiatives too often aim for poor use-cases, ignoring user needs and user experiences.

Anna was too human

Ikea was one of the first companies to provide chatbots in customer service, and its experience is a thought-provoking example of some of the potential challenges that chatbot designers and developers currently struggle with. For over ten years, the chatbot "Anna" aimed to answer customers' questions on Ikea.com. Anna was ready to listen 24/7. Her purpose was to guide customers around the Ikea website in an interactive and conversational way, adding a personal touch. However, Ikea retired Anna in 2016, with no plans for a replacement. Frustrating customer interactions with Anna may have played a major role in ending Ikea's innovative chatbot adventure. As Magnus Jern, president of the mobile solutions company DMI, told BBC: "If you try too hard to be natural, it diverts from the real purpose of [the chatbot], which is about giving the right answer as fast as possible." Ikea's chatbot initiative clearly struggled in terms of balancing human versus robot aspects, causing people to ask, "stupid questions," often sex related, because the chatbot Anna was too human,[4] according to Ikea. This is somewhat different from the experiences with other chatbot initiatives where users have complained about a chatbot experience as being overly "robotic" and lacking personal touch.

The ultimate chatbot fail

However, the ultimate chatbot fail was Microsoft's Tay, deployed on Twitter in 2016. Tay was perceived as a cutting-edge AI-based chatbot, the goal being that she would learn and mimic the personality of a 19-year-old girl through interaction with Twitter users. The problem was that Tay not only learned from well-meaning Twitter users, but also from online Twitter trolls exposing Tay to all sorts of hateful conversation. According to Microsoft, the teaching of Tay was revealed to be a coordinated effort by some trolling users in different online communities (e.g., 4chan, Reddit, and eBaumsworld), abusing Tay's commenting skills and having Tay respond in offensive ways. Many of Tay's comments mimicked some popular hateful memes online. In less than 24 hours, Microsoft removed Tay from Twitter, but only after she had praised Adolf Hitler and expressed anti-feminist sentiment in harsh language.

The stories about Anna and Tay leave chatbot developers and designers with an array of tricky questions. Challenges concerning the automation of dialogue may be even more substantial than those we have faced when designing graphical user interfaces. At first hand, this may sound strange as the natural language dialogue in chatbots suggests a low threshold for users to access data and services.

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[3] Luger, E., & Sellen, A. (2016, May). *Like having a really bad PA: the gulf between user expectation and experience of conversational agents*. CHI Conference on Human Factors in Computing Systems (pp. 5286-5297). ACM.

[4] Wakefield, J. (2016) Would you want to talk to a machine? BBC: http://www.bbc.com/news/technology-36225980

However, whereas conversational interfaces are truly intuitive when applied for interaction between people, conversations between humans and an automated conversational agents are more challenging.

Chatbots interactions with humans

An important lesson is that chatbots in general, and AI-powered chatbots , need substantial adaptation and maintenance to serve their task properly. The potential, and non-predictable, variation in user input, as demonstrated in the chatbot failures above, and what constitutes a valid chatbot response represents substantial challenges for the HCI field. To develop chatbots that adapt to the needs of specific users and conversational contexts, there is likely need for improved user and context models. Chatbots and their interactions with humans need to be analyzed and redesigned, not only with concern for specific interaction sequences, but also with the aim of improving generative responses to inputs from a range of users within a range of conversational contexts.

A poorly executed conversational user interface frustrates users, which in turn will be harmful for business. A conversational user interface also has fewer opportunities for representing the potential offerings of a service provider than does a graphical user interface. The chatbot dialogue instead needs to motivate to focused engagement, delivering simple and compelling users experiences. In so doing, there is a range of questions that designers and developers need to tackle: How friendly should they make the chatbot? How fast should the chatbot respond? How humanlike or personal? What about gender; should the chatbot be female, male, or gender neutral? Should the chatbot include a talk-to-human option? Perhaps the "chat" element should be less prioritized, with a greater reliance on pre-set answer options? The latter approach may remove misunderstandings in free-text conversations, making the process more efficient. However, it also represents a return to the old-style graphical interface, with a limited set of predefined choices made available at any given time.

Despite their long history, chatbots are still in rapid development with advances being made every day. We can also expect that the way in which people will interact with conversational user interfaces in the future will change, resulting in new user behaviors as well as social norms and user expectations. Consequently, more knowledge about chatbot experiences from an end-user point of view is needed. New user insights are critical for chatbot designers and developers. It is important to inform these designers and developers on the desires, needs, and practices of chatbot users. Designing a new interactive technology such as a chatbot requires in-depth knowledge about why people are choosing to make use of this technology as well as why people stop using it. It is necessary to understand the people who use chatbots, their goals, the tasks they have to perform, as well as their context of use. People's goals or tasks have often been seen in relation to motivational issues. However, motivation theories have led researchers to focus on factors that inspire people to use new technologies and factors that make technology use successful over a longer time period.

New user needs and motivations

Users of new technologies often espouse a range of motivations and patters of use in our high-choice media environment. And with ever more chatbots being launched, there is an ever-increasing range of possibilities. The great variety of chatbots is exemplified in the BotList (https://botlist.co/), a website where people can find chatbots for a broad range of purposes and messaging platforms. An enormous

variation in chatbot alternatives can also be seen by exploring Facebook Messenger, which now has over 200,000 chatbots[5].

