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# Can a Machine Tend to Teenagers' Emotional Needs? A Study with Conversational Agents

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**Abstract**

As teen stress and its negative consequences are on the rise, several studies have attempted to tend to their emotional needs through conversational agents (CAs). However, these attempts have focused on increasing human-like traits of agents, thereby overlooking the possible advantage of machine inherits, such as lack of emotion or the ability to perform calculations. Therefore, this paper aims to shed light on the machine inherits of CAs to help satisfy the emotional needs of teenagers. We conducted a workshop with 20 teenagers, followed by in-depth interviews with six of the participants. We discovered that teenagers expected CAs to (1) be good listeners due to their lack of emotion, (2) keep their secrets by being separated from the human world, and (3) give them advice based on the analysis of sufficient data. Based on our findings, we offer three design guidelines to build CAs.

**Author Keywords**

Teenager; Emotional Needs; Machine inherits; Human imitates; Conversational Agent

**ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

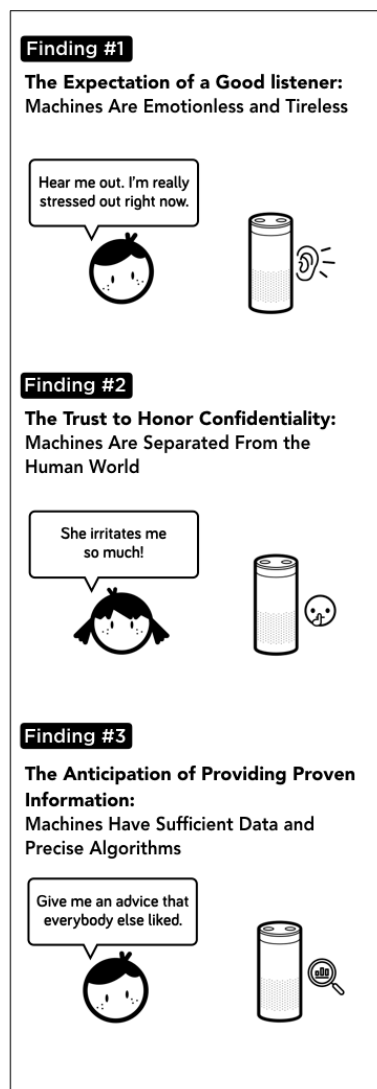


Figure 1: Summary of findings.

## Introduction

The increase in teen stress and its potential effects on their mental health has led many researchers to attempt to resolve the issue [9, 15]. Recent research has indicated that the stress levels of teenagers are increasing and currently rival those of adults [1]. Many studies have sought to manage their mental well-being through various technological methods, such as mobile training [15]. Some have tried to utilize conversational agents (CAs) [5].

The studies on CAs have focused on increasing their “human imitates” [1, 8], or human-like traits, arguing that making the machines more human would improve humans’ empathy toward and trust in the agents. This drive for anthropomorphism has led researchers to pay relatively less attention to “machine inherits”, such as lack of emotion or the ability to perform precise calculations.

Machine inherits, however, have the potential to satisfy the emotional needs of teenagers. Lucas et al. [6] suggested that self-disclosure was much easier with AI agents than with people in clinical settings due to the lack of fear of negative evaluations. Teenagers’ competence with technology and high expectations of ICT also suggest that they may expect the technology itself to tend to their emotional needs. The requirements for designing CAs that deal with teenagers’ emotional needs, such as reducing stress or sharing feelings, have not been investigated further, especially regarding the machine inherits of CAs.

Thus, in this paper, we aim to understand the types of machine inherits that teenagers expect from CAs in dealing with their stress and concerns. Two research questions were derived:

- What are the machine inherits that help satisfy teenagers’ emotional needs?
- How do machine inherits help satisfy teenagers’ emotional needs?

To answer these questions, we conducted a workshop with 20 teenagers, followed by in-depth interviews with six of the participants. We found that participants expected three machine inherits: emotionless and tireless nature, separation from the human world, and the ability to analyze enormous amounts of data. They wanted each of these traits to help them in three ways: by listening to them, keeping their secrets, and giving them advice backed by data (Figure 1). Based on these findings, we offer three design guidelines for both practitioners and researchers who endeavor to design CAs to meet teenagers’ emotional needs.

