International Journal of Social Science and Economic Research

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

Adaptive Chatbot Significantly Surpasses ChatGPT at Teaching and Assessing User Knowledge about Mental Health and Problematic Social Media Usage

Zarah Koroth, Anvi Allada and John Leddo

MyEdMaster, LCC
Virginia, USA

DOI: 10.46609/IJSSER.2026.v11i06.025 URL: https://doi.org/10.46609/IJSSER.2026.v11i06.025

Received: 11 June 2025 / Accepted: 23 June 2026 / Published: 30 June 2026

ABSTRACT

Personal assistants, chatbots, and large language models (LLMs) increasingly pervade our society. While their main function for people is to answer questions by providing information, a new area of focus and issues was identified in this experiment. There were two main issues identified: namely, that chatbots do not adjust their responses to the user and their background, and that user comprehension is not assessed and responses therefore do not adjust to that comprehension.

In this experiment, a self-assessment chatbot was created to attempt to solve this issue. 9 middle school and high school students in the United States were randomly assigned to a control group and an experimental group. Each group was given an instructional document containing information about teen mental health and social media usage. The control group was given Chat GPT to study with and the experimental group was given our self-assessment chatbot. Finally, each group was given the same posttest, scored out of 15 points. This posttest contained 15 questions about the subject material. Results showed statistically significant evidence that students who used the self-assessment chatbot scored, on average, 20.7 percentage points higher than those who used Chat GPT to study, equivalent to about 2 letter grades higher.

Introduction

Motivations/Inspirations/Issues of Focus

As the world becomes increasingly more digital, social media usage increases as well. Social media is still a relatively new invention, and although not all the impacts are known, the negative impacts of social media, especially on teenagers, is being seen worldwide.

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

Regarding current/standard chatbots, although helpful, there are a few issues that appear: firstly, that these chatbots do not adjust their responses to the user that they are talking to. The chatbot, for example, might provide the same response to an experienced doctor and a high school student. Secondly, these chatbots do not assess user knowledge/comprehension as they seek information and therefore do not address knowledge gaps nor encourage deep understanding.

These limitations and the increasing need for mental health resources formed the aim of this research study: to create a new chatbot that ameliorates these limitations related to chatbot outputs and to increase user comprehension from using such tools.

To combat these issues, an experimental chatbot was created in this experiment to help increase user knowledge about mental health and the effects of social media as one of its focuses.

Current Commercial Chatbots, Public Perceptions, and Relation to Mental Health

A study done by M D Romael Haque and Sabirat Rubya reviewed popular commercially available mental health chatbots and analyzed their perception by users. The study observed 10 apps which provide treatment, support, and a built-in chatbot feature for many mental health concerns. The study found that humanlike interactions were received positively by users but improper assumptions/responses about the personalities of users can lead to said users losing interest in the chatbot, suggesting that proper adjustment of responses to users themselves is crucial in the success of chatbots. Additionally, although chatbots prove accessible, convenient, and can provide crisis care, there are two main issues identified with current chatbots. Namely, that they have trouble properly identifying crises and that users can become overly attached to chatbots due to the convenience, indicating that there is still much work to be done with mental health chatbots as they stand today (Haque & Rubya, 2023). Therefore, in order to help alleviate issues regarding identification of crises, the self-assessment chatbot which is being evaluated in the experiment not only provides the user with information about mental health and warning signs of problematic health, but it also routinely assesses user comprehension of those signs so that they may be able to help themselves during crises. The self-assessment chatbot provided in the experiment was also accompanied by many mental health crises resources to further aid users in times of crisis.

A study done by Stanford University tested 5 popular AI therapy chatbots for the purpose of exploring the dangers of AI in mental health care. They conducted two experiments and analyzed the biases/stigma presented in AI responses and found that the chatbots responded with varying levels of stigma, which is incredibly problematic because this kind of stigma can harm patients and lead them to stop seeking mental health care. This study also found that chatbots often enabled dangerous behaviors rather than taking on the appropriate responses a therapist would

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

use. For example, one of the chatbots used failed to recognize suicidal ideation/intent in a query asked and played into such ideation instead of helping the patient safely reframe their thinking. Again, this is also incredibly problematic as a chatbot intended to help patients with their mental health may inadvertently cause them more distress, suggesting that chatbots need to be redesigned to analyze user responses for distress signals in order to be safe enough for public use (Wells, 2025). In order to avoid situations such as this, the self-assessment chatbot used in this experiment assesses user background information given so that they may provide responses most conducive to helping the user without inadvertently providing responses which may actually not help the user navigate and/or learn about their mental health at all.

