REHNUMA (رہنما)

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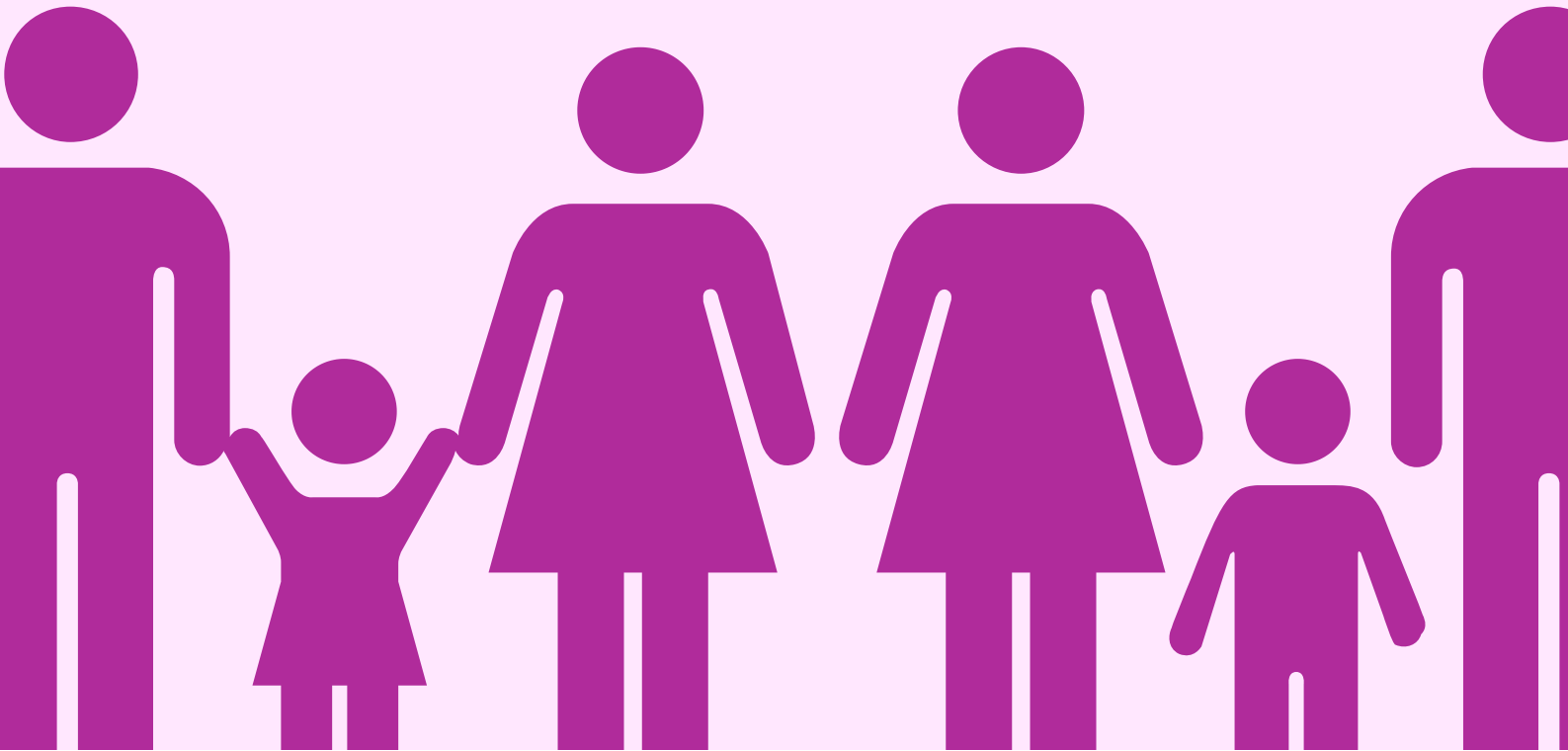
FINAL REPORT



Rehnuma: A two-pronged sexual education initiative in Pakistan

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Abstract

HCI is increasingly concerned with sexual health information quality and countering the spread of misinformation. Despite many major platforms having been adopted across the world, the situation is Pakistan is ¬underexplored to the extent that any solution, even talking, is considered taboo. Pre-Pubescent children are a vulnerable group who would easily believe any factually incorrect or misleading information. We explore problems, challenges around the topic and different solutions that could remove the stigma around the topic, at the same time, teaching children in an effective and interactive manner. We conclude with a design that would assuage the problem if not eradicate it and be accepted by parents and children throughout Pakistan.

1. Introduction

Sexual and menstrual health are both important components of one's health and well-being. Here we define sexual health as all matters pertaining to hygiene, sexual acts, STDs, UTIs etc., with both men and women lying under its umbrella. The existing environment of Pakistan is not receptive to the idea of empowering the youth with knowledge on this important topic rather it is heavily stigmatized and considered taboo to mention it any form or context. This lack of knowledge, communication and clarity has led to a deadlock shrouding the country under a dark shadow which leads to individuals unable to ask questions without fear of repercussions, forcing them to suffer in silence. For example, menstrual hygiene, an otherwise natural phenomenon is viewed in a negative light, causing feeling of shame in women and in case of STDs, men and women are afraid to reach out to medical and professional help; thus, this cruel cycle stemming from an absence of knowledge and communication continues, generation to generation.

The challenges due to the lack of awareness we as group members faced while going through puberty led us to a realization that this problem is deeply rooted in the cultural context of Pakistan. Parents shy away from teaching their children about the necessary sexual health education and changes that their bodies will undergo, resulting in this topic becoming a stigma throughout the nation and causing numerous problems throughout Pakistan. Adolescents begin to have demoralizing thoughts and believe something is wrong with them when they first experience puberty- related changes, especially when they have no idea of it beforehand. An interviewee mentioned, "When I had my first period, I thought I had succumbed to some illness or a deadly disease as I had no idea what it was and why I was bleeding."

