

Using cultural probes to understand students' mental wellbeing.

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We report on the design and execution of a probe as an anonymous self-reporting tool to investigate the perception of mental wellbeing and support services for university students. The pictorial describes a six-day probe study with students. The study focuses on students' perceptions, struggles and coping strategies to maintain their mental wellbeing. Our contribution is multifold. We detail the design and deployment of the probe for HCI practitioners and designers to adapt and adopt it, while we reflect on the data, deriving sensitizing concepts and personas to support the design practice for students' mental wellbeing.

Keywords: *cultural probes; mental wellbeing; privacy-sensitive; design for wellbeing*

1 Introduction

In the post-pandemic context, significant negative impacts on wellbeing continue with increased stress, anxiety, and uncertainty levels [1]. Wellbeing can be hard to maintain during stressful times, and being a student is no exception. Students' mental wellbeing is a key concern, as poor mental wellbeing greatly impacts all aspects of life. It can have an adverse effect at the individual, interpersonal, and institutional levels [2]. Students may be less likely to seek mental health support when they need it, due to self-stigmatizing behaviors [3]. Prior research focused on leveraging user-generated data, mostly through self-tracking apps, to gain insights into the wellbeing of students [4,5,6]. Previous work includes interdisciplinary research using sensors and interaction data to assess stress, depression, mood, suicide risk, and more. Still, this data is passive, meaning it is not actively input by the user and is generated incidentally during daily life [7]. Post Covid, the focus on mental health research among university students has gained importance with several quantitative and qualitative studies worldwide [8,9,10]. Some self-reported surveys were anonymous and offered quantitative data, while interviews offered qualitative data but were not anonymous. Considering the stigmatizing aspect

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of mental health among students, we fill this gap, aiming to explore an anonymous self-reported qualitative method using cultural probes. Data from the cultural probe was aimed at gathering a foundational understanding of mental health perceptions and behavior among university students. This pictorial presents insights from the process of designing and deploying the cultural probes with a lens of anonymity, and reflections on the collected data are ultimately distilled into personas [11] and sensitizing concepts [12] to inform the design of supportive technological interventions.



Figure 1. Student's mental health experiences

2 Cultural probe

Cultural probes are packages that consist of open-ended and provocative tasks that encourage participants to engage early on with the design process [13]. Cultural probes were first introduced by Gaver as interventions to elicit inspirational material from participants [13]. Since its introduction, probes have been adapted by many designers and researchers in varied disciplines. Crabtree, Hemmings, and Rodden Chervest explored how probes can be useful in informing design in sensitive settings where it is difficult to access participants and their environments.

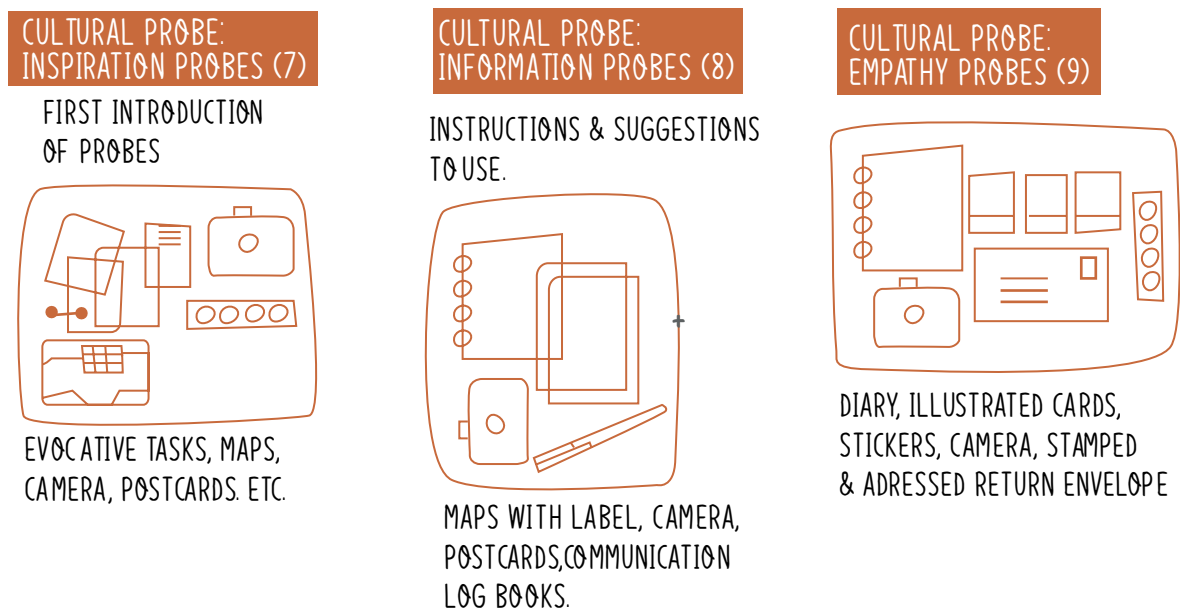
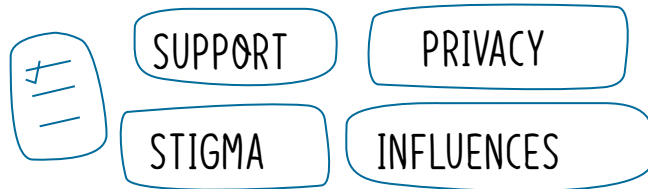


