An exploration into the usability of a mental health application for LUMS students: Afloat

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ABSTRACT

Covid-19 had many consequences, including economic and social. One such social repercussion was reduced human interactions and hence, a gap in the way humans communicate. Furthermore, there is more awareness regarding mental health and COVID's impact has led to a stark increase in mental disorders among students such as anxiety, depression, and ADHD. This paper poses as an exploratory research on a design application, Afloat, that targets these pain points for LUMS students. It is an application that provides a platform that matches users with friends and therapists based on preferences. The methodology in this paper included a qualitative study of 20 participants to (1) understand user pain points (2) test the lo-fi prototype (3) test the hi-fi product on target users. Then the report dives into related work on the topic of mental health, alternative applications already available in the market, findings after the qualitative study, limitations of the research, and future work that can be implemented.

CCS CONCEPTS

• Human-centred computing; • Empirical studies in HCI; • Human-computer interaction (HCI); • HCI design and evaluation methods; • Field studies

KEYWORDS
Social Media, Therapists, CAPS, Therapy, Profile, Information, App Design, Social connectivity, Friends, Mental Health, Interests, Psychologists.

1 INTRODUCTION
As anxieties were on the rise during Covid-19, an ample number of people reported psychological strain, domestic violence, and symptoms of anxiety and depression. This also led to an increase in the incidents of suicide, higher than 23 cases of suicide that are correlated with COVID-19 are reported in Pakistan [1]. In Pakistan, more than 4% of the total disease burden is taken up by mental disorders, and it is estimated that 24 million people in Pakistan are in need of psychiatric assistance [2]. This majorly contributed to the conversation of mental health and highlights it as an important topic in these times.

In addition to this, the belief that therapy is only required if the patient suffers from severe mental illness is now just a misconception. Yuko Nippoda, psychotherapist, and spokesperson for the UK Council for Psychotherapy (UKCP), reports that therapy involves acquiring understanding, increasing self-awareness, and shifting perspectives, which can be a part of personal development. As the world progresses to newer horizons, mental health is increasingly prevalent, and there is an escalating awareness of the topic. This, in tandem with the increased reports of symptoms of mental illness, is inspiring the newer generation to seek therapy.

Especially in a country like Pakistan, where generational trauma is passed down, therapy is considered a taboo topic. Since this segment is still budding, there is only a limited amount of research and resources put into it. Additionally, the high demand for trained psychologists is not being catered to. The World Health Organization (WHO) estimates that there are just 0.19 therapists per 10,000 residents of Pakistan [3]. Due to this, there is also a looming doubt and confusion regarding it, which further hinders people from seeking out therapy.

Secondly, the newer generations are becoming ever more socially integrated, such as the university students at Lahore University of Management Science (LUMS). The social relationships that people build across campus contribute greatly to their mental health, as interactions with others help regulate their emotions- as well as connecting with other human beings increases the release of oxytocin in our body. A study by Julianne Holt-Lunstad

(2010), revealed how quality of social relationships affects the risks of mortality. These all constitute how vital it is to have strong, meaningful social connections on campus. Owing to the closure of the campus due to Covid-19, students attended a virtual semester, and not having physical interactions greatly stunted the growth of social relationships. A 2022 survey resulted in findings that 23% of university students reported feelings of loneliness "all" / "most of the time" [4]. There have also been numerous posts on the university's online platform, the LUMS Discussion Forum, where students reveal details of their loneliness and depression on campus, and the desire to make new friends and socialize. Nevertheless, owing to social anxiety in young students, especially after Covid-19, people were not adapted to increased social interaction which came alongside booming social media technologies.

Primarily, there are two problems we have identified around us: difficulties in seeking professional mental help and difficulties in building social connections. This paper will examine the two issues closely, by interviewing students at LUMS and therapists, analysing their experience, then designing a paper/hi-fi prototype of the application and testing it with end users.

2 RELATED WORK

This paper highlights the evolution of mankind towards two phenomena: seeking professional help for mental health and the importance of social connectivity. This review will focus on previous literature on the two phenomena.

2. 1 Relevance of Mental Health Applications

Mental health applications give people the autonomy to take care of themselves, and they can also be utilised in clinical care settings to supplement current therapy methods. According to Neary and Schueller, the majority of apps are available for download for free or a small fee, can be used quietly and "on the go," and can be downloaded by anybody with a smartphone device (2018). By doing so, they eliminate obstacles to traditional mental health treatments like cost, stigma, and access. Approximately 325,000 Mental Health applications are thought to be accessible as of 2017 [5], with mental health apps making up about one third of disease-specific apps [6]. Consumer interest in mental health apps seems to be high. Psychiatric patients and community samples had favourable opinions of the use of applications to support mental health self-management [7]. Furthermore, if problems with security, privacy, and interoperability could be resolved, clinicians say they would use and recommend applications.

Only 2 of the 52 apps (3.8%) assessed in a recent study [8] of anxiety apps had feasibility and efficacy data from an RCT. Neary and Schueller state that sixty-seven percent of the apps were developed without the advice of a health care practitioner. Even worse, many apps do not take into account evidence-based techniques. It is clear that the mental health apps need to be developed more closely with clinical expertise (Neary and Schueller, 2018).