Children are expected to educate themselves as their parents had before them because they had no one to turn to for guidance. In some cases, an older sibling or relative is there if they are lucky, but in most cases, they must research themselves or rely on their peers, which is often inaccurate, incomplete, or just fiction. Google may be an excellent resource, but a vast abundance of resources might prove overwhelming for newly emerging teens. Having gone through this ourselves, we want to make it easier for the upcoming generation to have a reliable and streamlined source of information that effectively guides and reassures them of the changes they are about to face.

To begin with, in phase 1 we interviewed several parents to understand the problems they face while communicating with their children and whether they will be willing to use such an app that would solve the problems. From these parents, we gained valuable insights into the difficulties they face as a parent when delegating information about sexual health to their children and how we could help them overcome this. In the second phase of our work, we explored different solutions and made a digital design of an application which we got tested from the parents and children in phase 3.

Our study provides a contextual understanding of the problem parents face while teaching their children about sexual and menstrual health topics and, on the other hand, the problems children face while learning about these topics. With our design, we aimed to bridge this gap by providing a children-oriented application with parental controls on the parent's end. While our study was performed within a niche context of Lahore, Pakistan, the results can be extended throughout Pakistan and India. We highlight a new approach of a parent-child model to tackle the issue of a lack of awareness and education pertaining to matters regarding sexual and menstrual health.

2. Related Work

2.1 Sexual health education among adolescents in Pakistan

Sexual education is the dissemination of knowledge on sexual matters. We appreciate sexual health as an evolving term that was originally defined by the WHO in 1975 as: “a state of physical, emotional, mental, and social well-being in relation to sexuality…” with the following part implying that sexual health spread over a vast domain in individuals’ lives - and wasn’t just an absence of disease like the term ‘health’ is often perceived to be. A thorough understanding of this definition and its wisdom shows how pervasive and powerful the state of sexual health is in individuals. A body in the Centre for Disease Control revised this definition to include even knowledge of sexual health, and healthy sexual behaviours to be a part of one’s sexual health. This is a very powerful notion as it points to the importance of knowledge and understanding to be an extremely important part of sexual health, which will be an important theme of our analysis (Douglas & Fenton, 2013). Awareness in our context is the extent to which knowledge of sexual health is prevalent in a group, and the quality of such knowledge.

Pakistan is currently the sixth most populous country in the world, with an estimated population of 180 million[i]. Within the country, sexual education for adolescents and young adults is regarded as taboo due to socio-cultural challenges and religious beliefs of the population at large. Adolescence is a founding phase for children to establish healthy emotional, cognitive, and physical capabilities that are essential for them [ii]. However, due to lack of access to appropriate and accurate sexual health information, adolescents engage in high-risk sexual behaviors, consequentially leading to mortality/morbidity. [iii] According to the last mass survey taken, Pakistan had an estimated 97,400 people living with HIV at the end of 2009, with 2917 AIDS patients[iii]. Although, Pakistan has been identified as a low HIV prevalence country, available evidence shows that the country is already experiencing a concentrated epidemic.[iv]

Pakistan also has the highest total fertility rate (3.6 children per woman) in South Asia[v], and approximately 50% of all the births in Pakistan occur among girls younger than 20 years, living in rural areas where there is no concept of awareness regarding sexual and menstrual health, especially for women.[vi] This has implications for maternal and perinatal morbidity and mortality levels in the country, as adolescent mothers are at higher risk for complications, eclampsia, puerperal endometritis, and infections. At the same time, their newborns are more likely to be born prematurely and have low birth weight.

This prevalence of early marriage among girls is an important contributing factor to high levels of teen pregnancy, maternal morbidity, and mortality.[vii] There are a number of causes for these behaviours. Being a religious country experiencing an intergenerational shift in ideology and practices, Pakistan has struggled with cultural challenges and adapting to the relatively newer social climate. These socio-cultural challenges have directly affected sexual health education for adolescents in the country. According to several studies, parent-child communication regarding topics of sexual health is largely lacking. Majority of parents believe that talking to their children about sexual health will lead to early sexual activity. Because there is no significant communication between them, majority of adolescents and young adults seeking sexual health education reach out to their peers and the internet (aka Google). A research states that peers and family are actually reported as the first and sixth sources of sexual information for students respectively![viii]

Another aspect of concern with regards to the communication gap between parents and their children is that parents are actually confused about what sexual health education is, and how to approach their kids regarding it. Those parents who actually recognize that there is a need for them to talk to their children about these matters, they are unsure regarding how to go about it either because the topic has become so taboo in our society or because they lack enough information to educate their children about it.

2.2 Effects of healthy sexual health communication with adolescents

Several studies indicate that healthy communication between parents and children leads to “lower risky behaviours and more conservative sexual beliefs and attitudes in adolescents.” Furthermore, these studies also stress the positive impact of school-based sexuality education, establishing teachers as a primary source of learning within the socio-cultural context of local Pakistani schools. Surprisingly, according to research done in the United States, adolescent boys were found to have safer sexual behaviours and fewer sex partners, and start sex at an older age due to sexuality education. [ix]

2.3 Technology to advance sexual health education

The Sexual Health resources currently accessible in Pakistan are very limited. Moreover, most of the content available focuses on only young girls’ role in sexual

health and there are hardly any credible resources targeting young boys and parents. Young boys need guidance regarding the challenges they face and how to deal with them, and parents would also benefit from a community and resources that equipped them with the proper methods to talk to their children about matters of sexual health. Most of the content available on sexual health education is produced in the West, and can provide excellent information with learning modules designed to teach children in an age-appropriate matter, nullifying any concerns parents in Pakistan might have. One such website is sexetc.org, which is currently banned in Pakistan.