Figure 2. Cultural probes - Information probe, Information probe, Empathy probe

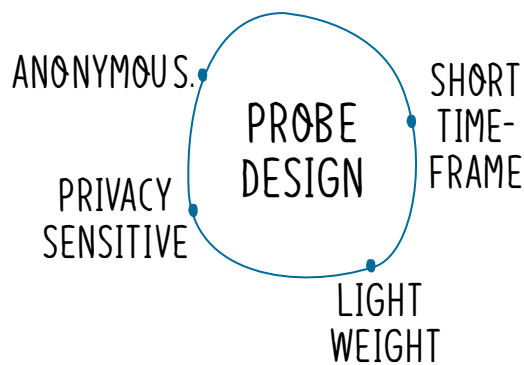
1) ASPECTS OF INQUIRY

LISTING IMPORTANT ASPECTS IN CONTEXT OF MENTAL WELLBEING TO FRAME PROBE ACTIVITIES



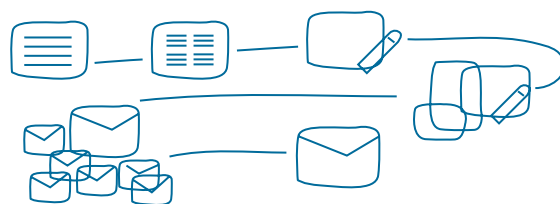
2) PROBE QUALITY

UNDERSTANDING ENGAGEMENT QUALITIES THAT THE PROBE SHOULD OFFER



3) ASSEMBLING PROBES

MATERIALISING THE IDEA THROUGH PEN, PAPER DIARY FORMAT AND ASSEMBLING THE PROBES



MATERIALIZING IDEAS AND PREPARING THE KITS.

Figure 3. Probe design steps

By increasing the comprehensive material to make the probes more direct, they applied it as information probes rather than inspiration probes [14]. Empathy probes extended this body of work as they were applied in industry settings [15]. Empathy probes focused on a follow-up interview with the participants to discuss interpretations of the data to develop themes and better understand the users [16]. Probes have also been previously used to understand wellbeing and exercise, focusing on topics ranging from nursing to weight management, and free skiing to telework [16,17,18]. Boehner et al. [19] highlight the multiple ways probes have been used in Human-Computer Interaction (HCI) research. They categorize the use of probes into four themes: probes as a packet, probes as a data collection tool, probes as a means of sensitization, and probes as a participation method. HCI designers use probes mainly for inspiration or elicitation of requirements [20].

Cultural probes can be appropriate for topics like mental wellbeing as probes allow participants to share their data in the form of stories which may be more privacy-preserving than traditional surveys, probes may allow them to reflect more deeply on their perceptions, attitudes and beliefs, probes may help to reveal some of the tradeoffs around the technology used for wellness tracking by gathering active input of insights from the participants.

3 Purpose of the Study

Considering privacy as a concern [21, 22], this study uses cultural probes as anonymous data collection tools to gather insights into the mental wellbeing of university students by asking:

Q1) How to design cultural probes as an anonymous self-reporting tool to understand university students' attitudes toward mental well-being?

Q2) How can these reflections inform the design for the mental wellbeing of university students?

4 Probe design

Empathy probes focused on a follow-up interview with the participants to discuss interpretations of the data. Aspects that shaped the narrative and activities of the probe were based on informal discussions with students and university counseling services and focused on the relationship between students' mental wellbeing and the university environment, students' help-seeking behavior for mental distress, the factors that influence and shape their priorities, the students' views and the stigma surrounding mental health and therapy, and reflections on their experiences with mental wellbeing.

Taking into account the simplicity of paper and pen as materials, we designed a probe kit made of tangible cards for participants to write, scribble, and draw to express themselves freely. This process involved various iterations, from being a booklet to a foldable zine to cards. We selected the card format as the final version based on low production cost, affordance of presenting one task per day without overwhelming the participants with all the probe tasks at once, and ease of use.

4.1 Pilot test

Discomfort with the task on day 7 - Participants were presented with stressful scenarios like failing an exam or missing a deadline and asked to comment on how they felt. During the pilot, test participants mentioned feeling extremely uncomfortable with this task. So we eliminated day 7 cards from the study, making it a 6 days study.

Language - We developed the probe in English, but during the pilot test, we found that participants felt more comfortable responding in their native language. Therefore we added an instruction card to convey that participants could use the language of their choice to share their insights.

fulfill the tasks inside, in either english or portuguese.