The Mobile App Rating Scale (MARS), which offers an unbiased, multidimensional rating of health app quality and usability, is the most extensively used rating system for mental health apps (Stoyanov et al., 2015). The MARS was created by taking quality metrics from a variety of disciplines, such as Mental Health and human-computer interface. The resulting scale includes four subscales—engagement, functionality, aesthetics, and information—as well as a total mean score that represents the overall quality of the app [9]

A non-profit organisation called PsyberGuide is a guide for digital mental health solutions, ranking applications using criteria like credibility, user experience, transparency, and expert reviews. There are eight apps on the website with PsyberGuide ratings above 4.0, with PTSD Coach receiving the highest score (4.65). PTSD Coach has been assessed in numerous research studies, demonstrating its viability for usage in veteran populations, both as an add-on to conventional treatment and for self-management [10]. PTSD Coach's recent randomised controlled trial shown benefits in PTSD symptoms when compared to a waitlist condition [11]. Seven products have MARS ratings above 4.5; several of these are either brain-training applications (Fit Brains; Peak) or apps for mindfulness or meditation (Stop, Breathe, & Think; Headspace; Buddhify). Given that these products have been incredibly popular and have attracted more contributions from business and technology developers, it is not surprising that these apps offer a more sophisticated user experience. Stop, Breathe, & Think has the highest MARS rating on the PsyberGuide website [9].

From the above literature, it can be inferred that applications based on clinical help are important. Moreover, applications that have sophisticated interfaces are popular and mental health apps focused on mindfulness/meditation are top rated.

2.2 The dynamics of online therapy tools

There is little research regarding the use of technology in therapy since it is a new practice. However, the literature that does exist provides substantial results.

Rochlen, Zack, and Speyer review the most recent literature addressing the definitions, ethical considerations, and potential strengths and limitations of online therapy [12]. They define online therapy as any professional therapeutic engagement that uses the Internet to link licensed mental health practitioners and their clients.

They claim it is vital to think carefully about which therapists should be offering services online, just as not every client is a good candidate for online therapy. Online therapists should at the very least feel at ease using computers and texting clients. It is claimed that the online therapists are strong visualizers with the capacity to be flexible, patient, and creative, that offer secure messaging and credit card processing possibilities. Convenience and improved accessibility for both clients and therapists are two of the most commonly mentioned advantages of online therapy. People with limited mobility, time constraints, and access to mental health providers may benefit from online treatment as well. Additionally, if potential clients believe their initial shame is lessened when they are not in the therapist's physical presence, they may be more likely to seek therapy online [8]. However, Rochlen, Zack, and Speyer, also state that online therapy could face legal and ethical concerns across "jurisdictional boundaries, legal responsibility in the event of a crisis, and the appropriateness of client anonymity, among other concerns".

Another study by Henson, Wisniewski, Hollis, Keshavan and Torous (2019) conducted literature search regarding digital therapeutic alliance in smartphone interventions for serious mental illnesses [13]. This search was conducted in four databases (PubMed, PsycINFO, Embase and Web of Science) and five studies were found. However, in "none of the studies was the digital therapeutic alliance the primary outcome". Therefore, it is difficult to draw conclusions based on these five studies. But the studies generally tended to conclude that smartphones can promote adherence and involvement in therapy and that being able to communicate and share information with a clinician outside of the typical therapy window is a crucial component of the therapeutic alliance.

According to Henson, Wisniewski, Hollis, Keshavan, and Torous, the use of computers in therapy and clinical settings has presented new difficulties for healthcare professionals, such as juggling the management of the electronic health record with building trusting relationships with patients (2019). Although the use of technology may occasionally result in overall improvements in healthcare quality and effectiveness, there is a negative correlation between clinician computer use and the effectiveness of the therapeutic alliance [13].

One participant is questioned by the interviewer in one of the five trials, Mackie et al, about if he felt supported by the app "at times that you were away, not directly in face-to-face therapy." The participant says in response, "It was a non-issue. It [the app] didn't give me any security because it didn't work" [13]. This example of flawed technology causing a lack of security implies that the success of the digital therapeutic alliance may depend in part on the functionality and design of the apps.

2.3 Social Ties and Mental Health

The link between social ties and mental health is obvious. However, Kawachi and Berkman identified an obvious threat in validating a causal relationship between social connectivity on mental health in their research study (2001). They claim that in cross-sectional studies, the retrospective recollection of social ties among troubled people may be biased. Even with a longitudinal study design, it can be extremely challenging to tell if a loss of social connections is the cause of or a contributing factor in psychological suffering. For instance, it is conceivable that some personality qualities, such as introversion, are linked to both the prevalence of depressive symptoms and a lack of participation in social networks. There is, however, considerable consensus among researchers that "social ties have a salutary effect on mental health and psychological well-being" [14].