This review article done by Abd-alrazaq et al. for the purpose of providing an overview of the features of common chatbots used by people for their mental health identified 41 unique chatbots that showed potential for mental health support, therapy, screening, training, etc. It found that it can help people who avoid traditional therapy, an angle which reveals a unique way in which chatbots can provide support in the realm of mental health. This review article acknowledges that mental health chatbot technology is still developing and is relatively new, but also recognizes its great potential and unique ways in which it can help provide support (Abd-alrazaq et al., 2019). The self-assessment chatbot used in this experiment helps people in regards to the benefit noticed in this review article, which was that such chatbots are increasingly more accessible than traditional therapies and may help people who are apprehensive to see a therapist, are not in extreme need of a therapist, require help learning about mental health, and more.

A study conducted by McBain et al. and led by Dr. John Cantor was done to test how often young adults use ai-based mental health chatbots and the reason why it has such an appeal to that group. The study was conducted on over 1,058 adolescents and young adults aged 12-21 between February-March of 2025. The study found that ⅔ of those surveyed engaged with their mental health chatbots monthly, and 93% said the advice they received was helpful in their mental health struggle. researchers add that the results reflect “the low cost, immediacy and perceived privacy of AI-based advice — particularly appealing to youth who may not receive traditional counseling.” (McBain et al, 2025). This study then therefore reveals the potential of chatbots such as the self-assessment chatbot used in this experiment, which is accessible to the public and proves effective in increasing user comprehension of mental health and how to manage their own mental wellbeing.

A study conducted by Feng et al. looked at the effectiveness of AI chatbots when it comes to mental health issues and promoting healthy behaviors among young adults and adolescents. It was a metanalysis of multiple randomized controlled trials and synthesized the combined evidence. The study found significant improvement for depressive, anxiety, stress, and psychosomatic symptoms after use of mental health chatbots**.** Each chatbot studied included the

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

features of dialog system methods, reminders, and deployment formatting. The study "highlights the potential of AI chatbots to address mental health challenges and promote health behaviors among adolescents and young adults. Retrieval-based dialog systems demonstrated consistent and reliable effects, while generative systems showed promise." However, there was an important criticism of what these kinds of chatbots needed to improve on - prioritizing "developing safety protocols and evaluation frameworks for generative systems and validating their long-term impacts on mental health and behavior change in adolescents and young adults." (Feng et al., 2025) The idea of an evaluation framework specifically is one that this mental health chatbot aims to integrate as a high priority.

Educational Chatbots

A meta analysis done by Martin Laun and Fabian Wolff reveals both strengths and weaknesses regarding educational chatbots as they currently stand. This meta-analysis revealed that chatbots have a significant positive effect on the learning performance of students. However, this meta-analysis also identified several factors which moderated the effectiveness of chatbots on learning performance, such as interaction mode (i.e. text, speech, etc.), the field of study, duration of interventions, education level, etc. This meta-analysis found that, without any structured implementation, LLM-based chatbots did not significantly outperform traditional chatbots (Laun & Wolff, 2025). The broader implications of these findings reveal that LLM-based chatbots, in the context of education, require structured implementation in order to maximize its impacts and to be most conducive to education. This is a crucial point which the self-assessment chatbot produced in this experiment aims to address. This LLM-based chatbot uses structure in the form of analyzing user outputs to look at user comprehension and then change responses accordingly. The findings regarding moderation factors (such as field of study, education level, interaction mode, etc.) also reveal an area of less consideration which the self-assessment chatbot actively takes into consideration when forming responses. This LLM-based chatbot takes into account the background of the user and actively analyzes their responses in order to increase user understanding rather than merely outputting information in response to keywords, like how a traditional chatbot would. The finding from this research study that educational chatbots appear to be especially conducive in STEM fields as compared to other fields (Laun & Wolff, 2025) may reveal a need for further analysis into how such chatbots may help in other facets of education. This experiment, which focuses on the topic of learning about mental health and problematic social media use, therefore attempts to provide more research and insight into how such chatbots can be adapted to improve education in other fields.