PILOT TEST
4 PARTICIPANTS, 4 INTERVIEWS
PILOT RESULTS

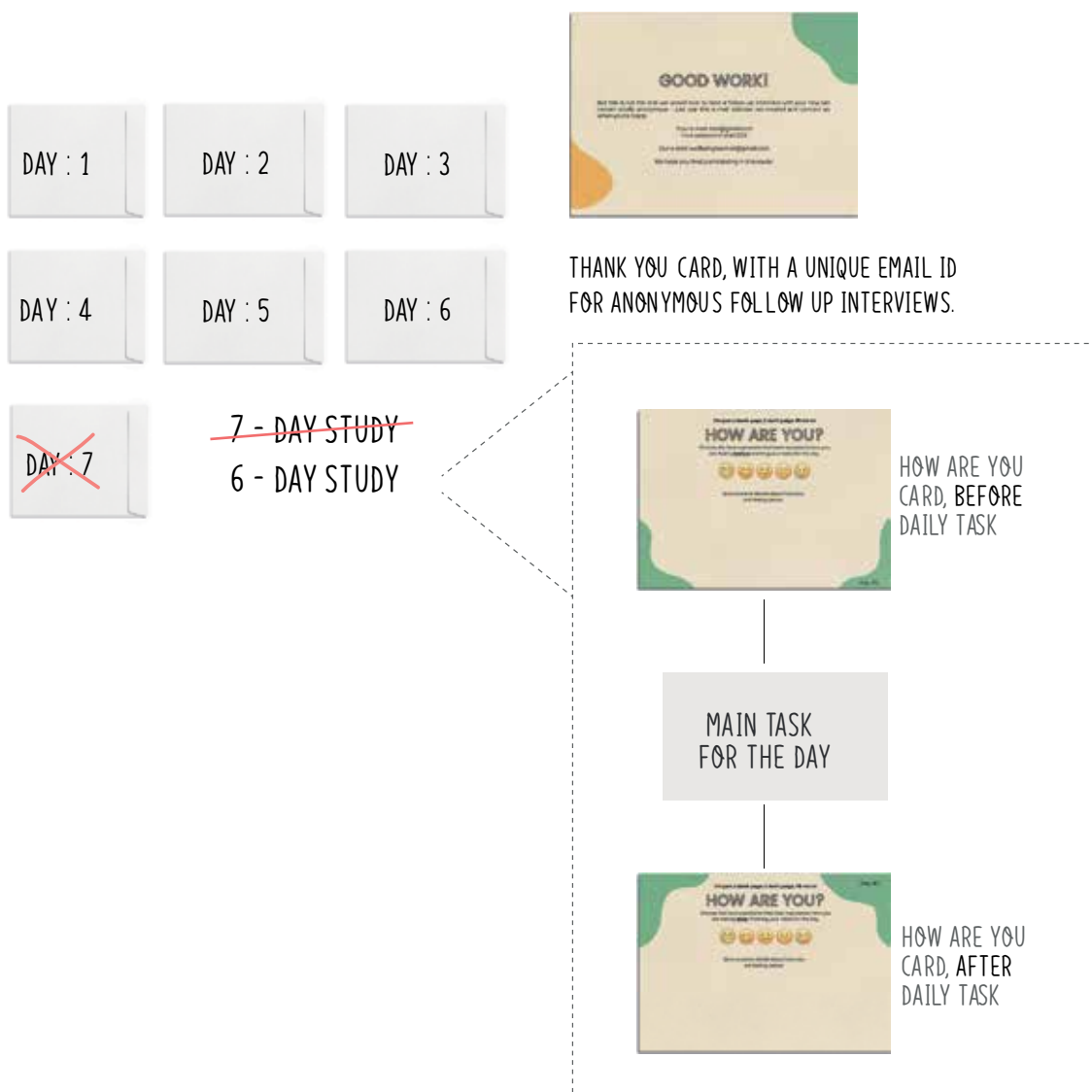


Figure 4. Probe design - pilot test

5 Method and Distribution

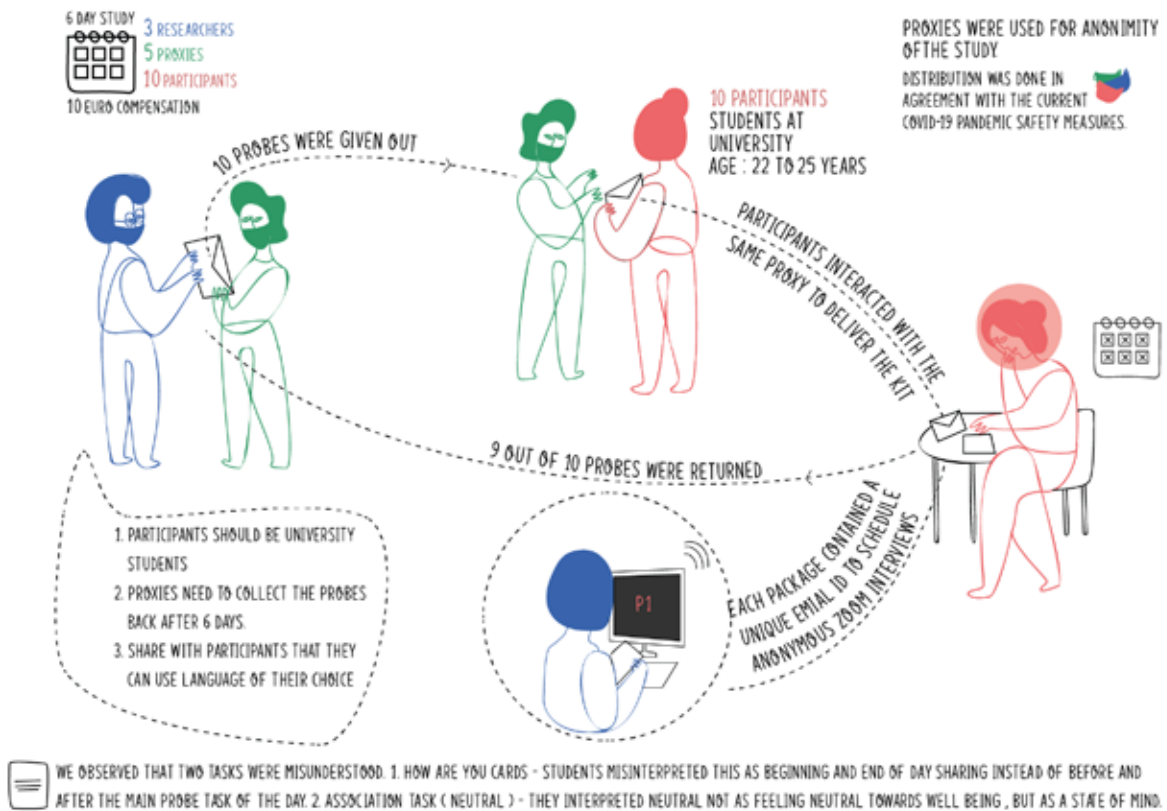
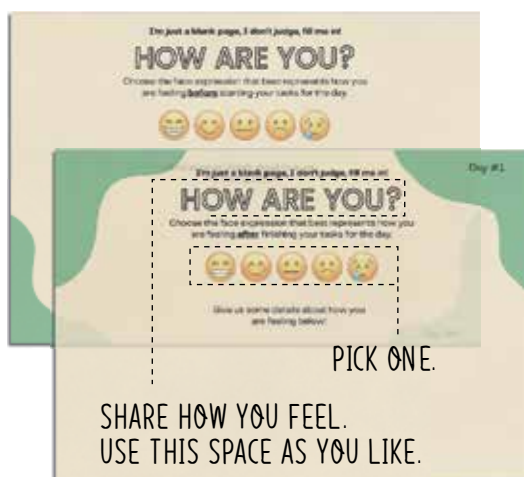


Figure 5. Method of probe distribution and collection

6 Inside the envelope

HOW ARE YOU:



TO BE FILLED BEFORE AND AFTER EACH DAY MAIN TASK.