Wilcox, Winn, and Fyvie-Gauld examined 34 first-year students' interviews to better understand the ways in which social integration—or a lack thereof—influenced their decisions about whether or not to drop out of university (2005). The evidence is in favour of the assumption that maintaining friendships is crucial to retention and that housing arrangements are crucial to this process for students. Similar to family, these pals offer buffering help during trying times as well as direct emotional assistance. Friendships made in classes and connections with private tutors are valuable but less significant because they mainly offer practical, educational, and critical support [15].

Kawachi and Berkman explain how effects of social ties on mental health are not uniform across groups in society (2001). The effects of social ties on mental health differ also by gender. It has been widely documented that women report significantly higher rates of psychological distress than men, a finding that may be partly explained by gender differences in social network involvement [16]. Summarising these gender differences, Belle observed that women tend to (1) maintain more emotionally intimate relationships than men, (2) mobilise more social support during periods of stress than men, and (3) provide more frequent and more effective social support to others than do men [16].

Social connections' effects on mental health differ depending on a group in society. Belle illustrates how gender also affects how social ties affect mental health. It is well known that women experience psychological stress at considerably higher rates than men do, a fact that may be partially accounted for by gender variations in social network participation. In summarising these gender disparities, Belle noted that women typically (1) maintain more emotionally intimate connections than men, (2) mobilise more social resources during times of stress than men, and (3) offer others more social support effectively than men.

It is important to understand the exact mechanism through which social ties may influence mental health. Cohen and
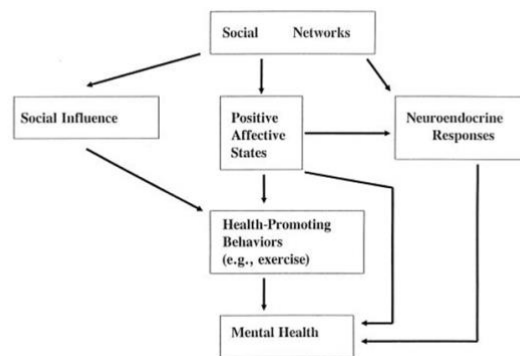
FIGURE 1. 2000. Main effect model of social ties and mental health. Adapted from Cohen S, Underwood LG, Gottlieb BH. Social Support Measurement and Intervention. A Guide for Health and Social Scientists. Oxford University Press.
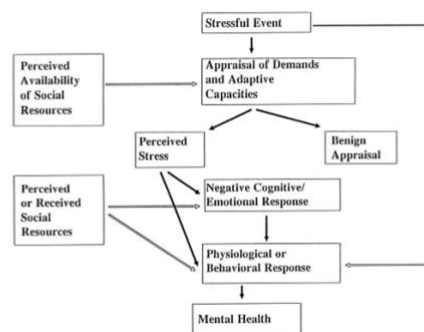

FIGURE 2. Stress-buffering model of social ties and mental health. Adapted from Cohen S, Underwood LG, Gottlieb BH. Social Support Measurement and Intervention. A Guide for Health and Social Scientists. New York: Oxford University Press; 2000

Wills proposed the main effect model and the stress-buffering model to describe the mechanisms through which social ties affect health outcomes [16]. The primary effects model contends that social links have a positive impact regardless of whether people are under stress, in contrast to the stress-buffering model, which claims that social ties are exclusively associated with well-being for those who are experiencing stress. The main effect model (Fig. 1) outlines several mechanisms by which involvement in social networks may influence psychological wellbeing.

According to the stress-buffering model (Fig. 2), social support can avoid or reduce unhealthy reactions to stressful situations. Support may therefore impact a number of stages along the continuum from stressful situations to eventual mental disease.

2.4 Existing Similar Products

There are a few similar products available in the market, for example, Bumble. It is an application that matches people to each other, based on their geolocation and gender-preference. However, the user gets the option to

swipe and choose who they want to talk to. While "Bumble" itself is an application to find romantic connections, there is also a version which helps you find platonic connections: "Bumble Bffs". However, it does not take into account one's interests or hobbies. Furthermore, since Bumble is primarily a dating app, it overshadows the friend segment.

Afloat offers a chance to connect based on similarities and interests. The application also facilitates meet ups by suggesting places to meet around campus. The users will be able to seek reviews for certain programs, activities, and places as well. These features draw inspiration from the already existing Facebook forum for LUMS students, LUMS Discussion Forum (LDF). People often post on this forum, to look for friends or find therapist recommendations. However, the forum is not limited to these discussions and hence, many of these posts get lost in spam.

The market also has an abundance of mental health applications and websites. One such website is Umang, which acts as a mental health helpline all over Pakistan and is officially registered as partners of Facebook and

Instagram and recognized internationally by WHO. It functions 24/7 and is free of cost. However, it does not have the option to choose a counsellor that may be the right fit and only has a very limited team. Moreover, the website mainly focuses on suicide prevention.

Another platform is Better Help which is a US based mental health platform that provides online mental health services through messaging, live audio, and live video calls. It connects therapists to patients. It has an option of picking therapists based on preference and using a survey to find the right one. However, the team consists of foreign therapists that may not cater to local issues and the sessions are very expensive.

Another similar application is Marham, which is a "find-a-doctor" service in Pakistan to locate the nearest doctor to a person. Marham allows searching for a doctor by specialty, hospital, city, diseases, and services. However, there is less focus on mental health professionals and lacks interaction options with like-minded individuals.