There are multiple different websites on the internet, leading to an information overload and often with conflicting answers to similar problems, confusing the user. A lot of that information is user-generated, leading to concerns regarding the authenticity of the factual information regarding sexual health. There are some selected websites, such as planned parenthood and amaze.org[i], which are reliable organizations providing credible information from certified health specialists. The content addresses a wide range of topics such as menstrual hygiene, birth control, consent, HIV/AIDS & STDs and more. However, there isn't much awareness about these resources.

Secondly, the mobile applications that pop up under the keywords ‘sexual health’ and ‘sex education’ are largely pornographic, misinformative, and catered to an adult audience.

(An example includes an app providing information regarding sexual activity, but no information regarding the precautions or the health consequences). Despite an age warning, there are no app controls to prevent a younger audience from accessing those applications and letting them learn from incomplete and misinformed sources.

Currently in Pakistan, resources pertaining to sexual health awareness amongst children and parents are almost non-existent. The existing resources targeting the topic are mostly developed in the West, and therefore the information provided isn’t always culturally relevant in the context of Pakistan. One example if the Flo application, a period tracker which asks the user upon signing up if they 'are looking to get pregnant.' [xi]

For young girls in the Pakistani context, this can be very confusing and expose them to information their parents might not be ready to discuss with them yet.

Some of the existing applications within across the world include apps for the following categories:

Period Trackers

The tools in this category let menstruating users keep track of their period cycles.

- **Flo**

The App is accessible in Pakistan, and one of the most popular period tracker app within Pakistan. It allows users to log daily symptoms, keep track of their cycles, read articles based on daily insights, and discuss their concerns within a community forum.

General Information

Majority of adolescents and young adults have a lot of questions when it comes to sex and sexual health education. The tools within this category aim to provide this information to them in an informative way.

- **It Happens**

The app provides teens and young adults with accurate, timely information about sexual and reproductive health topics. It includes informative articles about sexual health topics such as STDs/HIV, pregnancy, birth control and relationships, as well as database of nearby health centers

- **My Sex Doctor**

The app provides comprehensive sex education in an easy to access and understand format. It includes informative articles, QnA database categorized by topic, popular topics categorized under 100 things you must know, and a symptom checker. The app is intended for users 12+.

Clinic Finders

The tools in this category aim to assist users by connecting them with a database of local doctors in their area so they can receive physical/mental health care.

- **Maven**

The app allows users to book appointments with professional health experts near their area. It has a database of doctors, an option for paid appointment booking, as well as calling/chatting with professional health experts. The databases are categorized under fitness, menstrual concerns, and emotional wellness.

Consent

The tools in this category assist users with clearly communicating their boundaries.

- **Yes to Sex**

The app allows users to communicate properly before engaging in sexual activity by asking explicit questions regarding their consensual boundaries.

3. Method Plan

All questions asked were planned with follow ups discussed prior to the interview. Owing to the sensitivity of the topic, any wrong question can lead to the interview/ focus group crippling down.
The main aim of conducting interviews and focus groups was to understand the emotions, thoughts and motivations of the interviewee to determine the path towards innovation. By obtaining the knowledge mentioned above and understanding the rationale behind the decisions they take, we can identify their needs and design accordingly to meet those needs.

Contextual Inquiry: Context
Defined as: "The interrelated conditions within which something occurs or exists".
For our topic: 'Education Puberty, Mensuration and Sexual Health', schools could play the role of context. At an early age, the teachers are in a position to maneuver the behavior of the child and also control the content they learn while growing up. To better understand the environment, we went to public and private schools, ranging from pre-nursery to A-Levels and talked to the teachers. For the teenagers above eighteen, we got the context based off their personal experiences and outcomes.

Contextual Inquiry: Interpretation
By the end of each question, the interviewer would reiterate the point made to get a clear understanding of what the interviewee intended to say. For example: "So if I'm understanding you correctly, you said...". Again, verbal cues are important to justify or negate the interpretations made.

Contextual Inquiry: Partnership
We asked open ended questions to allow in-depth answers and get an insight to their thinking process, while paying attention to verbal cues. By the end of the interview, we shared our ideas for an app with XYZ functionality and asked their opinions on it to gauge the usability of our idea.

Contextual Inquiry: Focus
While analyzing the data collected, it is important to leave behind all biases and assumptions, be open to learn and most importantly, be neutral, even if the data points against your initial idea.

Recruitment and Participants
We recruited participants through calls, emails and surveys as our primary source. Our main target audience was divided into 2 categories: Wards (children) and Guardians (Parents and Teachers). The wards were further divided into 2 categories: above and below the contenting age of 18. For the wards above 18 and the guardians, we could approach them formally through any of the mediums described above for interviews, focus groups and surveys. With children below 18 however, there was a legal and moral dilemma to approach them the same way, thus the parents were present during their interview, or asked questions to answer on the behalf of their children if they were too young.