DAY1 - ASSOCIATION ACTIVITY:

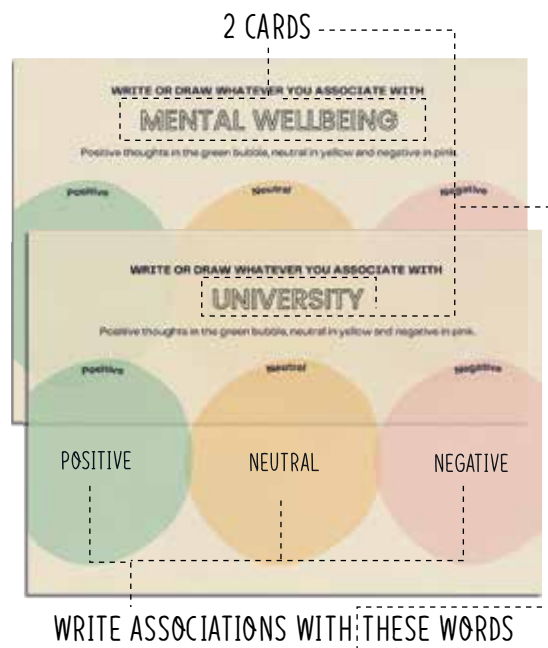


Figure 6. Inside the envelope - how are you cards and Day 1 task cards

6.1 How are you:

By comparing the before and after ratings, these cards help researchers gain insights into if and how the primary task affected participants' emotions and state of mind for the day.

6.2 Day 1, Association Activity:

This task aims to understand how the participants relate to 'Wellbeing' and 'University' and how this association reflects in their feelings and emotional wellbeing.

DAY2 - THE FOUR W'S:

WHEN IN STRUGGLE WITH MENTAL WELLBEING

THERE ARE NO WRONG ANSWERS!

WHAT would you do when you are struggling with your mental wellbeing? WHO would you turn to? WHERE would you go? WHY?

WHAT?
DO YOU DO?

WHO?
DO YOU REACH OUT TO?

WHERE?
DO YOU GO?

WHY?

DAY3 - INFLUENCE TASK:

GOOD JOB ON GETTING TO THE THIRD DAY!

What influences your mental wellbeing on a daily basis?

Fill in the spheres with what comes to mind, according to the level of influence it has on you.

LOW INFLUENCE

LOW

MEDIUM INFLUENCE

MEDIUM

HIGH INFLUENCE

HIGH

ME

WHAT INFLUENCES YOUR MENTAL WELLBEING ON A DAILY BASIS?

Figure 7. Day 2 and Day 3 task cards

6.3 Day2, The Four W's:

The purpose of this task is to get a glimpse into participants' behaviors and how they seek comfort during struggles with mental wellbeing, what are the resources they find most accessible and safe to reach out to and the reasons behind it.

6.4 Day 3, Influence Task:

This task aims to understand the influences that impacted participants' mental wellbeing the most.

6.5 Day 4, The Pyramid Task:

The purpose of this task is to understand where participants place mental wellbeing on their priority list. The second part of the task is to learn 'who' they find easiest to ask for support in the context of mental wellbeing.

DAY 4 - THE PYRAMID TASK:

PRIORITIES IN LIFE
 FAMILY SLEEP, PARTNER, ALONE TIME, FRIENDS, MONEY, UNIVERSITY, HOBBIES, MENTAL WELLBEING, PHYSICAL HEALTH

REACH OUT FOR SUPPORT
 PARTNER, ACADEMIC SERVICES, FAMILY FRIENDS, STRANGER, THERAPIST/PROFESSIONAL

MOST IMPORTANT

LEAST IMPORTANT

EASY

DIFFICULT

Figure 8. Day 4 task cards

DAY 5 - QUESTIONNAIRE:

- 1) COMFORT TALKING ABOUT MENTAL WELLBEING.
- 2) STRUGGLE WITH MENTAL WELLBEING.
- 3) RELATE TO PEOPLE HAVING PANIC/ANXIETY.
- 4) COMFORT SHARING WITH FRIENDS ABOUT THERAPY.
- 5) ACTIVELY WORKING ON MENTAL WELLBEING
- 6) FEEL LIKE MENTAL WELLBEING IS A TABOO.
- 7) SOUGHT PROFESSIONAL HELP.
- 8) APP USE FOR MANAGING STRESS, ANXIETY OR DEPRESSION.
- 9) WAYS TO EXPRESS FEELINGS,

Figure 9. Day 5 task cards and list of questions.

6.6 Day 5, Questionnaire:

Composed of 7 questions based on a 5-point Likert scale and two multiple choice questions, this task aims at gathering a general understanding of mental well-being, comfort, and stigma related to the topic and previous experiences of reaching out for support.

6.7 Day 6, Note to Self:

The goal of this task is to create a space where participants can reflect on their past and share their insights.

DAY 6 - NOTE TO SELF:



Figure 10. Day 6 task card

7 Findings

We analyzed the data from the probe by looking for patterns and connections through each participant's daily tasks and across all participants. One participant withdrew from the study. The researchers did not have direct contact with the participants, and the proxy did not provide information on the reason for the withdrawal.