3 PROJECT AND STUDY DESIGN

After conducting the numerous interviews and receiving the survey responses, the concept of our application, Afloat, was validated. Our quantitative and qualitative research proved that mental health was a major struggle for many LUMS students, and that it also came up because of academic pressures and social struggles. Many interviewees mentioned that they constantly had trouble making new friends which impacted how they felt about themselves and their mental health. On the interviewee insights we gathered, we discovered that many people were reluctant to make friends with complete strangers and preferred forming new and stronger connections with either acquaintances, or people they had mutual friends with. Simultaneously, many interviewees also brought up the fact that they preferred in-person friendships over online ones. Taking into consideration all these needs, we wanted to build an application that is narrowed down to the LUMS Community, where in-person friendships have a greater chance of prospering since the students have a greater sense of trust within the community than towards complete strangers with no common link. Furthermore, we wanted to cater to the professional as well as personal levels of seeking help, i.e., through therapy or new personal connections. Hence, we decided to provide a solution to two important pain points for the mental health and wellness concerns within LUMS students: difficulties in finding friends and difficulties in finding therapists. Afloat was our solution to these problems.

Afloat is a mobile application that promises an engaging interface emphasising simplicity and visuals, as it belongs to the mental health and wellness genre. A mobile application is a much more convenient, personal, and engaging platform than other options. Therefore, we created an app with the simple model of creating an account, logging in, and registering. Since the application will only be intended for LUMS students, students will have to scan their cards to sign up and verify their identity via the LUMS email.

Moving forward, to simplify the functionality and categorise them into easily understandable features, the application will have three sections: Find a Friend, Find a Therapist, and Community Center. These different sections will appear on the screen as three separate bars/buttons, each leading to the default pages of these sections.

Find a friend will first ask users about their interests and what interests they want in a friend. Then the screen shows the friend recommendations that the app's algorithm comes up with based on the forms filled in by the user. The algorithm matches the user with other users who look for similar characteristics if the user is also searching for that particular set of traits. We decided that we would only show a limited number of matches so that the matches shown have a higher probability of being given a chance by the user. This prevents discrimination and people from feeling like they are not good enough to be selected by others to interact with. When you click on a particular match's profile, you can start chatting with them and request a meetup. It will be up to the other person to accept or reject the meetup.

Find a therapist option helps users find the right fit for themselves based on their needs. When clicking on "Find a therapist," the user enters the therapist mode, where they have to answer questions regarding their struggles, what areas they require help with, and if they have taken therapy before. Following this, the default screen of discovering a therapist appears where numerous profiles will appear, just like the friend feature. These therapists' profiles will show some of the most important information. The screen will show external therapists and, upon scrolling, will show CAPS therapist profiles too. The option of a filter is also available; the user can filter therapists based on budget, gender, and geological location. Clicking any profile would open up further details about the therapist. Among the mentioned information would be their qualifications, ratings, years of experience, specialisation, distance from user location, contact information, reviews, and an option to add a review.

Based on some interviewees' suggestions, we added a forum called "Community Center". This "Community Center" aims to create a community where people can discuss different topics. It aims to help bring the LUMS community together, focusing on mental health-related issues. It enables people to reach out to the entire LUMS community for help and assistance. Being part of a community can positively affect mental health and emotional well-being. The community centre will have different channels where users can comment and discuss. The default channel will be the general channel where

users can discuss anything in general and have engaging conversations to connect. They can share voice notes, files, pictures, stickers/GIFs, etc. In addition, users can make more channels based on topics they want to discuss. For this, they must get approval from the administrator. By default, these channels will be muted, and the user can choose which channels' notifications to receive by clicking on the unmute icon on the channels. There will also be a FAQ channel containing information regarding CAPS and the procedure for reaching out to CAPS for help. Users can also add upcoming events to an "Events" channel.

After developing the prototype, we conducted usability tests amongst potential users. Our comprehensive usability test aimed to evaluate social acceptability, the convenience of learning, consistency, flexibility, efficiency, faultlessness, and visual aesthetics. We used quantitative and qualitative analysis in tandem with one another to conclude that Afloat is an easy-to-understand and learn application with sufficient flexibility, efficiency, faultlessness, and incredible visual aesthetics. There was a slight inconsistency owing to different font sizes, which we attempted to fix for a better experience. Our plan to contribute to the mental wellness ecosystem by placing our application in the centre was a success as we gained a lot of positive feedback for the idea. Our application received some constructive criticism which can help us understand how to further improve our design in areas that it lacks.

3.1 Participant Recruitment and Selection: User Research

The initial phase of user research was necessary to validate our idea. The sample for this research was limited to the audience of LUMS students, aged 18-23 years since our target population was also the LUMS student body exclusively. These participants were recruited from the LUMS Discussion Forum (LDF), which is a Facebook group with almost 14000 members from within the LUMS community. Since the post mentioned we were looking for people who struggled with socialising or mental health concerns, the volunteers mostly consisted of students from different batches and different schools who struggled with these issues. Using this method, 22 students were selected and interviewed. Alongside this, to ensure expert verification of our idea, we also interviewed 2 therapists via different social networks to provide valuable feedback for our idea.