Demographic metrics:
- Age
- City of education
- Highest education level
- Frequently used applications

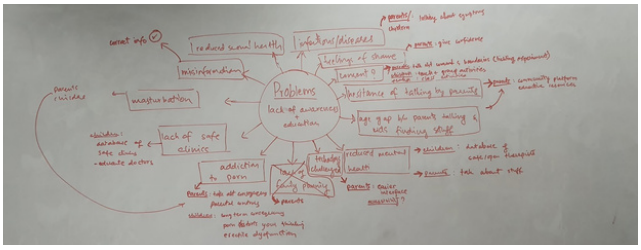
The results showed that a combination of education level and frequently used applications had the highest impact on users' answers to the questions asked. Children and some guardians who were highly educated were more open to the idea of children interacting with an application and educating themselves on such topics with minimal intrusion of the parents or guardians.
From the parents' perspective, while some parents of the same education background as the personas above were hesitant to let the child explore without supervision, almost all of them were in agreement of the parents learning themselves and aiding their child on their own to build a stronger connection.

Meanwhile, users who were educated but did not use relevant applications faced a considerable amount of hesitation in answering questions and were less keen to the idea of an application altogether, merely out of shame associated with these topics in our culture.

Brainstorming

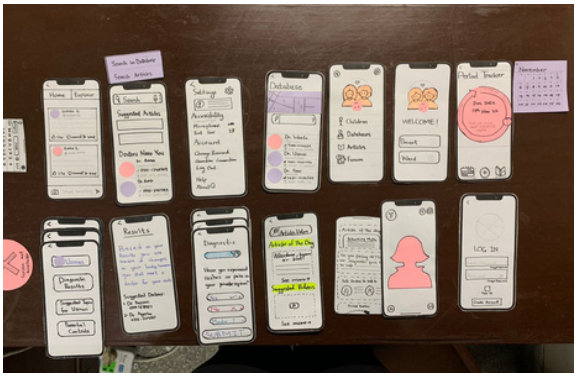
For initial brainstorming we used a google document where everyone separately added the problems into the document on a separate page, without any other member prying. While everyone typed, complete silence was observed in the room. This encouraged the wildest ideas without any fear of judgement and without any chances of other members unintentionally shutting down a potentially great idea.
For the next step, all the ideas were discussed individually, sketched on the white board and converged into a single idea for the next stage, using the affinity diagrams.
More details on the affinity diagram and the next stage of brainstorming can be found at the end of brainstorming.
For the original document used for brainstorming, please refer to the appendix at the end of the document.

The following and preceding pictures show the converging process of brainstorming, where all the unique ideas were written on the whiteboard as the first layer. The rectangular boxes represent the questions raised by the group members and the problems identified from the user research.
The text in the second layer, superseding the boxes are the solutions stemmed from the problems identified. These solutions were later jotted down again, discussed among the group, and after deliberations based off feasibility, usability, effectiveness and efficiency, were either discarded or merged into a new single solution represented by our product.



Low Fidelity Prototype

Initially our testing procedure was to give the user an extensive overview of our screens and guide them on each screen. Our goal was to incorporate a starting tour of the app when the user first signs in. However, upon reflection we realized that we were helping the user beyond the capacity of the guided tour. So, for future testing we gave a brief overview to the user of what the app is. We then gave them a scenario with a task that they had to accomplish without help from us. The user would then explore the various buttons and functionalities of our screens and they would be guided to the relevant screens or popups. This proved a better approach as users could freely explore the app and it provided us with more valuable observations of how a person would actually go about using the app.
Everything described in the Hi-Fi prototype below was part of the paper prototype, with a few exceptions and improvements.



High Fidelity Prototyping - Final Product

After multiple iterations until inspection, of researching pain points, analyzing data and incorporating relevant changes to our prototype, we were left with our final high-fidelity prototype, incorporated with the final changes and ready for testing. The following are the main features and use cases of the final product:

Swipe Up and Avatar
This is the swipe up home screen which is the focus of the Child mode. The avatar is to promote interaction between user and the app. This feature has two modes, educative and interactive. All other features can be accessed via swiping up. These features are reading articles, a list of safe doctors to talk to, an option to take diagnostic and or quizzes, and a period tracker. The main screen also has an option to search, at the top right which provides an alternate way to look for articles or find any feature of the app. At the extreme top right are the settings. At the bottom left we have the customization option for the avatar. At the bottom right we have the option to switch between interactive and educative mode.

Articles of the Day
Here the users can look up for different articles and some videos which they can use to brush up their knowledge.

Period Tracker
One important feature is the period tracker. Here the user can look at their due date for their period and what stage they are currently on. Clicking on the calendar at the bottom left will open up the calendar where the user can log their dates for their periods and overtime the app would learn their pattern. Clicking on the articles at the bottom right will take you to a page with articles related to menstrual hygiene and helpful suggestions.

Self-Check Up Tests
This is how the Quiz/diagnostics would be with the distinction that quizzes are only for a single topic and have a correct answer whereas diagnostics is to gauge an idea about the users understanding of their bodily function. The user enters their answer and then continues. After all questions have been answered, the user is taken to a results screen that also suggests to them what topics they should brush up on and if they need to contact professional help, the app suggests them with the relevant people.

Parent Mode
This is the children screen with the list of all linked children. Clicking on a child would take the parent to the parental controls. The parental controls have the option to add or remove prohibited topics for their child. The parent can block the account of their child by clicking on the block account toggle. The parent can unlink their child by clicking on the delete child.

Doctor Database

This is the screen we get to by clicking on the database option on the home screen. This has a search bar and a filtering option adjacent to the bar to refine the search for help. It has a map which shows the professional help individuals. Furthermore, it has the list of contact info for professional help individuals which the user can also click to make a call to them.

Parents Discussion Forum

This is the screen we get to after clicking on the forum option on the home screen. Here the user can read the questions or answers made by other parents. The user can click on the like button to like the question or the answer. The user can click on the comment button to reply to the question or answer. The user can make their own question by clicking on the share something and clicking on the arrow to post. The user can also add images by clicking on the camera. Clicking on explore would show the user other parents they can follow and show them trending topics.