Analysis was done by three researchers, two of whom were fluent in the language used by the participants when filling out the probe. After translating the probe data to English, the design probes were reviewed and discussed by the three researchers to familiarize themselves with the content and group insights. This activity was followed by digitizing the probe data for a detailed analysis, discussions among all authors, and grouping insights based on the main task for each day. The findings are organized and presented initially by categorizing the insights according to the participants' tasks. Subsequently, the researchers analyzed the content of the "how are you" cards, and quotes are presented and synthesized in the "Participant's Probe Experience" section.

ASSOCIATION TASK (DAY 1)

PARTICIPANTS' ASSOCIATION WITH 'MENTAL WELLBEING' AND 'UNIVERSITY'.

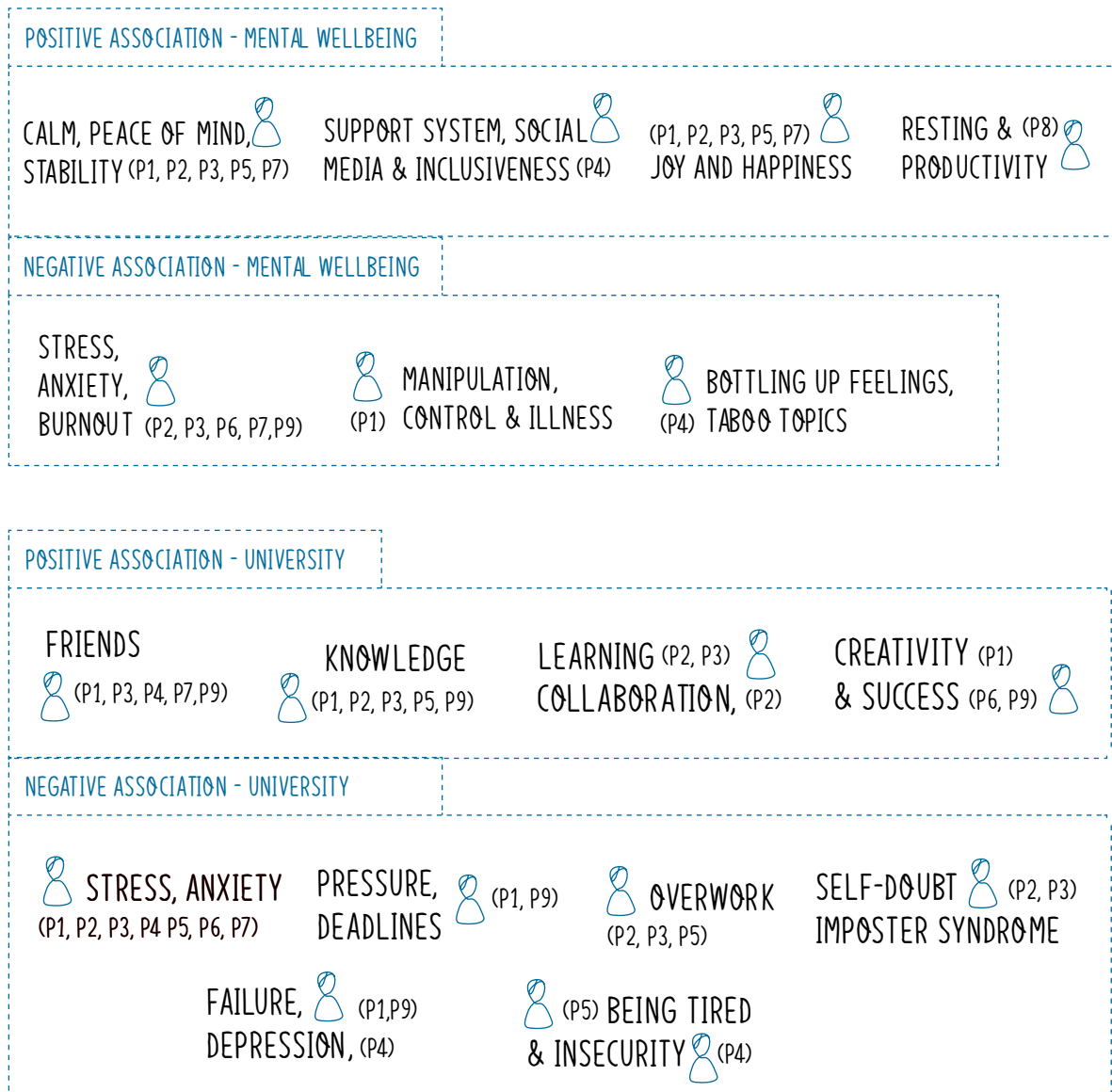


Figure 11. Findings from Day 1 task

THE FOUR W'S (DAY 2)

TO COPE WITH MENTAL WELLBEING STRUGGLE, WHAT, WHO, WHERE AND WHY?



Figure 12. Findings from Day 2 task

INFLUENCE TASK (DAY 3)

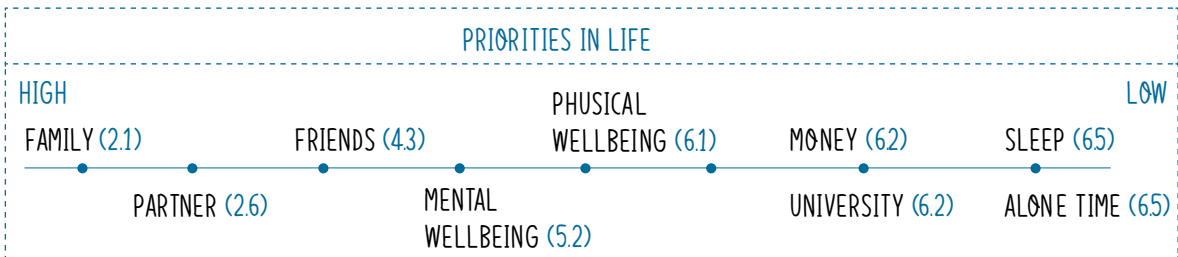
PARTICIPANTS' HIGHEST INFLUENCE FACTOR ON THEIR WELLBEING.