3.2 Participant Recruitment and Selection: Lo-fi and Hi-fi Testing

After the initial research and establishment of the solution to our chosen problem, the testing phase required two rounds of participant recruitment. The low-fi testing was conducted upon 7 students with the same demographic as the initial research method, i.e., same age group and students from all batches and both genders had strong representation within the sample.

For Hi-fi testing, a total of 21 participants - 9 males and 12 females - were selected to test the application design. In addition to these 21 testers, 2 experts also tested our application, i.e., peers from our Human Computer Interaction course, who could provide more in-depth insights regarding our application design. These students were selected by a mixture of randomised and snowball sampling methods. 3 of the most populous locations in LUMS were divided amongst the group members, namely Khokha, IST, and Sports complex area to recruit participants. This was done to cater to different personas of students, such as those that focus on academics (sample from IST), those that participate in sports (sample from sports complex), and those that spend time in social gatherings (sample from Khokha) with equal weightage i.e., 4 people from each location sample. These people were then randomly approached, requested for a few minutes to brief them about the application, and asked to test for the app with their consent. The remaining participants were selected through snowball sampling and the existing participants connected us to some people who would be interested in helping us out.

The implicit assumptions made with the participants, based on which they were selected, were that they were familiar with the technical interfaces of phone applications, had access to a mobile phone, and were educated enough to understand and comprehend basic English. Volunteers who struggled with their mental health were given priority during the snowball sampling phase to get more reliable input from the actual target audience for the app.

4 RESEARCH PROCESS AND METHODOLOGY

4.1 User Research

We used two primary methods for data collection and research: surveys and interviews, engaging the attention of over a hundred people this way. Surveys were anonymous to encourage honesty, and ensure questions were easy to understand. The collected data was summarised and responses in quantitative questions as well as detailed reasoning through qualitative questions helped break down the problem and understand it better.

Interviews were flexible and interactive, and arranged online via zoom as well as in-person. These interviews

	User Research phase	Design phase (Low-fi Prototyping)	Evaluation phase (Hi-fi testing)
Method	Interviews and Surveys	Speed Dating	Speed Dating
Location	Lahore, Karachi, Islamabad	Lahore	Lahore
Age Group	18-23 years old	18-23 years old	18-23 years old
Total no. of participants	22	7	23

Figure 3: Summary of participant details

were recorded, transcribed, and also periodically gauged for feedback to improve our methods.

4.2 Low-fi Testing

After considering different design alternatives, such as blogs, desktop software, websites etc, the final decision to design a mobile application was made. After the paper prototype was designed, it was used to conduct tests for additional research and insights. The prototype was tested by 7 individuals which tested out different scenarios provided to them, focusing on different features of the application. These were all students at LUMS from different batches, including males and females. Their feedback was then noted for the final phase of designing and user testing.

4.3 Hi-fi Testing

After selecting testing participants, they were tested in a quiet area with subtle student activity nearby to ensure that they felt comfortable and relaxed, unlike how they would have felt under serious, isolated testing conditions. After obtaining. They were then given the pre-test questionnaire to gather their psychographic details which helped in understanding the state of the participants' mental well-being and social life. Some examples of the questions were, how important their mental health is to them, questions regarding their social life - whether they struggle with it and whether it is linked to their mental health, whether mental health services were accessible to them easily, and their willingness to use these services.

Once the questionnaire was filled out, the participants were briefed regarding the purpose of the testing and the idea behind the application, after which the testing began. Testing was based on the speed-dating method. The participants were given a task book containing certain scenarios, based on which they had to navigate through the application. There were 6 scenarios which tested different features of the application. Out of these 6 scenarios, participants were required to randomly perform 3-4 scenarios on camera under the guidance of 2-3 group members. During the test, the time taken to complete each scenario was noted alongside any issues faced or areas of trouble, and whether the participant passed the test or failed it.

Once all the scenarios were tested, the participants were requested to fill the post-test questionnaire to gauge the application performance according to the user. This included questions regarding how easy, efficient, and

pleasant the experience is of using the application, and for any final comments regarding the application. Many participants were hesitant to make additional comments on camera but provided a more open and honest feedback off camera. The same process was repeated for each participant and the results were then gathered by entering the collected data on excel and a google form so that their responses could be visualized in the form of graphs and statistics.

