

# Designing Conversational Agents for Student Wellbeing

## An Exploratory Study of User Acceptance and Expectations

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**Abstract**—The innovative development of AI technology provides new possibilities and new solutions to the problems that we are facing in modern society. Student well-being status has been a major concern in well-being care, especially in the post-pandemic era. The availability and quality of well-being support have limited the accessibility of well-being resources to students. Using conversational agents (CA) or chatbots to empower student well-being care is a promising solution for universities, considering the availability and cost of implementation. This research aims to explore how CAs assist students with possible well-being concerns. We invited 96 participants to fill out surveys with their demographic information and 11 short answer questions concerning their well-being and their acceptance and expectations of CAs. The results suggested the participants accepted the use of well-being CAs with ethical concerns. Upon user acceptance, the participants expressed expectations on design features such as facial expression recognition, translation, images, personalized long-term memory, etc. Based on the results this work presents a conceptual framework and chat flows for the design of a student well-being chatbot, which provides a user-centered design example for UX designers of wellbeing. Further research will introduce detailed design discoveries and a high-fidelity CA prototype to shed light on student well-being support applications. Implementing the CA will enhance the accessibility and quality of student well-being services, fostering a healthier campus environment.

**Keywords**—Conversational agent/chatbot; wellbeing; UX design

### I. INTRODUCTION

The world is advancing with the fast development of AI chatbots. For students in schools and institutes, the expectation and stress upon them can be astounding. Student well-being has a tremendous impact on their performance in their study, work, and personal lives. Unavoidable life mishaps may cause a variety of well-being problems that require external interference. Schools have traditional ways to support their students in their physical health. However, assistance to student well-being has always been limited by the accessibility and availability of psychological and counseling resources.

Nowadays, we have more advanced artificial intelligence that empowers the work in industry and academia. Conversational agents (CAs) or chatbots, for their high availability and capability to interact with humans in natural language communication, would be a promising solution to address the shortage of resources for student well-being care.

The primary objective of this study is to ensure student well-being through the utilization of a chatbot. To achieve this goal, we sent out surveys to collect students' feedback about their acceptance and anticipation of chatbots. Based on their responses, we have developed a student well-being chatbot prototype that is embedded with information on some of the common well-being issues that students usually encounter during their education. This paper presents the design framework and chat flows of this prototype. We aim to reduce the time and confusion of students to search for relevant information online, allowing them to retrieve the needed internal university information and external resources that can be suitable and helpful to their situations.

### II. RELATED WORKS

Researchers have done comprehensive examinations of CA engagement in well-being. They were able to recognize the positive impact of CAs on major mental-health symptoms for CAs that are AI-based, multimodal, highly accessible, and externally connected. They also identified the key features of CAs that would shape user experience in well-being effectiveness and controlled integration [1]. The availability of well-being CA-embedded applications in the market from January 2020 to 2023 also has been reviewed. A total of 18 applications have been selected, classified, and analyzed. Most of the applications are aimed at multiple well-being issues and have cognitive behavioral therapy implemented. The proportion of AI-based apps and rule-based apps is equal with a total of 48 behavior change techniques utilized [2]. In this related work, we reviewed the studies of CAs for student well-being at universities, CAs for well-being outside universities, chatbot design with specific features, and ethical concerns.

#### A. Well-being Assistants at Universities

School environments have a significant impact on the construction of student wellness. The relationship construction between students and school has been a significant factor that impacts student well-being [3]. The persistent stress students endure during their education has long been identified as a major individual well-being issue. During the pandemic, the demand for mental health assistants increased. Nelekar et al. (2022) investigated the effectiveness of using an embedded conversational agent (ECA) to assist students with their well-being. They addressed the importance of cultural context, social environment, and personal intention in their design for the ECA.

The result demonstrated a positive effect of ECA on stress reduction and student construction [4].

Aiming at the same goal, Jeong et al. (2023) imported a robot to provide therapeutic intervention as well as social tips. Their result suggested that using AI products could be a promising solution for well-being care. Follow-up interviews and analysis revealed the significant factors that should be considered during the development of a well-being caring agent, such as personality traits, underlying behaviors, and association quality between the participant and the robot [5].

Using GPT as the base, a research team with expertise in psychology has developed a conversational agent that matches real-world context. It also included the response questions that were frequently asked by students. The team evaluated the CA's performance and participant's responses. The feedback favored the approach of using GPT for well-being care and suggested GPT would require personalized features to provide better services to users [6].