Figure 13. Findings from Day 3 task

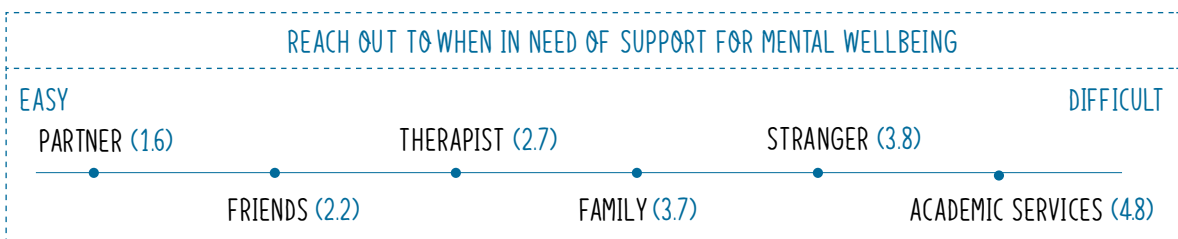
THE PYRAMID TASK (DAY 4)

PARTICIPANTS' RANK THEIR PRIORITIES IN LIFE.



(AVG. OF ALL PARTICIPANTS' RESPONSES)

PARTICIPANTS' RANK THEIR EASE OF REACHING OUT FOR SUPPORT.



(AVG. OF ALL PARTICIPANTS' RESPONSES)

QUESTIONNAIRE (DAY 5)



NOTE TO SELF TASK (DAY 6)

PARTICIPANTS' ADVICE TO THEIR PAST SELF

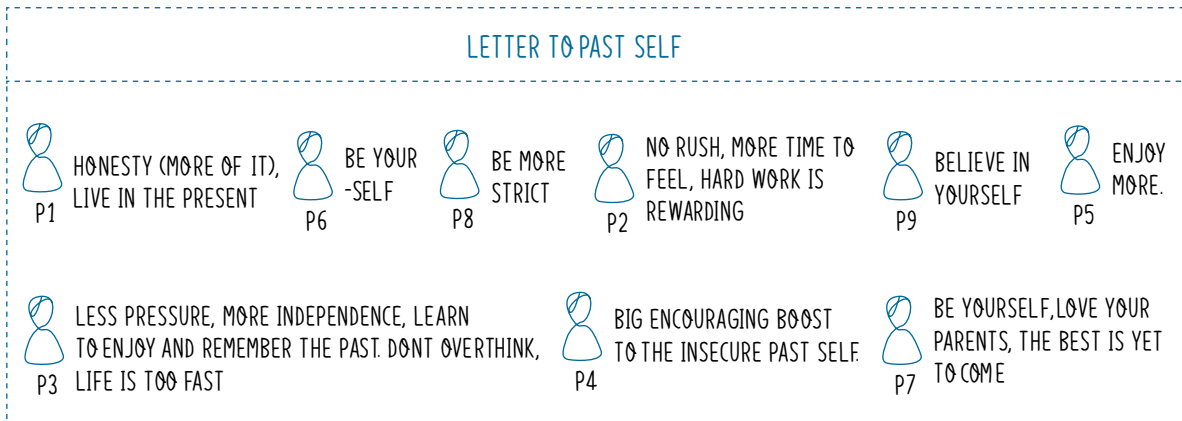


Figure 14. Findings from Day 4, 5 and 6

PARTICIPANTS' PROBE EXPERIENCE



Figure 15. Participant probe experience

8 Discussion

We used cultural probes as an anonymous self-reporting tool to understand university students' attitudes toward mental wellbeing. Based on the cultural probe data, we generated three personas to help us understand students' behavior patterns and strategies in the context of mental wellbeing. We extracted characteristics from probe data and aggregated them into each persona based on the commonalities. After aggregating insights across personas and tasks, we highlight four sensitizing concepts [12] when designing for students' mental wellbeing.

i) Supporting a variety of coping strategies - With regards to coping strategies, the students reported using methods such as distraction, socializing with friends, physical exercise, and taking time for reflection. Some students also reported seeking therapy as a means of coping, self-reflection, and diary keeping. Students mentioned factors like their self-image, participation in activities they enjoy, such as sports and arts, and their ability to find time for relaxation to influence their mental wellbeing.

ii) Quality of relationships - Students mentioned that their social life, including relationships with their family, partner, and friends, was considered a high priority as they substantially impact their mental wellbeing.

iii) Negative connection between the university and mental wellbeing - We found that for a majority of participants, the negative links between their mental wellbeing and university experience were primarily attributed to anxiety, stress, and burnout: students mentioned deadlines, grades, stress related to school, uncertainty, and imposter syndrome as influencing their mental wellbeing. iv) Facilitating counseling - Students mentioned counseling as a strategy to cope with mental wellbeing, together with difficulties reaching out, stigma, and long time frames before the institution can intervene with counseling support. We believe these four areas can be of rich inspiration for exploring technologies in supporting of students' mental wellbeing.