Avatar Modes - Interactive and Educative

The modes represent the behavior of the avatar. The interactive mode will teach safe touch to the child when the avatar is touched inappropriately by warning the child. In educative mode, the pressing of any body part will lead to articles entailing to the body part.

Settings and Accessibility

This is the settings screen we get to by clicking on the settings icon. It has accessibility features such as changing the language. Clicking on the language would take the user to screen with two language options, English and Urdu which the user can chose to switch between the language of the application. The user can switch on or off the microphone by clicking on the toggle adjacent to microphone. The user can also set the font size Furthermore the user can change the password of their app by clicking on change password. Clicking on the help option would take the user to a tutorial of the app. The user can click on the log out to log out from the app.

Quizzes

The user can take quizzes based off the articles they have read to understand where they lack and improve their knowledge on the particular subject.

Scenarios and Storybooks

Son Notices His Father's Shaving Kit in the Bathroom
He Lacks Proper Knowledge to Use It

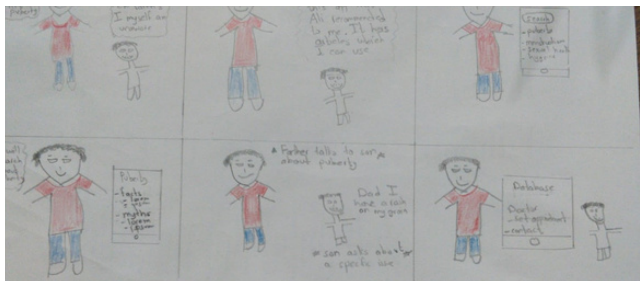
Ali looks in the mirror and notices hair growing on his body where there previously was no hair. He stares curiously and somewhat anxiously at this new development.
He promptly takes out his mobile phone and scans the code.
The code takes him to an application's eye-catching webpage, which explains what the foam and 'pen-shaped device' (razor) are, why and when they are used as well as the whole process of hair removal, step by step.

A Parent Hesitates to Talk to the Child on the Topic of Puberty, Menstruation, and Sexual Health.

A parent wants to talk to their child on these topics but doesn't know where, how to start due to the lack of education on such a topic. They fear misinformation but also don't want the child to learn unguided from google and/or immature friends.
Instead, they download the app which leads to helpful articles (short and long) just by a search
The app also suggests professionals who can further guide parents on issues regarding health by setting up one-on-one meetings
or appointments.

Parent is Uncomfortable Talking to their Child on the Topic of Menstrual Hygiene, Uses Application to Bridge Gap

Annie is playing when she notices a liquid feeling trailing down her thigh. She looks down at her shalwar, which is stained with blood. She hurries to her home and talks to her single dad about it.
She says to her father, "My shalwar is full of blood. Am I sick? What is happening to me?" Her father stares at her, flabbergasted and unaware of how to process the situation. Facing a lack of response from her father, she runs to her room crying.
Father has this idea that there exists a wonderful app that would explain everything clearly to his daughter.



Goals And Objectives

After completing the prototyping phase, we were left with a High-Fidelity prototype made through Figma. The layout and design of this prototype were motivated by our feedback on our paper prototype or Low Fidelity testing while also incorporating ideas from our User Research. The main goal now was to take feedback on our Hi-fi prototype and enhance it to the best of our capabilities.
We were aware of the shortcomings of the Hi-fi prototype, the more prominent being the incorporation of changes. The more intricate your prototype is, the harder it is to change it to suit the user. This is why we had comprehensive testing in our paper prototyping, making the prototype as closely relatable to the actual app as possible to reduce the number of changes later and make the app most suited to the users.

Usability goals and objectives concern how usable our product is from the user's perspective and how easy it is to perform the product's tasks.
While designing our application, we aimed to lay the foundation for the six main usability goals:

Safe To Use
Using the app doesn't cause any physical or mental harm to the user. This may also be a superset of causing stress to the user while they use the app.

Easy To Learn
The models used in the product or application can map to the user's mental model through constraints, mappings, labels, etc.

Effective To Use
Refers to how good a system is at doing what it is supposed to do. The effectiveness goal ensures that the product solves the problem for which it was designed.

Efficient To Use
The time or steps taken by the user to solve a particular problem are minimal.

Memorable
Once the user is done using the app for the day, they don't actively need to recall what a particular part of the model was supposed to do. Using recognition instead of recall helps us solve this problem.

Good Utility
the extent to which the system provides the correct functionality so that users can do what they need or want.
Whatever task the user needs to perform relevant to the application, they must have the means to complete that task.

Evaluation

Before testing, we asked ourselves: What are we measuring? What do we plan to get out of the testing?
We concluded that the most effective way to measure the usability and user experience is to determine the time and steps taken to complete a particular task as Quantitative data while also focusing on the user's expressions as Qualitative data.
A combination of both quantitative and qualitative will help us improve our application and make it efficient and user-friendly.

Inspection: Why did we do it?

It's also helpful to get help from other designers, who can give professional feedback that you may not get from your normal users but will eventually affect your end users.
Usability inspection is a way to find usability problems in the design. This method may address issues like the severity of the usability problems and the overall usability of an entire system. Many inspection methods lend themselves to the inspection of user interface specifications that have not necessarily been implemented yet, meaning that we can perform inspection early in the usability engineering lifecycle.