Usta's (2021) study addressed the harmful stress among many undergraduate students. To discover insight into the problem, the team conducted individual interviews with participants and arranged case studies. As identified by the analysis, the stress mainly originated from maintaining a highly productive status with self-obligation. Additionally, the team was able to summarize the primary needs of the student during the stress. The case study involved the utilization of a chatbot that prompted the participants with encouragement and suggestions to increase their self-esteem. Further research was advised to consider the identified needs in this study and a different setup on the case study for a more comprehensive outcome [7].

### B. The CAs for Well-being Care

CAs are also applied in mental healthcare in the general environment. To address the problem that self-help resources are not able to last long enough, Ly et al. (2017) implemented the interventions' strategies, provided solutions using a chatbot, and published it as an application to facilitate well-being care. They invited 28 participants and divided them into two groups for examination and a comparison study. The analysis of follow-up data resulted in higher achievement when compared to other intervention-implemented chatbots in related fields. This study presented self-help intervention as an effective tool for well-being care support to public health [8].

Inkster et al. (2018) conducted research aiming to address the mental health resource shortage. Their study focused on the evaluation of an AI-embedded conversational application. They invited anonymous users from a global range as participants in this study and examined the influence of the app on the participants. Evaluations were based on user feedback to evaluate the functionality of the app. Preliminary data facilitated the initial speculation. However, further research and analysis with a larger sample size were required to justify the conclusion [9].

Chatbots were also used to facilitate the well-being status of invited social groups. The participants were examined in 10 days and feedback was collected with follow-up interviews. The comparison of the experimental and controlled groups supported

that the chatbot had a significant effect on improving the well-being status of the participants. Interaction with the chatbot was favored by the majority of the participants with positive feedback. Further development and research should involve the improvement of current functionality and personalization, as well as conducting a study with a larger sample size [10].

However, a study showed an insignificant impact of CA on improving students' mental well-being. An evaluation of a well-being care application has been conducted to support the increasing well-being care demand. The research team invited two groups of undergraduates and performed a study for each with randomized control. The outcome did not demonstrate the influence of the application on participants' well-being status. The insignificant result indicated the importance of appropriate CA design [11].

Aside from general well-being, some CA studies addressed specific well-being issues. Adolescence is considered a significant period in life that can easily lead to serious mental health issues if not handled properly. To support the mental health of adolescents, Gabrielli et al. (2020) introduced a chatbot as a possible resource. The study involved the design and evaluation of chatbot software that implemented CRI and CRIS coaching sessions. The result of the study favored this design with most of the participants providing positive feedback and recommendations. A follow-up investigation was required in the future to capture the effects of this design in the long-term period [12].

Because the effects of psychological interventions for cancer treatments are significant, chatbots are applied to help facilitate the process to make it more accessible and acknowledged by young adults. A study introduced the participants to a chatbot (Vivibot) to teach them psychological skills that could help them with cancer treatment and examined the effects in four weeks. The result showed a reduction in anxiety levels by using the chatbot and no other impactful effects on other well-being issues [13].

### C. CA Design with Diverse Features

Emotionally sensitive chatbots have been under-explored. Ghandeharioun et al. (2019) conducted a study on an emotionally aware chatbot. They designed and evaluated the chatbot with 39 participants in two weeks. The result suggested that the participants supported the emotion detection feature. The participants' feedback has been collected and summarized into several guidelines that primarily focused on participants with positive moods. These guidelines were to be addressed in their further study [14].

Participatory design has been used to design a chatbot. A research team collected user reflections on the needs of a chatbot and summarized several guidelines for chatbot design that involved information usage and the delivery method for user-centered design. It involved the cooperation of both the evaluation and effort from the designer and mental health experts to implement these needs. Future studies would also consider possible ethical concerns and the practicality of this feature regarding the development of technologies [15].

Other than inviting users to participate in the design phase, feedback after the experiment can also be used to support CA

integration. Demirci (2018) used a conversational agent to manage interactions required for well-being care to the participants and explored the qualities of good design of CA for well-being care. They organized their results from user engagement to design qualities. They suggested that further research could repeat the process with a different user group or even a CA for a different purpose [16].

The development of conversational agents and smart speakers provides a possibility for new methods for well-being data collection. Maharjan et al. (2022) explored the feasibility of collecting self-report data with a speech-recognition CA. It presented a challenge to collect data with such a device, especially when deployed in a home context. They also conducted interviews and analyzed the data that reflected the technological limitations and appropriateness of the CA. This research provided valuable experience in using speech-recognition CA to support well-being care [17].

