**A Research Design to Understand Usability and Market-Fit Considerations of AI-Powered Menstrual Hygiene Information Assistant**

**Introduction:**

More than 54 million women in Bangladesh menstruate. Yet, they face period stigma, and often girls do not even know what menstruation is before they first experience it. This culture of silence creates barriers, stiffing their health, education and societal outcomes. Improper sanitation often leads to reproductive tract infections, of which 13% of Bangladeshi girls and women suffered in 2014. Furthermore, girls and women miss out on education due to their cycles, with absentee girls missing an average of 2.5 days each cycle, and about 40% of girls and women missing school during their periods. Curated application of artificial intelligence solutions, especially large language models (LLMs), can help address the problem of women and girls in Bangladesh being inadequately prepared to face menstruation.

WaterAid Bangladesh helps educate and inform women and girls on menstrual health and hygiene management (MHM) to enable best practices. They have also provided thousands of women with water, sanitation and hygiene (WASH) products and facilities. Furthermore, studies they conducted have provided evidence that their MHM drives can lower school absences and improve the quality of life of women and girls. As such, WaterAid constitute the bedrock of the solution, which we will supplement. Making use of the economies of scale of LLMs, we can assist in educating and informing local girls and women on proper MHM practices, leading to improved health, education, and societal outcomes.

**The proposed AI based solution:**

As part of the AI to Amplify hackathon by the Goethe Institut, team *AI4Good* – consisting of Armir Celiku, Swapneel Mehta, and Sadhli Roomy, developed a solution where they have integrated LLMs to a messenger – effectively harnessing the power of conversational AI as a chatbot. The chatbot, integrated into the Telegram messenger, works as an AI-powered menstrual hygiene information assistant. The LLM, in this case, will be trained to respond to menstrual hygiene queries with local knowledge base. The chatbot will support Bengali as an input language. This predated the time that Swapneel Mehta joined Boston University and was primarily related to application development, without user testing.

A quick user journey is noted below:

AI4Good will develop a back-end database which would retrieve anonymized user queries and the chatbot responses to understand the quality of responses to said queries.

**Objective:**

The objective of this study is to assess and understand the usability, quality of the application and market-fit considerations of the newly developed AI-powered menstrual hygiene information assistant/chatbot. This study will help to understand the benefits of the proposed AI powered chatbot for the target audience and the probable challenges of field deployment.

The specific objectives of this research are:

* To understand usability, quality of the application and market-fit considerations of the newly developed AI-powered menstrual hygiene information assistant/chatbot.
* To provide feedback, suggestions and recommendations for fixing existing and future challenges in using the Chatbot considering the target audience.

**Methodology:**

This research design combines both quantitative and qualitative methods to comprehensively address usability, demographic considerations, quality, and market fit for the LLM-powered Chatbot service for Menstrual Hygiene Management. A field trial of the Telegram/WhatsApp chatbot to aid-workers, girls and women in two schools, in Dhaka and in Shyamnagar respectively will be conducted. This trial will try to understand the adoption prospects between urban and rural audiences. The study results from Shyamnagar, a sub-district situated in the coastal region and climate vulnerable area, will unveil the adoptability of AI powered Chatbot as a learning platform for menstruating girls and young women in the rural setting, whereas research findings from Dhaka will give us a comparative analysis of the user experience in urban setting. With the help of purposive sampling technique, 50 girls from each school at Dhaka and Shyamnagar will be selected to conduct the feasibility survey. Total number of respondents for the survey will be 100 students from these two selected schools. To conduct a trial of the Chatbot, the respondents will be selected considering they fulfill following prerequisites:

* The respondent is in the age group of 10-24 (menstruating girls and young women) years old.
* The respondent has access to smartphone and internet connection.
* The respondent has the minimum literacy required to use Chatbot and comprehend the information from messages.

An online survey questionnaire will be developed and deployed through mwater platform. The respective partner staff working in/close to the survey location will be selected as enumerators and they will be provided a short orientation about the research tool. To evaluate the ease of use and user-friendliness of the Chatbot interface, usability testing with the respondents will be conducted with the help of the survey. The respondents will be asked about different scenarios and their experience of using the Chatbot to gather information related to menstrual hygiene management through the survey questionnaire. The survey will evaluate how effectively the respondents can interact with the Chatbot by collecting message success rate, time taken to complete the conversation, user satisfaction and qualitative feedback from the users. To understand how different demographics interact with the Chatbot, diverse group of respondents will be selected based on their age, educational level and geographical location (urban and rural). In order to assess the accuracy and relevance of information provided by the Chatbot, the Chatbot responses will be collected from backend database and responses will be compared against expert-reviewed sources.

Ethical consideration will be ensured during data collection and the respondents will be surveyed only after taking informed consent. The respondents’ data will be stored considering data privacy protocol of WaterAid Bangladesh.