## Related Work

### *Characteristics of Teenagers: Highly Stressed and Familiar with Digital Technology*

Significant research has been conducted to understand and meet the psychological needs of teenagers. Many studies have identified that teens suffer from severe stress, with some going as far as dropping out of high school [7] and even engaging in suicidal ideation [2]. Competitive academic environments [9] as well as ineffective and unstructured counseling systems [7] have been identified as the main reasons for their extreme stress.

Teenagers’ affinity for technology [12] has prompted researchers to attempt to manage the mental health of teenagers by incorporating cognitive behavioral therapies delivered through mobile technology [15]. Teenagers are generally competent with technology and have high expectations of its capabilities [12].

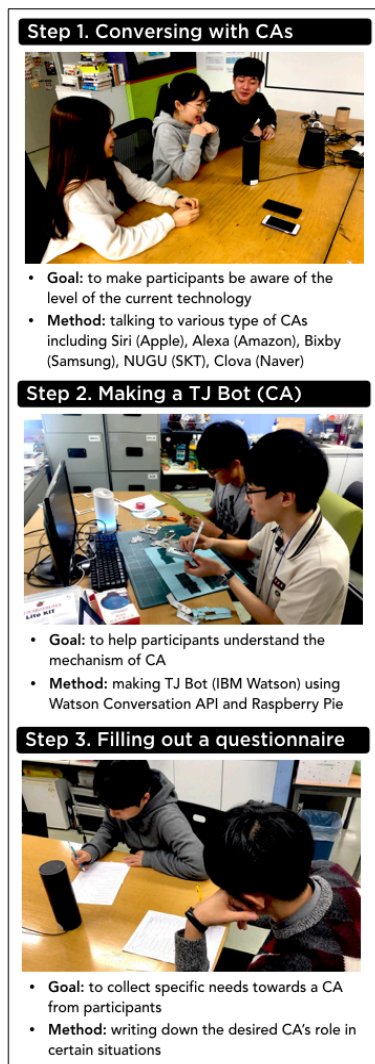


Figure 2: The workshop process.

These studies led us to hypothesize that teenagers may have distinctive expectations of CAs.

*Focusing on Machine inherits Instead of Human imitates*  
 Many studies of intelligent agents have concentrated on increasing their human imitates [5, 10]. Human-like behaviors (e.g., social robots waving hands [11], a sense of humor in chatbots [5]) have been observed to increase trust, perceived intelligence, and likability.

This prevalence of human imitates among agents directed our attention to their machine inherits. In the most recent work, Fitzpatrick et al. [5] showed that the usage of a chatbot named “Woebot” helped reduce the anxiety and depression levels of university students. Timely checkups by Woebot turned out to be the feature most favored by the participants [5], which implies that machine inherits, such as scheduled operations, might play a more important role in helping to satisfy teenagers’ emotional needs. Thus, we focused on how the machine inherits of CAs can contribute to dealing with teenagers’ emotional needs.

## Method

We conducted a workshop with 20 teenagers, followed by in-depth interviews with six of the participants. We recruited 20 students who volunteered for the summer camp hosted by the Advanced Institutes of Convergence Technology. Participants were aged between 16 and 18, and they were all highly interested in and knowledgeable of the field of HCI.

First, we conducted a three-hour-long workshop to understand the types of interactions teenagers expected from CAs in a broad context. In the workshop, we intended to limit the students’ expectations of the

CA by letting them know about the current technology level of the agent, as we did not want them to have unrealistic expectations of the CA. After becoming familiar with the CAs through several steps (Figure 2), they filled out a questionnaire that required them to come up with ten situations and describe how they would like the CA to help them in those situations. All the answers were transcribed and used for the analysis.

To gain deeper insights into why and how machine inherits of CAs can deal with the emotional needs of teenagers, we conducted in-depth interviews. Six participants from the workshop volunteered to participate in the interviews. All the interviews were face-to-face except for one case due to the distance issue. The interviews were based on a semi-structured guideline (Table 1). Interviews took an average of an hour and were recorded under participants’ consent.