#### D. Ethical Issues

Ethical concerns in CA design are essential. Yet the appropriateness of applying them to well-being services is under-explored. Research has been done to raise awareness among researchers and developers on the advantages and downsides. A research team analyzed 120 posts regarding well-being support applications and identified the features that other researchers could pay attention to or should be avoided. The team called for the consideration of responsibility and social effects of the application [18].

Privacy and data security of users are one of the major concerns for well-being CAs. Gengoux and Roberts (2019) focused on the ethical use of user data when dealing with mental health problems in higher education [19]. Local policies are also a concern when introducing a CA to support well-being services in the context of universities. Graham et al. (2023) focused on the school's influence on the construction of wellness upon students regarding safety and internal well-being. The study was based on interviews with both the school and their students. The team identified the relationship between the school practice and well-being conditions by taking different aspects into the analysis process. These findings highlighted the significance of relationship construction of the school with students [20].

In this work, nearly one hundred university students who present common student well-being issues were recruited. They were encouraged to report well-being issues that needed to pay attention to in this research. By addressing these issues, we aim to gain a comprehensive understanding of student well-being problems and identify what assistance and resources we can provide. In the surveys, participants were asked questions to assess their perception of the necessity of a student well-being conversational agent and their expectations of the functions. The research questions of our study include the following four points:

- User well-being status: The participants were asked to identify their well-being status. This allowed them to review and pinpoint the causation related to their current well-being status, as well as areas that were presented to have a positive or negative influence on their problem.
- User acceptance: The participants were questioned about their opinions about using AI products such as CAs for

student well-being support. They were encouraged to freely express their feelings toward this choice. They were welcome to express their support or disfavor with reasonable explanations. The feedback informs us where and how we can support students with our prototype.

- User expectations: The participants were asked to express their expectations on the use of conversational agents to assist them on well-being issues. They were encouraged to provide reasons for their responses and suggestions on specific tasks the CA would be capable of, which could be helpful and accessible to improve their well-being or support them.
- Suggestions for design and improvement: The participants were asked to provide suggestions for the prototype. This included specific features or functionalities to provide qualified services, significant issues to pay attention to and address, or user interface elements that could enhance user experience. Our team collected and evaluated these suggestions and eventually converged into several categories to provide the conceptual framework and guidelines for the design of the prototype.

By exploring the feedback from these questions, we aim to gather valuable insights from the participants to design and improve the prototype, addressing their needs and preferences to create a more user-friendly and valuable tool for student well-being support.

### III. METHODOLOGY

#### A. Participants

The study recruited 96 students from a university located in the Midwest region of the United States. We collected and initially analyzed the demographic information to understand the participants. Our participants are students from the age of 19 up to 37 with an average of 23.34 (SD=3.35). The gender distribution contains 59% (57 participants) male and 41% (39 participants) females.

The participants were from nine diverse majors: Accounting, Economics, Education, Finance, General Business, Information Assurance, Information Systems, Management, and Marketing. Among the different majors, the participants were mainly distributed among Information Systems, Information Assurance, Finance, Marketing, and General Business. Table I contains the number of participants in different majors. Two participants did not disclose their majors.

TABLE I. PARTICIPANT BACKGROUND

MAJOR	PARTICIPANT NUMBER
Marketing	10
Accounting	6
General Business	12
Information systems	24
Management	4
Finance	15
Mathematics/Education	1
Economics	1
Information Assurance	21

Before their participation, the study received approval from the Institutional Review Board (IRB), and the students were invited to join the experiment after providing their informed consent by signing the consent forms.

#### B. Surveys and Data Analysis

Ninety-six participants participated in our survey studies. They provided answers to their demographic information and 11 short-answer questions concerning their well-being and their acceptance and preferences of chatbots. The collected data were analyzed using qualitative data analysis techniques that involve the open coding method (OCM). OCM allows us to uncover some of the hidden information within the participants' surveys. As we continued the process, we were able to identify the interrelationship between their answers and further categorize them into various themes.

The open coding was conducted by two researchers to identify preliminary concepts of interest. Due to the nature of the materials used, measuring inter-coder reliability was challenging. Throughout the analysis, the two researchers engaged in discussions to explore similarities and differences in the themes that emerged from the data. This iterative process allowed for a deeper understanding of the data and the development of meaningful interpretations.

### IV. RESULTS AND DISCUSSION

The study aimed to uncover insights and patterns within the collected data, facilitating a comprehensive understanding of the participants' experiences and perspectives related to the well-being CA and its usage in educational institutions.