One stream of chatbots allows users to complete quick and specific tasks such as checking the weather, organizing meetings, ordering food, or booking a flight. Chatbots can also help people explore online content or services. For example, Microsoft launched Heston Bot to help users discover food and cooking opportunities as well as fashion preferences. The global fashion and clothing company H&M, for example, launched a chatbot to provide individual fashion advice based on photos uploaded from users' personal wardrobes.

Another stream of chatbots supports more long-term relationships and activities such as charity or civic engagement, work, fitness, and personal health. Some of these have already proven to be important co-workers in office environments, while other are "smalltalk" chatbots such as Mitsuku and Replika. These latter chatbots seem to support the need for connectedness. Some users find a chat with Mitsuku to be consoling much in the same way as a chat with a fellow human. Users are revealing intimate details of their lives to their chatbot friend to Replika, which is reported to be growing in popularity and in particular among young people aged between 18 and 25 years old.

On a general level, most users expect effectiveness and efficiency, through customer service chatbots, in conducting productivity tasks such as access to specific content or help with administrative chores, while other chatbots may be used for entertainment-based and social experiences. Moreover, successful chatbots seem to inform users about what to expect from the beginning. This means that they are transparent about who the users are having a conversation with—that they are interacting with a chatbot and not a human. Information about what chatbots are able (and not able) to deliver is another important factor to communicate to the user.

However, while there is some existing research into people's uses and motivations for using media technology in general, there is a dearth of research on why people use chatbots or stop using them. According to the uses-and-gratifications perspective[6], people's social and psychological factors produce reasons for their motivations for media use. People are found to use media technologies strategically by employing different media technologies for diverse purposes. Thus, media users select among media technologies based on how well a certain media form helps them meet specific needs or goals. A fundamental notion in the uses-and-gratifications perspective is that people are motivated by a desire to fulfill certain needs. The key is, therefore, not to ask how a particular media use influences users but how users' basic needs or requirements influence their particular media choices. These choices are found to be motivated by several basic needs such as entertainment, social connection, identity, and information.

An important question, therefore, is whether chatbot users use media in a completely different way to previous media users and whether user needs are shifting with changing user interfaces. Our own recent research on motivational factors of chatbot users in a US sample[7] found slightly similar basic needs among chatbot users and those found in more traditional media use studies, albeit with some interesting differences. The majority of chatbot users in our study reported their main motivation for using chatbots as the effective and efficient accomplishment of productivity tasks. Participants typically reported using chatbots to obtain assistance or information. However, some users also reported entertainment or social and relational factors as their main motivations for using chatbots.

[5] Statista 2018: https://de.statista.com/statistik/daten/studie/662144/umfrage/anzahl-der-verfuegbaren-chatbots-fuer-den-facebook-messenger/

[6] Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *The public opinion quarterly*, *37*(4), 509-523.

[7] Brandtzaeg, P. B., & Følstad, A. (2017, November). *Why people use chatbots*. In International Conference on Internet Science (pp. 377-392). Springer, Cham.

They described chatbots as a fun or entertaining means to kill time. Some of the participants addressing social and relational factors even reported that chatbots could help reduce loneliness or enable socialization, though they of course knew that chatbots are not real human beings. A final category of users highlighted the novelty aspect, emphasizing an interest in trying out new technology.

The productivity aspect concerning efficiency and effectiveness is very important for chatbot users. Users of chatbots need to feel that they are in control of the technology. More concretely, they want to be able to have particular tasks done quickly and efficiently. This might have to do with the additional time demanded of users and people's expectations in an accelerating digital society experience. The main gratification for the typical chatbot user is, therefore, to make life easier and more productive.

Concerning the social aspects, chatbot users are not necessarily looking for social experiences with family and friends, which they find through other media channels. Rather, they may be in need of a channel for revealing personal and intimate details without being judged by other humans. Thus, the experience of connectedness is not necessarily about other people, but about being connected to yourself. A chatbot may serve people's need for connection and support 24/7, which may not be available through friends and family. Research long ago[8] revealed the tendency for people to open up more easily to a computer or a technology than to humans. It is safer for people to participate in self-disclosure with a chatbot. However, we know less about what such relationships with chatbots can lead to in the long run, whether they can generate increased loneliness or depression or whether they can be balanced in a way that can be beneficial for users' mental health.

Another important lesson learned is that chatbots are not a "one-solution-fits-all" technology. People have several motivations, and the purposes for using a chatbot can vary enormously. As such, there is a need for an appropriate range of use cases in the chatbot context.

Conclusion

Designing and developing chatbots is about understanding new user needs and motivations, which is required to make successful automatic conversational interfaces. Such conversational user interfaces to data and services means a dramatic shift in how designers and developers are used to thinking about interaction and user needs. Chatbots are changing user behavior as well as user needs. They are also altering particular user interfaces, creating new demands in the field of HCI. We have here outlined some of the new needs and challenges posed by the emergent trend of chatbots.

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[8] Weizenbaum, J. (1966). ELIZA—a computer program for the study of natural language communication between man and machine. *Communications of the ACM*, *9*(1), 36-45.