**Survey Tool:**

The survey questionnaire:

Good Morning/Good Afternoon,

Thank you for joining this interview. My name is...................................... I am working with WaterAid Bangladesh. WaterAid Bangladesh is conducting a survey to evaluate user experience of AI powered chatbot. The survey will record your response about your current Menstrual Hygiene Management (MHM) knowledge and practices, your experience of installing and using this chatbot. The survey will also ask you about your challenges while using the chatbot and your future suggestion to improve the experience of using AI powered messaging platform for MHM knowledge.

I extend a warm invitation to you for this discussion. Feel free to express your thoughts and share your experiences. Please be confirmed that your responses will remain confidential. Only anonymous quotes and aggregated findings will be included in the final report. Your answers and your identity will not be disclosed elsewhere. The interview is expected to last about 15 to 20 minutes. Is there anything you'd like to discuss with us or any questions you have before we begin the interview?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Consent of Participants** | | | | |
| Do I have your permission to start the survey? |  | | | |
| Yes |  | No |  |
|  | | | |

**Section A:** Respondent Identification

1. Name of the Enumerator:
2. Name of the School:
3. District/Sub-district
4. Name of the Respondent:
5. Mobile No:
6. Age: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Years
7. Grade: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Class

**Section B:**

1. Did you experience menarche yet?
2. Yes
3. No
4. How do you get information related to MHM? **(Choose multiple answers if applicable)**
5. Family members
6. Peers
7. Health workers / Volunteers
8. Doctor/Nurse
9. TV/Radio
10. Books
11. Facebook/YouTube
12. Search Engine (Google)
13. Didn't know till got to my first period
14. NGOs/INGOs
15. Others: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
16. What type of information do you seek related to MHM? **(Choose multiple answers if applicable)**
17. What is menstruation
18. What is the reason of menstruation
19. When does menstruation start
20. How long does period last
21. How long is the menstruation cycle
22. What materials should be used for menstrual bleeding
23. Food recommendation during menstruation
24. What hygiene practices to follow during menarche
25. Where to buy sanitary pads
26. How to dispose used sanitary napkin
27. Which medicine to take for pain relief
28. What are the effects of inadequate management of menstrual hygiene
29. When to see a doctor
30. Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
31. In whose device did you install the chatbot?
32. Yes, in my smartphone
33. Yes, in my family member’s smartphone
34. Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
35. Was the system installation complex?
36. Yes
37. No
38. Somewhat
39. Did you use the Chatbot to ask queries related to MHM?
40. Yes
41. No

**If answered “No”, skip to Question 21.**

1. If answered “Yes”, How many times did you use the Chatbot to ask queries related to MHM?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ times

1. Would you like to use this system frequently?
2. Yes
3. No
4. Did you feel any difference in using Chatbot compared to Google/Youtube/Facebook or other existing social media?
   * 1. Yes, chatbot was more user friendly and effective
     2. No, same as other online resources
     3. Don’t know
5. How convenient was it to use the Chatbot?
6. Completely Convenient
7. Fairly Convenient
8. Somewhat Convenient
9. Slightly Convenient
10. Not Convenient
11. Can you use the Chatbot by yourself?
12. Yes
13. No
14. How confident did you feel while using the Chatbot?
15. Completely Confident
16. Fairly Confident
17. Somewhat Confident
18. Slightly Confident
19. Not Confident
20. Was the prompt text option helpful?
21. Yes
22. No
23. Somewhat
24. Was the response from the Chatbot helpful?
25. Yes
26. No
27. Somewhat
28. Will you use the Chatbot in future?
29. Yes
30. No
31. Don’t know
32. Will you refer this system to friends or family members?
33. Yes
34. No
35. Will you be interested to pay any subscription fee for this system?
36. Yes
37. No
38. Don’t know
39. If answered “Yes”, how much will you be interested to pay for this system per year?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Taka

1. Did you face any challenge while using the Chatbot?
2. Yes
3. No
4. If answered “Yes”, what were the challenges you faced during using the Chatbot? (Select multiple options if applicable)
5. Poor internet connection
6. Cost of buying data package
7. Device accessibility
8. Device configuration
9. Chatbot not working
10. Writing queries in chat
11. Understanding responses from Chatbot
12. Chatbot did not provide correct information
13. Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
14. Do you have any suggestion for improving the user experience in Chatbot?
15. What other challenges might users face to use the Chatbot?
16. Do you have any other remarks to share?

**Data Analysis:**

The collected data will be cleaned and sorted through Microsoft Excel. The data cleaning procedure will involve checking for mislabeled or system missing data and correct as necessary. Once the data management and verification processes will be completed, descriptive statistics will be produced for each variable.

**Reporting Format:**

1. Introduction:
2. Objective:
3. Methodology:
4. Findings:
   * 1. Demographic Information of the respondents
     2. Current practice to collect information related to MHM
     3. Quality assessment and usability of the Chatbot
     4. Financial sustainability
     5. User recommendation
5. Conclusion