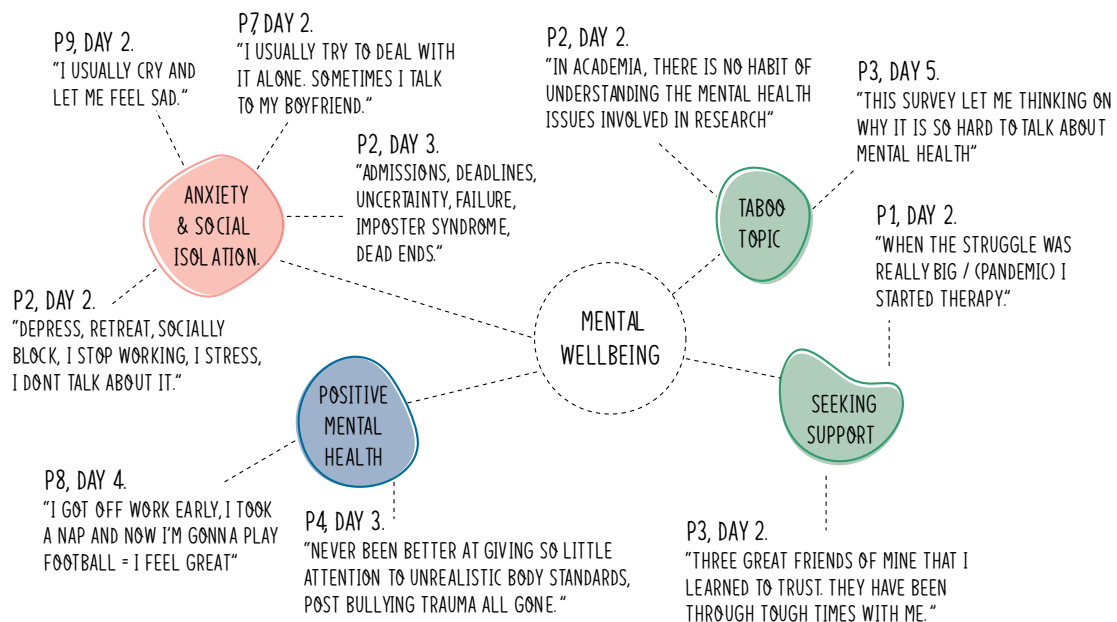


Figure 16. Aspects of mental wellbeing that emerged from the data (Sensitizing concepts)

9 Synthesis - Personas

We found distinct behaviors in student's experiences with mental wellbeing leading to three personas, 1. Oliver, who is anxious and isolated,



OLIVER AGE : 31

"I FIND IT HARD TO VERBALIZE OR UNDERSTAND MY EMOTIONS"

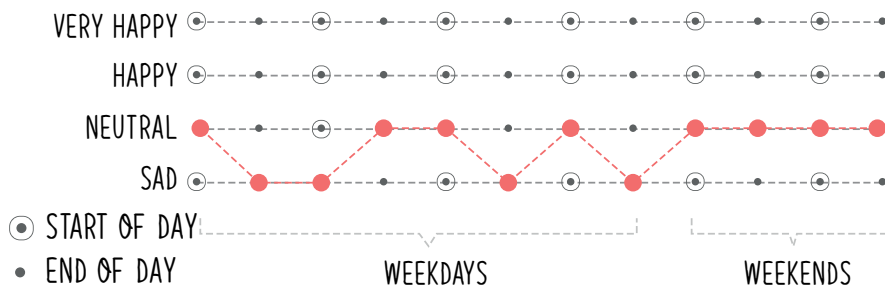
ANXIETY AND SOCIAL ISOLATION

FEELS ANXIOUS ALL THE TIME. SUFFERS FROM IMPOSTER SYNDROME. IS SEEKING PROFESSIONAL HELP

PRIORITIZES:
HOBBIES, PARTNER, ALONE-TIME

USES APPS LIKE:
HEADSPACE

MOOD CHART



WHEN THERE IS A MENTAL HEALTH CONCERN

SOCIALLY BLOCKS; DOES NOT TALK WITH ANYONE ABOUT IT, DOES NOT REACH OUT TO ANYONE OTHER THAN THE THERAPIST.

FINDS IT EASY TO REACH OUT TO



Figure 17. Synthesis - Persona 1 (Oliver)

2. Jane, who seeks help but perceives mental wellbeing as a taboo topic.



JANE AGE : 28

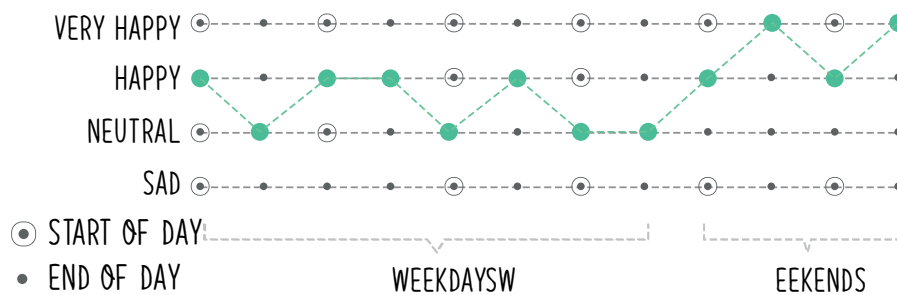
“TALKING WITH OTHER PEOPLE
ALLOWS ME TO UNDERSTAND
BETTER MY PROBLEMS”

CLOSE TO FAMILY AND FRIENDS BUT IS NOT COMFORTABLE
SHARING WITH FRIENDS THAT SHE IS IN THERAPY

PRIORITIZES:
FAMILY, FRIENDS, HOBBIES

DOES NOT
USE APPS

MOOD CHART



WHEN THERE IS A MENTAL HEALTH CONCERN

BE WITH FRIENDS, SEEK THERAPY, GO
OUT IF POSSIBLE OR ZOOM CALL WITH
FRIENDS TO TALK

FINDS IT EASY TO REACH OUT TO



Figure 18. Synthesis - Persona 2 (Jane)