The analysis of the data from both the workshop and the in-depth interviews was conducted through qualitative categorization and thematic analysis [3] using Optimal Workshop Reframer (Figure 3). Reframer is used in qualitative analysis by highlighting and summarizing the relationship between themes that appear from interviews.

## Findings

### *The Expectation of a Good listener: Machines Are Emotionless and Tireless*

Most participants expected that the lack of emotions would help the machine to be a “good listener,” which can have three meanings: it listens continuously, listens without emotional transference, and responds actively while listening.

## Interview Guidelines

- What kind of stresses do you have?
- Who do you talk to when you get stressed?
- How would you want CAs to help you when you are in stressful situations?
- Why would you want such help from CAs?
- What kind of functions do you suggest let CAs care for your emotional needs?

Table 1: Interview guidelines.

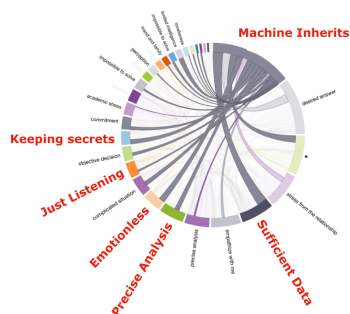


Figure 3: Tag chord diagram highlighting relationships between 'machine inherits' and other tags. The tags relevant to this work are highlighted in red, all relating to the major theme of machine inherits.

Firstly, CAs do not have feelings, so they can listen to anything without any complaints. This characteristic corresponds to participants' emotional needs. They needed someone who could patiently listen to their thoughts and worries whenever they wanted to talk, even if it was about something trivial or negative. The workshop results showed what teens wanted in a listener: "I want them to just listen to me" or, "I want them to empathize with me." It seems that CAs make good listeners, as they are available whenever students want to talk about anything.

Another aspect that makes CAs good listeners is the fact that they are not affected by others' feelings due to their lack of emotions. Participants believed that using CAs as listeners would free them from the exhaustion of intimate relationships. They felt as if they did not have to worry about the machine's feelings, as a machine's feelings can never be hurt. P03 reported in the interview, "I'll, like, whine for no reason at all, and she (CA) can embrace all the negative feelings. Unlike my boyfriend, the CA would never break up with me." This implies that the machine inherits of having no feelings might help relieve the fatigue teenagers feel from their relationships.

Simultaneously, participants suggested that a good listener should not only listen carefully but also respond with desired answers. Interestingly, participants did not think that the CA should have advanced conversation skills to comfort them. Instead, they focused on hearing encouraging messages from the CA. P06 mentioned, "I want the CA to tell me, 'If you keep going like this, I'm sure you'll get into the college you want.' I don't care if it's a cliché. I just want to hear supportive messages." Participants were already aware

that concerns about studies, family matters, and loneliness could not be solved all at once. Therefore, they believed that even these kinds of clichés would help relieve their stress temporarily. This indicates that providing messages of support, even those containing overused expressions, might be enough to encourage teenagers when designing conversations.

### *The Trust to Honor Confidentiality: Machines Are Separated from the Human World*

Most participants believed that machines would not reveal their secrets to others, especially their friends. It was critical for most participants that the machine ensured confidentiality, because they were afraid of having unwanted rumors spread about them. P04 noted, "I sometimes want to talk badly about my best friend, 'cause she sometimes disappoints me. But my other friend is also close to her, so I can't. Instead, I can confide in the CA, who is not related to my friends." They separated the real world, where they lived with their friends and family, from the machine world, where CAs existed. This cognitive separation indicates that the machine inherits allow participants to trust CAs to keep their secrets.