Professionals perform an inspection to give feedback on the aspects and design principles using the following heuristics:

- Visibility of System Status
- Match Between System and Real World
- User Control and Freedom
- Consistency and Standards
- Error Prevention
- Recognition rather than Recall
- Flexibility and Efficiency of Use
- Aesthetic and Minimalistic Design
- Help Users With Errors
- Help and Documentation

Participants of Formal Usability Testing

Since our application aims to cater for guardians and children, the target group for our testing seems obvious. We reached out to the people we conducted our user research with since they were already aware of our problem and suggested solutions for the application.

Demographics
The only factor viable to our study is the age of the children and the literacy of the guardians and children.
The children must be above the age of ten—two groups relevant to our study: below the age of fifteen and above the age of fifteen.

*ALL SCENARIOS IN DETAIL ARE IN THE APPENDIX

The main thought behind taking the step was to analyze how the two age groups would behave and whether the current model would work for either.
Due to the lack of feasibility, we didn't reach out to the under-fifteen group directly.

Guardians
The guardians included parents and teachers; in other words, entities which interacted with children (between the age of ten to fifteen) the most and in a personal manner.
Since approaching children under eighteen is not feasible, we decided to work around the problem and instead focused on the adults closest to these children at this age. Since children at this age replicate what the adults around them do and share a similar mindset, we were able to get an idea of how to tackle adolescence.
The technology that the adults use in their homes is roughly the same technology the young kids use to either play videos, poems or play games, so the mental model of the parents would match that of the kids. It was essential to grasp what the adults want for their kids and what they want their kids to stay clear. By testing the application on them, we got an idea of what the adults were feeling, their thought process and their feedback on the application. This led to further enhancements of the application on the children's side.
Since a considerable part of our application is for parents/teachers, it was necessary to get an idea of how practical, efficient and simple our application is in terms of its usage.

Overview - Children Scenarios

Our Interactive app, Rehnuma, aims to bridge the communication gap between parents and children and allows you to understand more about yourselves. Decades of stigmatizing topics like puberty, sexual and menstrual health has rifted parents and children apart on such topics, leaving children with little to no information on such topics.

In the application, the user will have an avatar they can talk to, which will respond back according to how the user interacts with it.

The app is based on a modular learning system, where different modules will teach the user about different aspects in the sexual health spectrum. The level can increase by reading articles and then testing the knowledge gained by taking quizzes. The user can also take diagnostic quizzes, which are like check-ups and will guide the user about any potential health risks. We also provide an easy-to-use period track calendar and helpful tips to make the painful time a little less painful. The avatar also teaches users interesting facts about their bodies, and they can also customize the avatar by changing its clothes, amongst the many features of the app.

Sign Up
As a teenager, with a constant urge to get more information about the world and the things around you, you decide to join 'Rehnuma's' increasing userbase and sign up!

Self-Check Up
You have downloaded the app and want to take a Self-Check Up to gauge your level of understanding about your body, the changes it goes through during puberty and other related topics.

Avatar Customization
You have decided you do not like how your avatar looks and want to change it. Browse for a different avatar.
You do not like the shirt your avatar is wearing. Browse for different Avatar T-shirts

Change Language
You challenged your mom to a quiz competition on puberty (you will take the quiz on the app); however, your mom does not know English that well and would like to take the quiz in Urdu.
Go and change the language of the App from English to Urdu.

Overview - Guardian Scenario

We provide parental controls to monitor your children's progress and articles you can read to help them understand these topics in a better manner and increase their learning. We also offer a platform to discuss your respective issues with other parents, learn from them, help them with their problems, and a list of safe, professional help you can reach out to in case of any health or mental related emergency.

Sign Up
As a parent, with a long urge to get more information about the world and the things around you, you decide to join 'Rehnuma's' increasing userbase and sign up!

Contact Doctor
You wish to call Doctor Usman (a gynecologist) so you can ask him some questions regarding your daughter's delayed period

Post on Discussion Forum
You have to post as a parent on the discussion forum or check what influencer parents have to say today. Maybe you would finally accept your neighbor mom's friend request that's been pending for weeks! Head on down!

Check your children's information
Your child just took a quiz on groin rashes, and the results are out. Nothing to worry about right now, have a look at the results from your parent interface!

Testing Materials
Tripod Stand, Laptop, Questionnaire, Phone Notebook, Pen, Phone/ Camera, Snickers as a Reward, Wi-Fi Device for Internet Connectivity, Pre-Test and Post Test Questionnaire, Task Book, Consent Forms for Children and Guardians

4. Findings

These sections delve into the findings we came across in our user research and testing phase. There is a multitude of aspects of the findings, but the following were the most salient ones. Some have been modularized for readability.

4.1 Social Findings

1 - The Effect of Socioeconomic Class on Sexual Education
Socioeconomic class is a good marker for the attitude towards sexual education of children. This was seen both in the literature reviews we conducted, and the user research phase.

1.1 - Majority Consensus
A majority of parents and teachers agreed that sexual education in vacuum is extremely important, This idea was prevalent among almost all participants (regardless of class), who agreed that sexual health and its education had great significance in one's life. The point of contention was when and how this should be imparted to children.

1.2 - Openness and flexibility
Openness and flexibility here is referring to the attitude towards new approaches in sexual education and how malleable they are perceived to be. According to our observation, the higher the socioeconomic class, the greater the openness and flexibility. This is a directly proportional relationship.

Minimum Age of Sexual Education
The minimum age at which sexual education should begin was seen to vary with socioeconomic class as well, with an inverse relationship. The higher the socioeconomic class, the lower the minimum age for sexual education is perceived to be.