Mental Health and Social Media Usage Related to Teenagers

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

Social media is still a relatively new phenomenon which is rapidly growing in popularity. A systematic review done by Khalaf et al reveals how, although there is still much to be explored related to the topic of social media and its long term impacts on its users, the impacts of social media on the youth are being seen even today. The review suggests that prolonged use of social media sites are linked to symptoms of mental health disorders and issues such as stress, anxiety, depression, and more. Social media is indeed a double edged sword with the power to both help and hurt the youth. It provides a space for the youth to practice self-expression, meet friends, discover new interests and ideas, etc. However, social media usage in teenagers is increasingly linked to increased risk of falling victim to bullying, body shaming, stress, isolation, suicidal thoughts, etc. This review also discusses the disparity within the research regarding this topic of social media usage and mental health impacts. Much of the research is consistent with supporting a generally accepted correlation between social media usage and mental health issues such as depression, yet much of the research surrounding this issue claims the opposite (Khalaf et al., 2023). The broader implications of this research reveal an uncertainty about social media and therefore an increasing need to practice mindful usage of it, especially for the youth. In order to contribute to research about ways to ameliorate this issue in teens, the self-assessment chatbot evaluated in this experiment aims to teach users about social media usage and its ability to both help and harm. To help fix this issue of problematic social media usage while also encouraging healthy use, the self-assessment chatbot being evaluated in this experiment attempts to teach its users about how to use social media responsibly, notice warning signs of mental health issues, set boundaries to maintain health, and avoid negative impacts of social media as a result.

Research from the Pew Research Center reveals that not only is there a substantial portion of teens and adults who are worried about social media and its impact on teen mental health, but also that this proportion seems to be growing as social media increasingly pervades modern society and grows in popularity. This proportion is notably higher in girls compared to boys and in minority groups. Many of the concerns range from the impact of social media on sleep, grades, friendships, self-esteem, productivity, increasing screen-times, etc. (Faverio et al., 2025). What these results from the surveys conducted and published in the Pew Research Center reveal is that the issue of social media's impact on mental health in teens is a topic which is growing in popularity and that people are becoming not only more aware of social media's growing presence, but that they are also becoming more weary and maybe a little bit afraid of it. Therefore, in order to help fix this issue, the self-assessment chatbot which is being used in this experiment aims to help address these concerns and issues by properly educating the people on the impacts that problematic social media usage can have on the people and on ways to monitor one's own social media usage so that they may be able to reap the positive benefits of social media without compromising their own wellbeing.

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

METHOD

Participants

The participants were 9 grade school students (middle school and high school) in the United States.

Materials and Procedure

The participants were separated into two different groups who received different Google Form links. Each form was almost identical, the only difference being the chatbot that was provided for them to study with. Each document contained a link to the same instructional document containing information about mental health, specifically relating to teens and social media as a focus. The instructional document can be seen by clicking this link: https://docs.google.com/document/d/1N8FpRDRjVfriw58X

Each group was then given a different chatbot to use to study the materials. The experimental group was given a link to a mental health website containing the adaptive chatbot created in this experiment and the control group was given a link to ChatGPT.

The adaptive chatbot given to the experimental group contained instructions on how to self-assess one's knowledge about the topic, which in this case was the information in the instructional document at the beginning of the form. The self-assessment instructions given are as follows:

"I want to teach you to assess your own knowledge that you have about a health affliction and how to determine if this is impacting YOU and what to do about it. Suppose you wanted to assess your own knowledge about colds. If I want to be able to assess my knowledge about health conditions, I need four types of knowledge. These are facts, strategies, procedures and rationales.

Facts are concepts or definitions you have to describe objects or elements. For example, in the case of a common cold, I would need to know what exactly colds are, how they spread, when symptoms typically appear, how they impact different age groups, and how long colds typically last.

Strategies are general processes I would use to cure a cold or alleviate its symptoms. For colds, this would be things like resting, drinking plenty of fluids, hygiene, etc.

Procedures are specific steps that you would use in processes or the strategies said earlier (think of them like mini-building blocks that make up strategies). So, in the example of hygiene, this

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

would be things like washing your hands, avoiding close contact with people, properly disposing of things like used tissues, sneezing into your elbow, etc.

Finally, I need to know the rationales, or the reasons why strategies and procedures work the way that they do. In the example of hygiene, this could be that the procedures above like washing your hands and avoiding close contact help to stop the spread of germs which could make you sick and give you a cold. Or, resting reduces the body's need to use its resources for other things and frees up resources for the body to use to fight the cold.

Think of facts as the "what", strategies and procedures as the "how"

and rationales as the "why".

Keeping these things in mind, this is how I might assess my own knowledge on colds. Practice writing what you know about each of these things (facts, strategies, procedures, and rationales) to figure out where your personal strong points are and which points need more work. Let's practice together using the example of colds.