We also found that students wanted to talk about personal issues (e.g., family matters, loneliness) to CAs. Students hesitated to talk about these issues to people close to them because of the fear of gossip or judgment. They felt comfortable confiding in CAs, because the CAs never judged them. P03 reported, "I wanna talk about bad things, but people usually patronize me and start rumors. But the CA doesn't judge me, even though I badmouth my friends or family." Supporting previous work [6], this finding shows that participants were much more comfortable revealing secrets to a CA than

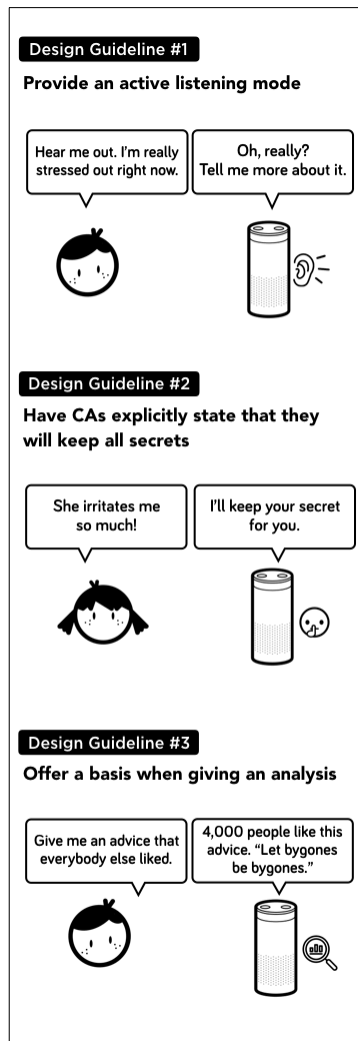


Figure 4: Summary of design guidelines.

opening up to their friends and family. Therefore, we need to design additional expressions emphasizing the machine inherits of separation.

*The Anticipation of Providing Proven Information: Machines Have Sufficient Data and Precise Algorithms*  
Teenage participants believed the objective advice from the machine based on data would relieve their stress about their grades or college admissions. P06 said, "All I am concerned about is admissions. If the CA could analyze my GPA and application letters, and then compare them to those of other students for some advice on how to gain admission, I would feel better." In the workshop, participants also wrote, "Give me some advice to get good grades" or, "Give me some counseling when I'm in trouble" as their most desired functions on the questionnaire. This result reflects participants' perceptions that machines can create the right advice by analyzing data.

Interestingly, teenagers expected that the supportive messages given to them by the CA were proven effective with supporting data. Participants did not care if the motivational or supportive messages were personalized. Instead, they preferred "proven messages of support" that others had already found helpful. P01 explained, "After analyzing large data, they (CAs) can give me words of support with messages that are proven to comfort everyone." This finding can be aligned with the part of our first finding related to responding with desired answers.

## Discussion and Conclusion

We discovered that machine inherits, as well as human imitates, could play an essential role in dealing with the emotional needs of teenagers. Although participants

expected some human imitates (e.g., energetic voices, the ability to hold a conversation, a sense of humor) as in [5, 10, 11], we tried to shed new light on the role of machine inherits in satisfying teenagers' emotional needs. Thus, design guidelines for promoting emotional communications are offered based on the findings:

- **Provide an active listening mode** that can react to users by responding with "Uh-huh" or, "Really?" so that users feel as though there is someone there who is listening attentively. Providing continuous responses would help teenagers feel consoled when talking to CAs.
- **Have CAs explicitly state that they will keep all secrets** in order to allow users to feel comfortable confessing personal issues. For example, "The only one who knows about your story is me. If you want me to forget your story, I can delete my memory." This clarification will put teenagers at ease regarding the risk of the spread of rumors.
- **Offer a basis when giving an analysis.** We found that students trust the power of data and algorithms, given that these tend to be based on proven facts or calculated analyses. Each analysis must be evaluated in order to be verified. For example, "4,000 people liked it when I said, 'Let bygones be bygones.' Do you like it too?" The responses can be used for future analyses.

Possible limitations of our work are as follows. Teenagers may have concerns regarding their private information being revealed as in [4]. In addition, ethical issues may be raised regarding how students want to badmouth their peers to CAs. However, this study contributes to HCI community by elucidating the role of machine inherits in designing CAs for meeting

teenagers' emotional needs. In future, we plan to deploy a prototype following the above guidelines and considering the privacy and ethical issues in an attempt to acquire rich insights on actual conversations while keeping the balance between machine inherits and human imitates.

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