5 DATA ANALYSIS

5.1 User Research

The user research helped us understand the significant issues faced by students regarding mental health and the roadblocks to getting therapy. These interviews were conducted online and in person, according to the interviewees' choice. These interviews were semi-structural and informal. Once the interviews were conducted, we transcribed them and analysed their data. After conducting interviews with students, we identified some general issues regarding mental health faced by most interviewees. These included:

- Lack of awareness regarding mental health
- Not being vocal about the mental distress faced
- privacy concerns
- People not being receptive if they try to open up to anyone

A general issue repeated multiple times was a lack of awareness regarding mental health issues. Most of the LUMS student body mentioned reaching out to CAPS due to accessibility and no monetary barriers, as it is a free counselling service provided by LUMS. However, many problems and roadblocks were also mentioned, which hinder the process of students reaching out for help or end up in people opting for external therapists, which is expensive. Some frequent issues that came forward included:

- Delays in initial appointment
- Issues with scheduling and follow-ups
- Concerns regarding the therapist's approach and effectiveness

During our interviews, we encountered multiple people who reached out to external therapists, mainly after unsatisfactory results from CAPS. While these interviewees generally seemed happier with the results

	S1	S2	S3	S4	S5	S6	Time S1 (s)	Time S2 (s)	Time S3 (s)	Time S4(s)	Time S5 (s)	Time S6 (s)
Person 1	P	P	P	P	-	-	81	70	55	21	-	-
Person 2	-	-	-	P	F	P	-	-	-	28	41	33
Person 3	P	P	P	P			105	41	63	28	-	-
Person 4	-	-	P	P	P	P	-	-	18	42	163	62
Person 5	P	P	P	P			46	42	38	25	-	-
Person 6	P	P	-	-	P	P	65	177	-	-	39	37
Person 7	P	P	-	-	P	P	10	24	-	-	21	23
Person 8	P	P	P	P	-	-	73	31	14	74	-	-
Person 9	-	-	P	F	P	P	-	-	31	50	265	33
Person 10	P	P	P	P	-	-	44	39	63	27	-	-
Person 11	-	-	-	P	P	P	-	-	-	75	39	52
Person 12	P	P	P	P	-	-	89	52	63	35	-	-
Person 13	P	P	P	P	-	-	47	46	40	37	-	-
Person 14	P	P	P	P	P	P	56	37	30	29	47	53
Person 15	P	P	P	P	-	-	159	53	55	39	-	-
Person 16	P	-	-	-	P	P	94	-	-	-	47	19
Person 17	P	P	P	P	-	-	148	35	63	19	-	-
Person 18	P	P	-	-	P	P	78	58	-	-	25	33
Person 19	P	P	P	P	-	-	30	54	45	42	-	-
Person 20	P	P	-	P	-	-	66	72	-	59	-	-
Person 21	-	-	P	P	P	P	-	-	26	37	64	37

Table 1: Summary of time taken by participants to finish various scenarios.

based on nonverbal cues, there were some major problems faced by people who either went for external therapy or tried to reach out to external therapists. Some significant issues included:

- Concerns regarding pricing
- Lack of reviews or information
- Transportation issues

In the case of friends, while most people expressed relief in opening up to a friend, some did mention that it is difficult to find someone with a deep connection to share any mental health distress. We also found in our research that many people face mental anguish due to friendships or friend groups that negatively affect them. Some common issues faced by students involved:

- Not finding people with similar interests
- Not knowing people with similar experiences
- Don't know how to approach people

These were the issues our interviewees faced which had to be resolved with the help of an app.

5.2 Low fi prototyping

The paper prototypes testing helped us understand the usability of the design. Users tested out different scenarios provided to them, focusing on different features of the application. The users appreciated using "intuitive" icons and design metaphors to convey a message. User feedback also made us implement the back button on all screens and the logout and edit buttons on the main home screen. They also pointed out the clutter in the community center screen. The text "filter" was added to the therapist screen after feedback, as users were confused when there was only a filter icon.

5.3 Hi-fi testing

In our HI-FI testing phase, we wanted to test if the interface is easy to learn, easy to remember, efficient to use, subjectively pleasing, and isn't error prone. Twenty-one participants were selected to test the app. They were asked to complete a pre and post-test questionnaire followed by an optional feedback/suggestions form. We also noted the times taken by participants to finish scenarios as summarised in Table 1. We drew all our conclusions from these questionnaires and feedback.

In the case of visual aesthetics, many participants especially underscored the application's appealing physical appearance, and others suggested improvements in the fonts and colours to enhance this experience. Coming to app interactions, participants prioritised easier ways to carry out tasks that required fewer clicks. From our testing, we noted that users had difficulty saving the therapist profile. They preferred saving the profile from the home screen rather than first opening the therapist profile. The same was the case with applying filters, where users preferred manually searching for a relevant therapist rather than using a filter.

To conclude the analysis of HI-FI prototyping, Afloat needed an improved navigation system, more modern design, visible fonts, and smaller buttons.

We conducted the first 13 tests with our initial screens and found that the participants did not follow the same tasks as mentioned in the task book. We also noted the average time taken to complete each scenario with the scenarios taking 62.2, 58, 42.7, 40.4, 94.6, and 40 seconds respectively.

6 FINDINGS

6.1 User Research

Data collected from the user research highlighted 3 major aspects important for Student mental health: Support from professionals, support from close friends and support from the community. This encouraged the App to be divided into three major functionalities, *Find a friend, Find a Therapist and the community centre*.

Some repeated concerns highlighted were:

- Lack of awareness regarding mental health,
- Difficulty in the process of finding the right therapist.
- Lack of information of therapists including pricing and skillset
- Therapists not equipped to deal with student's particular case
- Not being able to find friends who can understand their struggles.