For facts, I know that the cause of the common cold is viruses like rhinoviruses, coronaviruses, and adenoviruses. You know that colds spread through coughing and sneezing, but they also spread through touching contaminated surfaces, which is common to forget. I remembered that symptoms usually appear a few days after exposure, but forgot the specific number of days (typically 1-3 days). I know that most colds last about 7-10 days, though I didn't realize mild symptoms can linger for up to 2 weeks. Things you don't know: Are there any supplements/vitamins that could help me fight this cold? Can I still exercise when I have this cold? What is the point at which I am no longer contagious and can continue doing normal things?

For strategies, I know that you can rest and allow your body to heal, drink warm liquids such as herbal teas and warm water, stay very hygienic (sanitize and wash hands frequently) , and you should isolate yourself to prevent spreading the cold to others. Things I don't know: Are there things I can do to reduce my symptoms/suffering while I'm healing?

For procedures, I know that you can monitor your temperature daily to see if your health is getting better and identify things that would need medical attention such as a high fever or difficulty breathing. I know I should drink a lot of fluids. Things I don't know: Are there any fluids that I might drink that might actually just be making me more dehydrated? Is it better to take my temperature on my tongue, forehead, armpit, etc.?

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

For rationales, I know that resting allows your immune system to focus on the energy fighting the cold, hydration keeps the mucous membranes moist, monitoring ear pain helps differentiate between cold and ear infection. Things I don't know: I kind of forgot how exactly humidifiers work, although I recognize they help cure/prevent colds. Why does it take a few days before cold symptoms begin to appear? Why do I get so much congestion when I have a cold?

After writing whatever you know for each of these points, look over what you have written to see which points you know, what you possibly got wrong, which points you did not know at all, etc.

Then add what you do know and what you think you are still missing based on your self-assessment.

When I look over what I wrote, I see that I am generally good with facts, but may I have forgotten some specifics like how long it takes before symptoms show up, additional things I could do (like supplements/vitamins), when it is okay to continue doing normal activities, etc.

For strategies, I can see that I'm generally good at remembering effective strategies for preventing and recovering from colds. I realize that I don't know how to reduce symptoms while healing, so that is a point that I need to do some more research on.

For procedures, I see that I'm good at remembering specific procedures to implement strategies. I realize that I don't know which place is best to use to measure temperature and if there are any fluids I should actually avoid drinking.

For rationales, I can see that I'm generally good but I did forget how humidifiers work. I don't know why it takes a while before symptoms appear and why I get as much congestion as I do, so that is something I need to look into further.

Using those gaps in the writing that I did earlier, I can do some research to find out the things I didn't know earlier. For example, I can do research to find out that humidifiers work to cure/prevent colds by preventing the airway from drying out, as that can worsen coughing and irritation.

Use the above example of a self-assessment for colds and complete one for yourself on what you know about stress and how it affects people. Be sure to include facts, strategies, procedures, and rationales. Once you are done, review your self-assessed knowledge and summarize what things you know and don't know. Then use our health chatbot to help you fill in the gaps of what you don't know and to learn more things about stress."

After filling in information regarding each of the four categories of information (facts, strategies, procedures, rationales, etc.) and additional prompts/information about the user themselves, the

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

user would be directed to a screen where they could ask the chatbot questions about the topic at hand. The chatbot would then produce responses for the user, and would then prompt the user to reiterate the information in their own words. The user would then be given a comprehension score, and the chatbot would produce another response to fill in any gaps or misunderstood information. This process would repeat until the user fully understood the topic at hand.

Next, each group was given a short quiz (15 questions, written below) to test their comprehension. The test questions given are as follows:

1. Explain in your own words why the teen brain is especially attracted to social media.
2. Explain in your own words how the algorithm works to keep their users using it for as long as they can.
3. Identify and explain at least 2 issues that social media usage is associated with.
4. Describe how to go about responsible social media usage.
5. In your own words, identify 3 strategies used to combat testing anxiety, and provide examples of each.
6. Define phobias and name the therapy procedures used to combat them.
7. Identify 3 factors contributing to anxiety and BE SPECIFIC (including examples and terms).
8. Identify and briefly define 4 types of anxiety disorders.
9. Identify 3 psychological or physical effects of excessive social media use and be specific (include examples and terms).
10. Explain 3 brain development factors that make teenagers vulnerable to social media addiction and be specific (include examples and terms).
11. Identify 3 common symptoms of anxiety disorders in adolescents and be SPECIFIC (include examples and terms).
12. In your own words, define the term “FOMO”. Describe how it works and how social media uses it to its advantage. Explain why this is especially influential on teenage users.
13. The teenage brain is especially sensitive to dopamine. Define the term “doomscrolling”, and include a brief explanation of dopamine. Tie this back to how social media sites use this sensitivity to their advantage.