2 - Position of Parents as Point of First Contact
Nearly all of our participants in both user research and testing phase, both in the capacity of children and guardians - operated with an underlying notion. This was either made explicit or remained implicit in their ideas or behaviour.

This was the notion of parents being the first point of contact in terms of sexual education. Such an implicit position is an interesting observation, because it also hints that parents serve as secondary stakeholders to the sexual education of their children, occupying a very important position close to the heart of the matter.

3 - Sociocultural context and relatability
Testing participants greatly appreciated how grounded the prototype was in the Pakistani context and culture.

This was appreciated on three fronts, the name itself - Rehnuma, the intention to keep Urdu as a language of the app, and the cultural attire of the avatar in the prototype. To quote a testing participant, 'the avatar is so cute!'.

Such a cultural and traditional grounding makes the design seem familiar and approachable, a necessity when it comes to an app of such a nature.

4 -Differences between Age Groups in their Usage of Web and App Technologies
There were certain key characteristics that were found to differentiate the usage of the children demographic - youth, and guardian demographic - middle aged and onward.

4.1 Children (Youth)
The younger demographic exhibits greater exposure to such technologies and their rapid uptake. It may be deduced that the youth are also more active and diverse in their use.

4.1 Guardians (Middle Aged and above)
The guardians exhibit a propensity to shift towards more traditional forms of media, with minimal to no use of modern popular social media apps, and a lower frequency of use.

4.2 User Interface Findings

1 - Labelling and Iconography
Labels and especially iconography were seen to be especially effective in the interface built in the prototype. This is owed to a good match between the mental models of the users and the models upon which such labels and icons are built.

1.1 - Good Mental Model Matches
The examples that serve as resounding successes are those of multiple basic functionalities like settings, avatar customization (the coat hanger), and search.

The success of these is owed to the prevalence and knowledge of them in their form.

1.2 - Sparse Labelling
Labels (and often their overuse) take away from both the usability and quality of experience of users. This is demonstrated in the section that follows immediately. The relative lack of labels and reliance on iconography or a hybrid instead was greatly appreciated by testing participants.

1.3 - Difficult Terminology and vocabulary

The presence of difficult terms such as 'diagnostic quiz' and even 'professional help', led to confusion among test participants. Some were even visibly frustrated in trying to comprehend what they meant. This alludes to the idea that complex and verbose terminology causes a difficulty in understanding, and hence reduces the accessibility of a certain idea.

Alternatives were also suggested, including 'about your child' in the place of diagnostic results. The professional help section was also suggested to have been split up instead - with each split section being the corresponding specialization of the professionals (E.g. psychologists, physicians, gynecologists)

2 - Interactivity and its Merits

The incorporation of interactive elements that gave some level of feedback or exhibited communication were greatly appreciated by testing participants. The two prime examples of this interactivity are the in-app tutorial at the start, and the avatar's interactive mode.

Users went on to say that these helped keep them stay engaged with the app and piqued their interest.

3 -Content Density

With reference to the density of content, users had much to say. The most immediate example of high content density was Rehnuma's swipe up menu, which users often called 'cluttered'. They hoped for it to be less dense and evenly spaced out, some even calling it 'overwhelming'.

As both a usability heuristic and a design standard, minimalism was followed and applied wherever possible. The swipe up menu compromised this for more content density in hopes of greater accessibility. This might be why users felt it to be 'cluttered'.

As a finding this speaks volumes about the importance of minimalism to ensure that individuals are not overwhelmed by the interface.

4 - Habits of Usage and UIs:

An important observation that was made regarding the UIs that testing participants were accustomed to was that there was stark contrast in mental models due to these very habits of use.

Rehnuma incorporates many elements of an iPhone interface.

Relatively simple gestures, like swiping up for a menu are difficult to execute and get comfortable with if the participant is not an iPhone user. Vice versa, multiple iPhone users breezed past tasks due to their habits of using an iPhone.

The implication of this finding necessitates a thorough analysis of the usage patterns of the target audience to ensure correct mental models.

4.3 User Experience Findings

1 - Aid Materials Effective but Neglected

Exploration was seen by users as a better alternative than usage of aid material. This was true for the taskbook and especially for the in-app tutorial. Users would quickly skip over the parts of the tutorial without reading them fully - an observation made across the majority of testing, and continue to go through flows randomly to get a 'feel' for the app.

2 - User Expectation of Aggregation and Concentration

A recurring theme was the expectation of users that similar concepts would be aggregated. This led to multiple issues observed. The aggregation mental model caused problems with search tasks, whereby users would rely on their previous use of a similar task in a specific context, than generalize it.

As with searching for articles and the period tracker article task, a staggering amount of testers didn't go through the simpler and effective search route/period tracker route - instead just went to the swipe up menu to sift through the articles instead of going to the relevant flow.

This implies an important mental model mismatch, whereby aggregating and concentrating certain ideas should be done carefully.

3 - Recall Prioritized by Users over Exploration

Generally when going through the tasks, test participants preferred to use the paths they had already explored and their existing conceptions than trying out new exploratory flows.

This holds implications for all design- communication of models should be done effectively and accurately without much left for exploration.

4 - Lack of Incentive for Children

A user experience observation that is a major issue came into notice - children in their capacity have limited incentive to download and use Rehnuma, and a greater incentive must be offered than say 'simply looking it things up on the internet'.

In sum, the research and testing conducted by us in the backdrop of HCI principles proved to be insightful, with important revelations about how to go about sexual education in Pakistan, especially through a digital medium.