Our open-coding analysis clarified the following design guidelines. We will center our design to address the major issues.

#### A. Methods to Maintain Well-being

The participants were questioned about the existence of any of the symptoms such as stress, anxiety, depression, and insomnia that they experience. The feedback from the survey indicated that the pandemic was one of the causes of the aforementioned symptoms. Further analysis of the feedback gave us a more comprehensive perspective on the problem.

Participant 4 suffered depression during the pandemic because of restricted socialization under self-quarantine. Participant 10 also experienced all the symptoms during the pandemic, especially when they were working in a hospital.

"I suffered from depression when I was in the Pandemic. The reason is that I had to self-quarantine for two weeks whenever I went back to Korea, but I once suffered from depression because I couldn't go out and meet people." (Participant 4)

"Yes I have experienced all mainly from the harsh transition to online schooling and not being able to go out and socialize as much during the pandemic and I had also worked at the Hospital during the pandemic which was stressful." (Participant 10)

Other participants showed effective self-coping ability, and socialization helped them stay mentally healthy.

Participants 34 and 57 were in a completely different situation in contrast to the previous examples. Participant 34 was not subjected to any of the symptoms and was able to keep up

the good status. Participant 57 didn't experience any of the symptoms and had dependable communication channels with others. Their need for an additional release channel was much less than many other participants and less likely to suffer some well-being issues.

"Explicitly No because I tried to familiarize myself with digital transformation and got some new skills. Those skills were very helpful to utilize to get ease in my routine life. I have also organized myself regarding defining my future goals, and designing my goal scope." (Participant 34)

"No, I didn't experience any of those. I'm not someone who really goes into specifically bad moods, I'd say I'm pretty grounded when it comes to mood type of situations. If anything ever happened like that it would be hard to choose one in specific, but more than likely someone in my family..." (Participant 57)

Consequently, participants who were more willing to actively release emotions or already have a dependable release method were less likely to suffer from well-being issues. Although communication alone was not enough to support the participants, it had a positive influence.

#### B. User Acceptance of CAs

Based on the participants' feedback, we confirmed the possibility of using CA to support the participants and build up a reliable release channel through a CA. Before we proceed, we would like to know whether it was acceptable for the participants to use CA as a source to moderate their well-being status. It was confirmed after we analyzed the participants' feedback from the surveys. Here is some of the feedback:

In the previous theme, we noticed that Participant 8 was relatively isolated compared to other participants' feedback and preferred to be alone rather than build communication with others. Yet using AI products such as CA was acceptable to him.

"I do not contact anyone. I prefer being alone." "Yes, I would be willing to try it; I just want to keep any recording confidential/private." (Participant 8)

Another feedback was from Participant 40 who favored human contact over using AI. Participant 40 mentioned the importance of emotional exchange during communication, which could be a feature we address when we design our CA.

"No, I don't think I would seek help from AI I would rather talk to someone who I can gain their emotion from." (Participant 40)

Participant 24 expressed the same choice as Participant 40. They also preferred to communicate with real humans than with AI. But participant 24 was willing to try this method first before making a judgment.

"More likely than not I am going to turn to my mom for advice." "I wouldn't completely turn away from it without trying it out first." (Participant 24)

Unlike the previous participants, participant 77 doubted the CA's ability for complex tasks other than gathering and filtering information for the user.

"I use AI agent I think it makes our work less by searching what we need. It is better than searching in Google and picking

a website to see information about some topic. But coming to help I don't think so." (Participant 77)

Participant 78 had an accountable communication channel to release his mood and stress, but he still held a positive attitude toward AI agents. Similar to Participant 77, they expressed the same concern regarding the ability of the CA.

"I'm very close to my family. I share everything with my parents, my brother, and my friends. I talk to them daily regularly. Yes, I am willing to use an artificial agent to get some information and help. It would depend on the capabilities and functionality of the agent. Mainly, how it has been integrated with my abilities." (Participant 78)

We also received some recognition for our research. They valued this project and understood how this project could help people when they had limited medical resources to support themselves.

"I don't think it's unnecessary because some people do not like to talk to actual living people so talking to a screen would be a much better choice for them. This could help a lot for those kinds of people when they have no one to talk to." (Participant 21)

These were some of the representative responses we collected from the feedback. In general, participants were positive about using a CA or attempting to construct a release communication channel to moderate their mood and improve their state of well-being. Moreover, considering user needs, we believe we should build a student well-being CA as long as we can support students by any means in this intelligent era.