Interviewing external therapists highlighted the importance of a therapist's skillset to deal with particular cases and the importance of therapist and client personality match. This claim was also backed up by students who mentioned issues with their therapists which mostly revolved around the therapist's lack of ability to help them or issues with difference in pace or expectation. The data also revealed that most students who reached out to external therapists had a better experience than CAPs therapists. Whereas most LUMS students reached out to CAPs first due to the free of cost counselling. Hence, we decide to include information on both external as well as CAPs therapists with their reviews and specialised skills to improve users experience when reached out for therapy.

Many students also highlighted that their friend circle lacked people who could relate to their struggles and hence could not understand what they were going through. Students also confirmed that having someone with similar experiences can help through the process and hence we introduce the feature of finding a friend where people can find friends to connect with not just based on interests and hobbies but also with the expectation of finding more understanding people with whom they can open up regarding their struggles.

Conversations with Therapists also highlighted the important role of the community in one's mental health. Moreover, students repeatedly highlighted the issues of lack of information and support from loved ones when reaching out to someone for help. For this purpose, we create a community centre where students can ask others for advice and also plan activities together that can help students bond together and feel a part of a community.

6.2 Low fi prototyping

Based on our findings from the user research, we created low fi screens to test our design and functionalities.

Finding from the Low fi prototyping highlighted functional and design issues that the participants faced which were improved when creating the final design. Some major concerns highlighted were clutter in the Community centre home screen, inconsistent back buttons on screens, issues with filter button on therapist home screen, and no hamburger menu on app home screen.

These suggestions were then incorporated into the design to improve user experience. Major suggestions included:

- Adding a hamburger menu with Edit Profile, Report and Log Out option in a hamburger.
- Consistent use of the back button for all screens.
- Removing repetition from screens and making Events Channel in community centre related to only events.
- Replacing filter icon with text "filter" for the filter button on therapist home screen.

6.3 Hi fi Testing

The post-test as well as in test measurements were evaluated. The post and in test data provided us with qualitative as well as quantitative data.

The analysis highlighted many findings regarding the app's performance.

90 percent of the people found the app efficient while trying to find the information they need or complete their work.

70 percent of the people were satisfied with the functionalities offered by the app while about 28 percent were indifferent.

About 90 percent of the people agreed that the app was easy to use for the first time and easy to learn. Some people felt the need for a tutorial for the first time and some felt that particular functionalities, such as viewing the list of saved therapists, was a difficult task.

90 percent of the people felt the app was accessible. Many people appreciated the soothing and therapeutic colour scheme whereas some felt that the colour scheme created some visibility issues.

80 percent of the people agreed that the app provided good navigation whereas some felt that the navigation could be improved specifically for the case of viewing the saved therapist's list.

80 percent of the people also felt that the app interface was pleasant whereas some people, who we ruled out as outliers due to their pre-test questionnaires as they did not fall into the target audience because of psychographics

Further analysis of user's times taken to complete scenarios (Table 1) and the in-test facial cues and observations revealed more trends and pain points which majorly included the use of filter button which was also highlighted during low fi prototyping. Many versions of the screen were tested along with changes in the scenario being tested to find the cause of this pain point. After testing with multiple participants. The issue was highlighted as lack of visibility of the filter button as standalone text or icon. Hence, a version consisting of

both "filter" text as well as icon was created with increased font size of "filter" text which resolved the issue as participants were observed to find the filter button more easily.

Another highlighted issue was the horizontal list of channels which created confusion as participants were unable to decipher the meaning. For this purpose, we were recommended to add a label to the list to improve understanding.

Many participants also faced difficulties in trying to find the list of saved therapists, however, changing the wording of the scenario showed an improvement in participants' ability to find the list. Moreover, first time users found the feature difficult to find but participants who performed other tasks first and had a little familiarity with the app interface were able to find the list easily. Hence, the functionality might be problematic for first time users but has a very good learnability.

Along with this the findings revealed that some participants disliked the interface of the app due to being less modern. However, such feedback was only received from participants who did not fall into the target audience based on psychographics. While most of the participants found the app to be efficient, learnable, effective, easy to use, accessible, and liked the interface/ design, the impact of a more modern design for our target users could be further studied.

7   DISCUSSION AND RECOMMENDATIONS7

7.1 Key findings

The user testing was conducted to test the major features of the application Afloat to better understand user experience and whether the interface design ranked high in usability. Our findings provided valuable insights regarding the functionality of the application, its benefits, its limitations, and its implications. After conducting the initial surveys to validate the concept of the application, we received an overwhelming response from the participants claiming that such an application was increasingly necessary for the LUMS community. Our findings contextualise these claims and provide interesting, varying responses, some of which contradict the initial data gathered. Speed-dating helped explore the participants' preferences regarding their interaction with the interface, while the qualitative comments at the end of the questionnaire helped gauge what were their most and least favourite aspects of the application.

Based on these key insights, we concluded that most individuals liked the application interface and especially pointed out the colour scheme and visual aesthetics of the application. Some suggested some improvements in the font and colours, though. Some participants also highlighted issues faced while navigating through the application which shed light on the key implications for the application's designing and presented opportunities to propose recommendations for future research and development purposes.