5. Discussion

5.1 Analysis

Effect of Social Economic Class on Willingness and Openness to talk on sensitive topics

The results of our testing were that 75% of Parents in Pakistan are not comfortable educating their kids regarding sexual health. Upon analysis from the answers previously stated by the members of the subgroup, it was concluded that the members of the middle class and upper middle class were more open to talk to their children about puberty, personal hygiene and sexual health whereas the Lower Class is aware yet hesitant to talk about it. 87.5% of people have talked to their children on the topic. 60% of people had no conversation with their parents. 87.5% of parents want an app catered to parents opposed to that to children. In the case of using third party apps the lower class who have no knowledge of such topics were open to the idea of an app whereas people with some knowledge would prefer their kids to come to them. In the case of middle and upper middle class they were open to the idea of an app but were concerned on its authenticity and security regarding misinformation and why would people use our app when they could use google.

Since people are not comfortable talking about such topics, this opened an avenue for applications such as ours which provide a platform for parents and children to educate themselves on sensitive topics such as these easily and without shame of judgement or repercussions. To implement this app, we proceeded with our user design phase.

Importance placed on sexual education, its relevance and the associated Cultural sensitivity

Our findings show that regardless of demographic or education level, all parents placed importance on sexual education and realized its relevance to be taught to their children. However, the associated cultural sensitivity with sexual education is such that parents are unwilling and ashamed to talk with their children, leading to an infinite loop of children learning on their own, being forced to handle sensitive matters related to their body themselves as well as having to navigate the minefields of misinformation.

Breaking barriers for progress

To get rid of this stigma and taboo, barriers must be broken. This could be achieved if parents start communicating with their children and act as a source of correct information and comfort for them. They first must stop feeling shame approaching such topics. This shame must be dealt with at an intrinsic, psychological level by empowering them with schemes at a large scale such as government initiatives, advertisement taglines for sanitary products, and healthy discussions to name a few.

Websites and apps as media for education

Our users appreciated the idea of using websites and apps for educating people. Many users already used apps like Flo for menstruation tracking, and google for general information. However, they felt a singular app which would have verified and authentic information would serve very well for both parents and children. Along with information access to quizzes and discussions forums would also enable people to better educate and test themselves.

"Show don't tell" in digital education design

In this day and age, people have short attention spans, spending little to no time reading and absorbing information. "Show, don't tell" is the way to go. For example in our testing very few users spent time reading the tutorial and went straight on to exploring the app, using visuals to interpret the features.

Following this our app focuses heavily on the visuals. From having a large, interactive, engaging avatar to interesting articles with more pictures with accompanying text. This serves to attract and hold the person's attention as well as getting them to imbibe the information we want them to learn.

"Users are pleased at the initiative

There was a pleasantly consistent theme across all users, who when asked what they liked the most about the application, answered that the "initiative is the best part about it." They realize the need to talk about these things, as they are pertinent to both their mental and physical health.

Older age groups (Guardian interface testers) don't have mental models for the app

A noticeable pattern amongst almost all guardians tested was that they felt confused and at times frustrated with how to proceed with the app. Even though the app was designed to be straightforward and minimalistic for the guardians, we observed that they still struggled to navigate through the app. This provided us with the insight that we need to make our solution more reflective of the audience, where the application is a guiding hand in itself

"Children need incentive to download application

When children were asked if they would be willing to download this app, a majority of them were hesitant. A common question for them was "What's in it for us?" and "Why can't we just google it?". This was partially due to the impracticality of making the avatar interactive in a static prototype, and also partially due to the app not being gamified and incentivizing users

5.2 Improvements

The post test questionnaire indicated that users gave mostly positive feedback after using our application. They were easily able to access all the features and thought that the usability was very easy to use and interactive. They liked the minimalistic design and color palette and were easily able to access the nested options like enable microphone which were in accessibility in settings.

Child Interface

Our observations highlighted a few improvements within the child interface which would better the app usability experience for children. Separate menu placements for android and iPhone users could help solve the issue of mapping mental models to the application, with the current wipe up menu for iPhone users and a top-left menu dropdown for android users. The mode button could be placed in setting instead since it was confusing the users. Moreover, the user profile level could be incorporated within the settings, or the design for the level could be changed to better indicate what it represents.

Guardian Interface

Some common improvements that could be implemented in the prototype can be to add a dedicated home button in the parent's interface because at their age constantly clicking the back button to return to the home screen is very tedious and tiring. Another idea could be to keep Articles and Videos separately as it gets confusing for users to have them under the same section. Discussion Forum users said that posts should be characterized under topics rather than users as it would make it easier to search for a specific topic. This was based on the model of Quora/Reddit, where posts are categorized by topics. Professional help should also be broken down into different categories of doctors to make it more accessible. Some users also felt they could benefit from a more organized data construction.

Future Work

We plan to incorporate a machine learning model, which will generate new articles by finding articles under the umbrella of sexual health and puberty, summarizing them and making them more engaging by adding relevant images. We further plan to incorporate the avatar with other virtual assistants like Siri, Alexa and Google Assistant.

6. Conclusion

In this paper to check people's perceptions on topics like sexual health and puberty we targeted both parents and children to see how they handled puberty, how they helped their children to handle puberty, how receptive they are to questions regarding these topics and how they dealt with misinformation about these topics. We started our user research phase by reaching out to parents and children of different demographics, documenting their experiences. Our findings showed that parents were hesitant to talk to their kids about such topics and often children were left on their own to deal with it. Using our users' suggestions and feedback we implemented our design phase in which we made a prototype application for both parents and children which aims to aid them in learning about these 'taboo' topics. In our testing phase we tested our prototype application on our target users of parents and children and got feedback that our initiative was good and would help dispel the stigma attached to these topics as well as help both parents and children to learn and communicate on these topics.

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