### C. User Expectations of CAs

We also focused on user expectations of the CA. We investigated the role that the CA should play during the conversation according to user feedback, what kind of conversation they would prefer from the CA, and other related features that required our attention during the design process. The typical feedback was summarized as follows:

Participant 21 expected the ability of emotional support from the CA when dealing with various moods from users. Unlike emotional exchange as mentioned in the previous theme, the CA here should act more like a comforter.

"Based on the questions above, I believe that a conversational agent that helps people with their feelings or talks to people when they feel sad, mad, or emotional would be great. For those who those who do not have anyone to talk to, this would be great." (Participant 21)

The feedback of participant 37 focused more on the naturalness of the language during the conversation. In this feedback, the CA should act proactively to solve the user's problem.

"Actual conversation, the same phrases over and over do not help. They need to ask me to explain in detail what is bothering me and why I think it is." (Participant 37)

Participant 48 preferred the CA concerning data privacy and

the quality of the information provided to users. He commented that the answers provided by the CA would be clear and unbiased.

"I would choose artificial intelligence. Artificial intelligence stands for privacy, it doesn't spread my ideas around. From the AI side, I would like to get more precise and objective answers." (Participant 48)

Participant 53 relied on the availability of the CA. Even though the exact functionality was not specified, she held a strong position that the CA should be a passive comforter to users.

"When everyone around me is busy it would be good to know that a conversational agent is available in difficult times when I feel like pouring my heart out (Participant 53)."

Participant 71 provided a remarkable suggestion for CA design. Instead of solving short-term tasks assigned by the user, he said the CA should also focus on how to build a long-term trustworthy relationship with users and handle long-term tasks. Well-being care was not a simple issue that could be addressed within one or two interactions, but rather a continuing process.

"It would be interesting to be linked with the conversational agent as they will analyze your thought process and may give you a rational solution. It should fulfill the user's requirements and interests and build a trustworthy relationship." (Participant 71)

The feedback from the participants further expanded the design of CA from the basic functionalities to user adaptation. It provided insight into the direction of how CAs can better fit the needs of users and maximize the support users can receive. Besides the possible roles that CAs can offer, expanding the service of CAs from short-term interaction to long-term support should be significant to the design and necessary to provide continued support to student well-being.

### D. User Requests for Chatbot Design Features

The user feedback also focused on the expected features of the design. It addressed the issue related to the images used to represent CA. It mentioned the applicability of facial expression detection on student wellbeing CAs. It discussed the impact of enabling the ability to communicate in users' native language. There were also other suggestions of possible features for the CA as directions for further development.

1) *Use an image to enhance user impression:* The participants appeared to be diversified in their views regarding the image representing the CA.

Participant 21 suggested a customizable animated real-life person. This feature might be helpful to begin the conversation with a user and add to the impression by allowing the user to choose a figure that they feel most comfortable with.

"I think that having an image to see when talking to the conversational agent would be nice. Maybe an animated real-life person. Have different types of persons that you could choose from so that the person can choose who he/she feels like they can talk about their feelings to." (Participant 21)

Not all the participants can accept human images when communicating with the CA. Participant 35 and 90 expressed their dislike toward the human image.

“I feel like a basic smile that’s robotic would be nice. I would not prefer anything human-like, as I feel like it would be too creepy.” (Participant 35)

“No, a conversational agent is not a human so associating it with a human face feels dishonest.” (Participant 90)

The participants demonstrated a diversified opinion toward the image of CA, primarily on whether to use human images or not. It would be best to make it customizable for the user to choose the appropriate image for themselves.

2) *Facial expression detection*: The feedback from the participants towards a facial expression feature concentrated on the notion that facial expression detection would be useful for emotion analysis, but not sufficient. It required assistance with several other methods to function constructively. Meanwhile, some participants expressed a feeling of insecurity if emotions had been detected during the interaction with the CA.

Participant 21 shared a supportive opinion toward the expression detection feature since it could provide additional information during the conversation besides text messages.

“Yes! I think that this would make it much better because then even if the person can’t say anything yet about their feelings, the conversation agent can start the conversation into their feelings based on their expressions.” (Participant 21)

Another feedback that supported this feature conveyed the appreciation if the CA contained the ability of emotional exchange during the conversation.

“If a conversational agent can analyze moods I would 100% be willing to use it, why? Because if they’re able to recognize emotion then it’s almost the same as talking to a friend or family member which I prefer more because they’re able to display emotion.” (Participant 40)

Participant 24 explained a mixed feeling toward facial detection. This feedback admitted the positive effect of facial expression detection but also hesitated about this technology since it analyzes a person and collects information during the interaction.