3. Eric, who has a positive mental wellbeing.



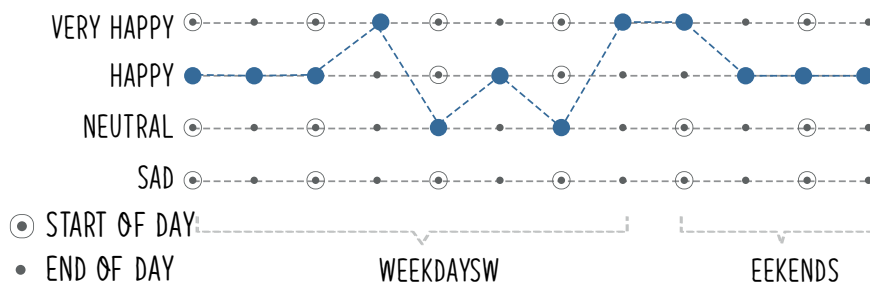
ERIC AGE : 30
 "I TALK ABOUT HOW I FEEL
 AND TRY TO RESOLVE IT"
 POSITIVE MENTAL WELL-BEING

STOP TO THINK AND REFLECT, TALK WITH PARTNER,
 AND CLOSE FRIENDS

PRIORITIZES:
 FAMILY, FRIENDS, HOBBIES

DOES NOT
 USE APPS

MOOD CHART



WHEN THERE IS A MENTAL HEALTH CONCERN

NOT SEEKING THERAPY, COMFORTABLE AND
 OPEN TALKING ABOUT MENTAL HEALTH
 ISSUES AND THERAPY

FINDS IT EASY TO REACH OUT TO

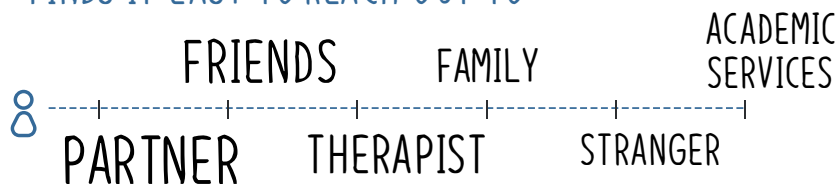


Figure 19. Synthesis - Persona 3 (Eric)

10 Contribution

Sensitizing concepts are tools from social sciences used in tech design to highlight underexplored social problems, providing rich descriptions that can guide designers towards key issues and challenge design assumptions [23]. This study contributes by highlighting four scenario spaces as non-exhaustive but inspirational examples, for potential crosses of the personas with the sensitizing concepts. Moreover, one or more personas can be crossed with one or more sensitizing concepts, forming a wide variety of fruitful combinations of students' typologies and situations. We analyze the data collected with the probe to derive three personas and four sensitizing concepts that can support HCI practitioners in designing for students' mental wellbeing. Moreover, the cross-pollination of personas with the sensitizing concepts can help further identify users' needs and frame follow-up interviews to orient ourselves to the key challenges of designing for students' mental wellbeing. The study also contributes on unpacking the design choices of using cultural probe as an anonymous self-reporting tool to investigate students' wellbeing, for designers and researchers to use and adapt. The utilization of cultural probes as a method for anonymous self-reporting was pivotal to the depth and honesty of the insights gathered in this study. Guaranteeing anonymity encouraged participants to share personal and sensitive information about their mental wellbeing, making it possible to derive nuanced personas, scenarios, and sensitizing concepts that may not have been achievable without such confidentiality.

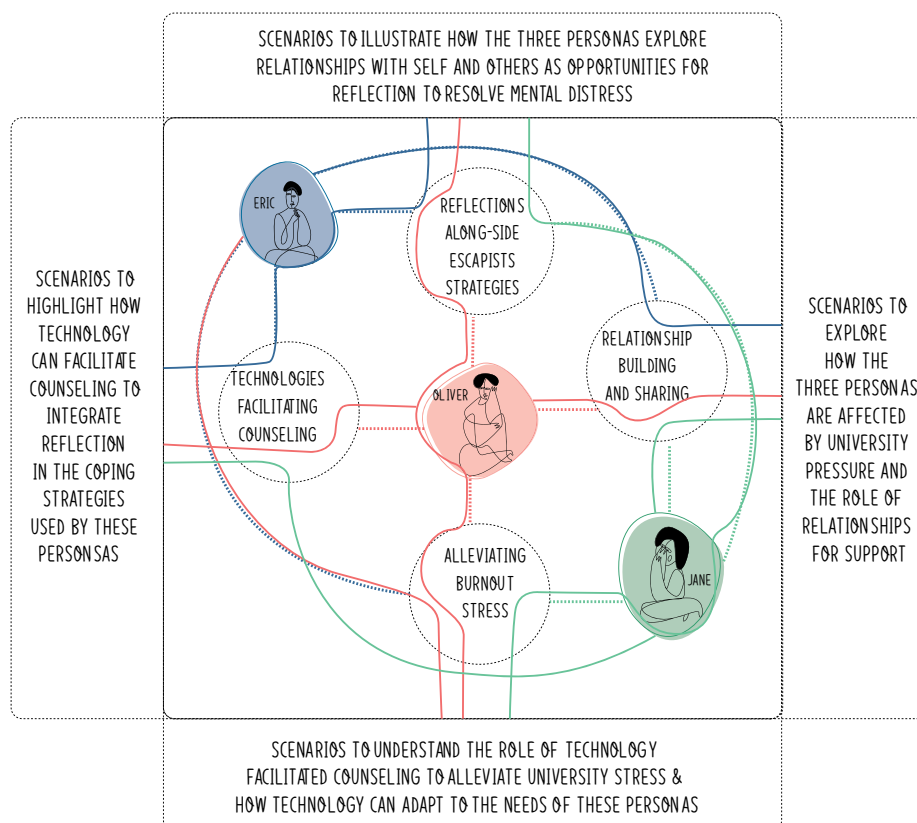


Figure 20. Cross pollination of personas with sensitizing concepts

11 Limitation

This 6-day study was limited to 10 students from the same university department, thus reducing our sample variety. Moreover, the probes were distributed during exam week. Both participant selection and time of data collection may have led to some bias in reporting.

Acknowledgement

Should i mention the FCT grant for this?

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