7.2 Visual Aesthetics

Mental Health and social struggles related applications must be extremely sensitive to the user experience since their struggles may be exacerbated by a stressful application experience. Previous work highlights the importance of colour schemes and calming tones on the stress levels, well-being, morale, and productivity of users (Ghamari and Amor). One extremely important insight gained from the user testing supporting this theory was the significance and value placed by the testing participants on the physical aesthetics of the application. These visual elements impacted user experience by affecting the visibility, efficiency, and effectiveness of the features. Many participants especially underscored the application's appealing physical appearance and others suggested improvements in the fonts and colours to enhance this experience. E.g., Person 2 mentioned trying to "make fonts and tabs smaller" while 9 of the participants displayed satisfaction with the graphics of the interface.

7.3 Simple Interactions

A notable insight we got was the significance of simplified interaction with the interface. Participants prioritised easier ways to carry out tasks which required less clicks. In the context of a mental health related application which caters to personal and social struggles of the individuals, this is an important criterion so that the process of seeking help is made as convenient and efficient for the user as possible.

Under this light, our findings proved that any interface complexities were faced with user resistance during testing. Examples include the disapproval of "saving the therapist" option being available only after opening the therapist profile rather than the main screen beside its preview. Similarly, it was observed that when asked to filter out therapists, participants preferred to scroll and search for the profile on the main screen rather than go through the hassle of applying a filter. Even when asked to give a therapist a rating, they attempted to give ratings on the first set of visible stars (representing existing ratings) rather than scrolling to the end to give personal ratings.

7.4 Mental Health in Pakistan and existing work

Mental Health in Pakistan is a gradually arising concept, but not much work has been done in the past since it is still a taboo amongst Pakistanis (Javed et al.). Despite the fact that more liberal and higher education institutions like LUMS encourage mental health awareness, there is still a

major gap within the market. Mental health services are still inaccessible to a majority of the population, even in institutes like LUMS. This belief was solidified during the initial phase when surveys were conducted, and most of the people admitted that it was difficult to find mental health professionals who were qualified enough and had reliable reviews.

Even with advancement in this area, most platforms in Pakistan cater to the provision of mental health services such as platforms like BetterHelp which provide access to therapists. However, there is no platform that verifies and provides real time reviews for existing services. This is one gap that Afloat addresses and during the testing, this was appreciated by the participants as well, thus substantiating our process.

7.5 Limitations

Long term vs short term impact of application

One major implication of Afloat is that an application which aims to resolve any mental struggles of an individual needs to be judged over a longer period for holistic feedback of its interface. An immediate impact of using the application cannot be pinpointed - a repeated usage of this application will be a more accurate indicator of the improvements that need to be made to enhance its performance.

In this regard, our testing falls short of feedback complete in itself, taken over a period of time of using this application due to logistical constraints. This opens up a myriad of opportunities for future research to test such an application contextualised in an elongated time period rather than an incidental point in time.

7.6 Scale of application

The application Afloat is designed exclusively for the LUMS community to serve their mental well-being and combat social isolation on campus. Within this community, the application allows individuals to seek reliable professional help or seek out new people within the community for a fresh environment. Our findings suggested that the participants were quite satisfied with the features available and did not suggest any additional or missing features within the application. However, the exclusive nature of this application prevents other potential users from accessing these services. Additionally, it also prevents LUMS students from broadening their social network outside of LUMS and restricts their interactions with new people only amongst themselves.

For future considerations, this limitation can be accounted for and worked upon to make the application services more accessible depending on the preferences of the current user base. Extensive research can lead to

interesting ways to make this application available to a wider audience.

7.7 Sampling bias

Another implication of this application is how usable it is under stressful circumstances, such as when a person is truly feeling low and wants to reach out for help from a professional or meet a new friend to combat loneliness. Under these situations, user response to the application's interface may be a lot more different from the testing environment.

Furthermore, despite attempts to make the sample diverse by incorporating different batches into it as well as sampling from different locations at LUMS, we still fail to take into account people who may not prefer to be present in such social settings and thus were not accessible to us. This causes misrepresentation in the sample, skewing it towards individuals who are more comfortable socially. These factors may bias our sample and deter attaining a definite and clearcut testing feedback.

8 CONCLUSION

This paper poses two important observations: there is a need for social interactions amongst students and a need for therapists to be matched based on specialisation. Using these two observations, an application Afloat was designed with the help of conducting qualitative and quantitative research with participants from LUMS that fit the target user profile. The qualitative and quantitative data from participants added substantially to the existing literature on mental health applications and their need in this present day and age. Most importantly, it provided a framework for our application, Afloat, that assisted the design process. While the entire process did face some limitations such as the lack of time in testing user preferences and app usability over a prolonged time, there was considerable validation for the application. Users seemed to love the interface, concept, efficiency, and aesthetics of Afloat.

We conclude with positive feedback for Afloat and an incentive to develop the application further. The future holds ample opportunities for scalability, such as making this application available in different universities and one day, perhaps it could be an application that caters to all Pakistani individuals.

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