“Yes and no I feel like that would be cool but at the same time kind of creepy. I would try it out because technology has become so advanced and interesting to me but I would be skeptical at first to the idea.” (Participant 24)

There is also feedback reflecting doubt about the accuracy of facial detection. Participant 14 expressed this concern with his own experience.

“My resting face regardless of my mood oftentimes makes me look sad so I don’t think this would be a great indication.” (Participant 14)

We also got feedback that demonstrated a direct dislike toward this feature. Being analyzed based on their facial expression will generate an uncomfortable feeling to them during interaction.

“I don’t think I would want to use it more. It honestly is uncomfortable knowing that I CA can decipher my facial expressions and mood.” (Participant 45)

Our participants provided feedback on the features of facial expression detection that focused on two issues: the method of facial expression detection and its accuracy, and user acceptance of expressions analyzed during the interaction.

3) *Translation*: We also received some feedback on the feature of translation for the CA. Participants have been questioned whether a translation function could be added if their first language was not English.

Participant 29 gave a negative answer based on the identity of the English speaker.

“No. English is my primary language, so this would not provide any additional benefit.” (Participant 29)

Participant 71 focused on the convenience for users if they could communicate with the chatbot in their native languages. When English isn’t their first language, they might have limitations on expression during conversations. However, when users can communicate with CAs in their native languages, they can provide more accurate messages that improve the efficiency of communication.

“Yes, being able to communicate in your language makes it more comfortable to describe what you are feeling now. You won’t be thinking much of things to say, rather you will be putting words to your emotions.” (Participant 71)

Participant 53 admitted the functionality of this feature and thought it would increase the desire for people to use it since it added to the emotional connection when communicating in their native language.

“Yes, it would increase my desire to use it, as I could talk with the agent in my native language, which would make me feel that the agent is close to me and understands me well.” (Participant 53)

Participant 29 provided further insight into this discussion. This participant admitted the usefulness of translation and suggested moving one step further and considering natural language processing in other languages.

“Even if I spoke a language other than English, I would be surprised if the translation was very accurate, especially with the intricacies of the English language. It would work better if the agent functioned in different languages independently of translation.” (Participant 29)

Overall, the feature of translation is welcomed by most of the participants. They recognized the benefits users would receive if the conversation could be carried out in users’ native languages, such as increasing communication efficiency and emotional connection. The advantage can be further expanded and probably needs tremendous work if CAs’ natural language processing can understand other languages.

4) *Future development*: At the end of the feedback session, we organized some of the messages to generate several possible directions for further development in the design.

Participant 21 suggested chatbot personalization by memorizing previous conversations to construct a long-term association with users. This would be helpful to build a long-term connection. We could reduce data privacy concerns by users logging in with their user accounts.

“It might already be part of your ideas but maybe having the conversational agents remember the person using them and memorize all their conversations for future times. This would help a person feel connected to it.” (Participant 21)

Participant 4 suggested using feedback from other users as evidence and examples to solve the user’s problem with the permission of other users considering there might be data privacy concerns.

“What the other person is worried about and what is good for the other person.” (Participant 4)

Participant 34 suggested implementing the feature to access human agents when CA fails to complete required tasks. This option can maximize the capability of the CA.

“If it can be possible to have an option for some experienced real agents to tackle the severe problem that conversational agent is unable to solve.” (Participant 34)

Participant 24 provided valuable insight based on personal work experience that introduced how CA has been used to refer to the right resources. It triggered our consideration of task design for the CA.

“I think that they are extremely helpful when it comes to getting to the right person. Where I work, our website uses a conversational agent to answer your questions or to reroute you to someone who can help.” (Participant 24)

### E. Ethical Concerns

Data privacy is a concern when a user interacts with CAs. We collected some sample feedback on what the participants might be worried about when using the CA as a tool to moderate their well-being status.

Participant 10 expressed a direct concern about data disclosure to third parties, mentioning this happened to companies. Participant 20 demonstrated the situation when a user had less trust in a CA, he would only allow for limited interaction with the CA to ensure sensitive information was kept private.

“I have very strong concerns about the privacy of this agent.” (Participant 10)

“I 'm not sure I would 100% confide my worries in this conversational agent but I might be able to talk about smaller things in my life to them. (Participant 20)

Participant 22 expressed an open attitude toward the sensitive information collected during the interaction. The bottom line was no disclosure of user information to third parties. This participant was willing to try the CA to use the information for service, but this was only allowed for usage and the privacy should be respected.