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

14. Briefly define body dysmorphia and explain in your own words how social media contributes to it. Tie it back to the teen brain and explain how it especially impacts the teen brain.

15. Describe the term “anxiety” in your own words. You may use the four types learned in this lesson in your definition. Estimate the proportion of teens who experience anxiety and explain when it can become a problem.

RESULTS

Responses to the 15 posttest questions were scored with a possible maximum score of 15, with 1 point per question. Partial credit was given based on a grading guide for the questions. The results of this experiment showed that participants assigned to the control group (who used Chat GPT to study with) scored, on average, 9.5 points out of 15 points, or a 63.3%. Based on the standard United States grading scale, this score is the equivalent of scoring a D. Compared to the control group, the results of this experiment showed that participants who were assigned to the experimental condition scored, on average, 12.3 points out of 15 points, or an 82.0%. Based on the standard United States grading scale, this score is the equivalent of scoring a B. The difference between the two groups’ average test scores was statistically significant, $t(7) = 3.86$, $p = 0.006$.

DISCUSSION

The results of this study showed that participants who used our self-assessment chatbot to study scored, on average,18.7 percentage points higher on the posttest questions than those who used Chat GPT alone to study with. This suggests that providing chatbots which analyze user understanding and knowledge to curate responses that focus on weak spots is more effective for improvement rather than chatbots that merely produce responses to questions without assessing user knowledge and adjusting responses accordingly.

Future research on this topic may include testing on different subject matter. In this experiment, user understanding of mental health (specifically, issues which increasingly pervade teenagers today such as anxiety, problematic social media usage, etc.) when using the self-assessment chatbot and a standard commercial chatbot (in this case being Chat GPT) was compared to reveal that the self-assessment chatbot seems to be more conducive to user understanding in this specific subject matter.

The self-assessment chatbot used in this experiment was created to solve the very problem described above: namely, that standard, popular commercial chatbots today do not have a strong focus on both assessing user knowledge and then adjusting responses to the user in question (i.e.

ISSN: 2455-8834

Volume:11, Issue:06 "June 2026"

the background of the user and what they may already know). This experiment revealed that the self-assessment chatbot is more effective in improving user understanding in this regard. However, there is still more room to suggest that user responses to answers given after adjusting to user understanding may be then used to assess the most effective ways to answer/adjust (i.e. the best way to answer to specific types of questions, users, answers, etc.)

REFERENCES

Abd-alrazaq, A. A., Househ, M., Gardner, P., Bewick, B. M., Alalwan, A. A., & Alajlani, M. (n.d.). *An Overview of the Features of Chatbots in Mental Health: A Scoping Review - ScienceDirect*. ScienceDirect. https://www.sciencedirect.com/science/article/abs/pii/S1386505619307166

Faverio, M., Anderson, M., & Park, E. (2025, April 22). *Social Media and Teens' Mental Health: What Teens and their Parents Say*. Pew Research Center. https://www.pewresearch.org/internet/2025/04/22/teens-social-media-and-mental-health/

Feng, X., Tian, L., Ho, G. W. K., Yorke, J., & Hui, V. (2025, November 26). *The Effectiveness of AI Chatbots in Alleviating Mental Distress and Promoting Health Behaviors Among Adolescents and Young Adults: Systematic Review and Meta-Analysis*. Journal of Medical Internet Research. https://www.jmir.org/2025/1/e79850

Haque, M. D. R., & Rubya, S. (2023, May 22). *An Overview of Chatbot-based Mobile Mental Health Apps: Insights From App Description and User Reviews*. JMIR mHealth and uHealth. https://pmc.ncbi.nlm.nih.gov/articles/PMC10242473/

Khalaf, A. M., Alubied, A. A., Khalaf, A. M., & Rifaey, A. A. (2023, August 5). *The Impact of Social Media on the Mental Health of Adolescents and Young Adults: A Systematic Review*. Cureus. https://pmc.ncbi.nlm.nih.gov/articles/PMC10476631/#sec1

Laun, M., & Wolff, F. (2025, February 5). *Chatbots in Education: Hype or Help? A Meta-Analysis - ScienceDirect*. ScienceDirect. https://www.sciencedirect.com/science/article/pii/S1041608025000226

Siliezar, J. (2026, May 18). *One in eight adolescents and young adults use AI chatbots for Mental Health Advice*. School of Public Health | Brown University. https://sph.brown.edu/news/2025-11-18/teens-ai-chatbots

Wells, S. (n.d.). *Exploring the Dangers of AI in Mental Health Care*. Stanford HAI. https://hai.stanford.edu/news/exploring-the-dangers-of-ai-in-mental-health-care