“I believe that I would. I think that it’s a great idea. I don’t have a privacy concern unless they are trying to sell my

information to people or something. It would be nice to have some privacy on these kinds of things though.” (Participant 22)

This feedback focused primarily on ethical concerns of the party running the CA not selling user information to third parties and how to prevent unauthorized access to private data. To protect user data and build up trust between the user and the party that maintains the CA is crucial to the final product of this CA. In this research, we only use the data collected from the surveys and follow-up interviews before and after the interaction. The chat history between users and the CA will be anonymous and will not be recorded.

In sum, the analysis of the survey data enabled us to start our design based on users’ input and provided a more detailed blueprint for the conceptual design. Therefore, we designed a conceptual framework and chat flows for the major structure in detail for our CA.

### F. The Conceptual Framework and Chat Flows

We designed a student well-being chatbot prototype via the platform Juji [21, 22]. According to the framework of the prototype (Fig. 1), a user will first receive a welcome message. Then the user will be asked about his purpose. According to the participants’ feedback, we designed the chat flows of depression (Fig. 2), anxiety (Fig. 3), insomnia (Fig. 4), and panic attacks (Fig. 5) based on the university’s internal references and the external resources of the Mayo Clinic and the Anxiety & Depression Association of America (ADAA). The survey data suggested that these four symptoms that students usually have trouble with prevented them from achieving their best performance in their studies [23]. There are also several Q&As prepared for users to answer some quick questions.

1) *Design framework (Fig. 1):* When the user chooses to do a symptom examination, he or she will have to pick which one they want to check with. To distinguish each of the symptoms, definitions for each of the four are built into the Q&A. After the user selects one, the conversation will be guided to a specific topic, that is, to the specific question sets built for each symptom. After the users have finished with the questions, treatment suggestions and external links to other healthcare resources will be offered accordingly. After the chatbot offers suggestions, it will be put to wait for new tasks from the user.

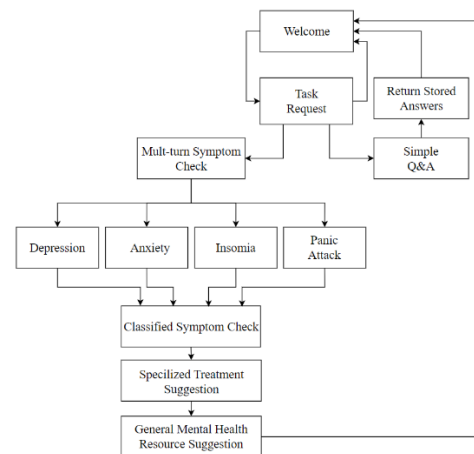


Fig. 1. Framework.

2) *Depression chat flow (Fig. 2)*: The interaction process for depression contains a question phase and an answer phase. After the welcome message of the chatbot is presented, the user will need to select a task for the chatbot to perform. When the chatbot is asked to start an examination on depression, the conversation topic will be guided to the question phase of depression analysis. After the conversation goes through all the necessary questions, it will be guided to the suggestion phase of the chatbot. First, the specialized treatment suggestion for depression will be printed for the user. Then based on the user's location, it will suggest nearby healthcare resources and providers. Finally, it will provide general helping resources.

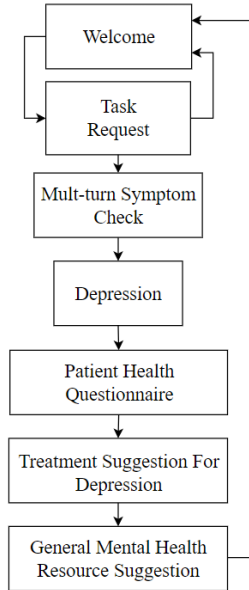


Fig. 2. Depression chat flow.

3) *Anxiety chat flow (Fig. 3)*: We designed the general interaction sequence for the check process of Anxiety in a similar way to depression. We used the website of Mayo Client as the information source to construct our knowledge base for anxiety symptoms. The examination process for anxiety is also split into a question phase and an answer phase. When the chatbot is required for anxiety examination, it will launch the question phase of the anxiety analysis. After the conversation went through all the necessary questions, suggestions will be posted to the user. The answer contains a specialized treatment suggestion, the well-being resources to be accessed based on student location, and the generally accessible resources.

4) *Insomnia (Fig. 4)*: The third examination process is designed for insomnia or sleep disorders. The interaction sequence for insomnia examination is split into 3 symptom checks. When the user raises a request for a checkup of this symptom, the prototype will use questions to gather the necessary information to help identify the possible result and post it to the user. The chatbot will also include a link to the information page that can help with the identified issue. At the end of the chat flow, the prototype will suggest the wellbeing

resources accessible to the user based on their location, and the general accessible resources.

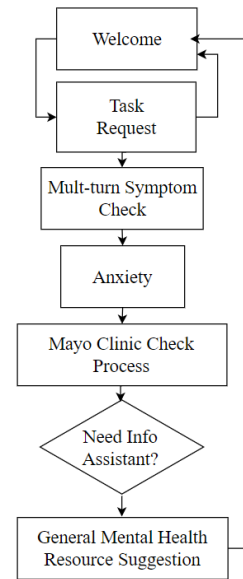


Fig. 3. Anxiety chat flow.

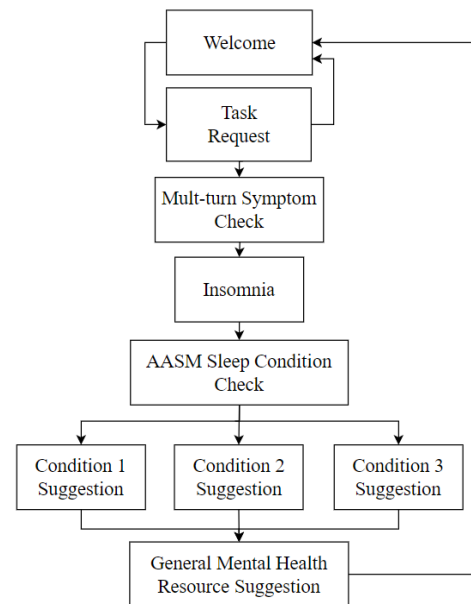


Fig. 4. Insomnia chat flow.

5) *Panic attack (Fig. 5)*: The general interaction sequence for the examination process of panic attacks is quite similar to the design of the process for depression. When the chatbot is asked to start an examination on panic attacks, the conversation topic will be guided to the question phase of panic attack analysis. After the conversation goes through all the necessary questions, it will be guided to the suggestion phase of the chatbot. First, the specialized treatment suggestion for panic attach will be printed for the user. Then based on the user's location, the chatbot will suggest nearby healthcare resources and providers, then finally provide general helping resources such as 911.



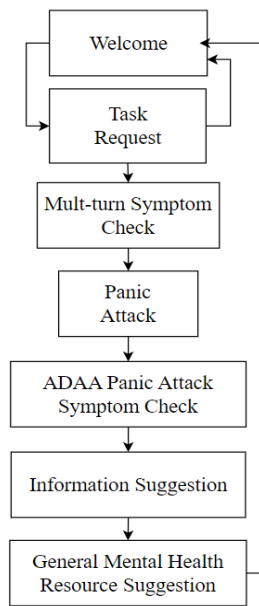


Fig. 5. Panic attack chat flow.

The work aims to provide a high-fidelity chatbot prototype for student well-being at one university, which can be a practical application once published if needed. This paper explored student acceptance and expectations for the CA via surveys and presented a framework for conceptual design and related chat flows. However, it is important to acknowledge the limitations of our study. Though the sample size of the survey could have been larger, we found numerous valuable text answers while analyzing them using the qualitative open-coding method. The qualitative results directed the framework and chat flow design, which can also be generalized and used by other UX designers who are working on well-being chatbots.

## V. CONCLUSION

Conversational agents provide new possibilities to improve people's well-being. This work explores user acceptance and expectations of well-being CAs. The participants reported how they maintained their well-being, their acceptance of the well-being CA with privacy and security concerns, and their expectations for the CA's emotional support and availability (24/7). This work also presents a conceptual framework and chat flows for the well-being CA, which directs the further design of the chatbot.

Inviting participants into the preliminary stage of the project assisted us in the conceptual design process. User-suggested features were evaluated by feasibility and cost for project implementation. The results were used to guide our design and implementation of the CA in the next stage.

In the future, we will further design this student well-being CA into a high-fidelity prototype and evaluate it with usability testing. This high-fidelity prototype can be published into a mature app if needed. We will further look into professional evaluation recognition from experts in psychology and counseling; connect with the current healthcare system; and incorporate private information management, and ethical and legal issues when applied in the real world. We look forward to

exploring how this tool can facilitate research and development in related areas.

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