STUDENT CANDIDATE NUMBER (given by Examinations and available on Portico): **BQKG6**
DO NOT WRITE YOUR OWN NAME ON THIS SHEET
MODULE NAME & CODE: PSYC0098: **HUMAN FACTORS FOR DIGITAL HEALTH**
COURSEWORK PART (IF RELEVANT):
NAME OF TEACHER WHO SET THIS WORK: **ANN BLANDFORD**
COURSEWORK TITLE: DESIGN, EVALUATION AND REFLECTIONS ON ACTIVITIES IN DIGITAL HEALTH
SUBMISSION DEADLINE: 29/05/2019
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Introduction

This report will focus on outlining some of the aims, strategies, and insights that were adopted and experienced throughout each of these activities. Providing information obtained by a user-centred design process, regarding the use of an autoethnogrpahy in the adoption of a digital behaviour change intervention, the review and refinement of a newly implemented interactive dashboard in an Intensive Care Unit, along with a privacy and safety risk analyses.

Activity 1: Autoethnography of Calm

Aims

Over a two week period I conducted an autoethnography around the adoption of the popular mindfulness application Calm. The aim of autoethnography was to better understand the experience of a digital behaviour change intervention (DBCI) from the users perspective, not only understanding who they are but also what it feels like to be them. Empathy played an important part throughout the study, as the autoethnography enabled me to empathise with some of the challenges, constraints, and delights of using Calm as I became personally involved in the use of the application on a daily basis.

Strategies

In order to maximise the possible findings of the autoethnography I set some general guidelines, the DBCI had to be something that I hadn't already mastered or failed at, I should have a degree of interest in the given behaviour, and it should fit in my pocket. I planned to integrate the app into my daily routine, identifying the evenings as the most pragmatic time slot for both using the app and recording data. The recording of data was done in a Google document sheet as this was the most accessible medium across all of my devices, I captured the majority of data through short descriptions, noting the different contexts and feelings I came across. I structured these descriptions firstly, under the day count and time of day (either morning or evening) to define a context, and then subdivided the descriptions into the specific sessions they were attributed to, including the session length and title (Figure 1Figure 1).

Autoethnography of Calm

Day 1: Evening
Reduce anxiety (12 mins)
- Was too aware of external noises and environment (need to wear headphones next time).
- Did feel more balanced and calm afterwards.
- Felt enthusiastic towards the app.
- Before starting the session felt it was hard to fit into my evening routine (too tired, can't do anything after).

Get better sleep (10 mins)
- Was close to sleep.
- Breathing was calm and felt relaxed.
- After the session ended I repeated the exercises and I couldn't recreate the experience, couldn't settle: rolling around, couldn't concentrate on my breath: was too loud.

Day 2: Evening
Reduce anxiety (12 mins)
- resistant, felt like a task.
- However, afterwards I felt better for doing it. Mixture of general benefits and achievement.
- Wore my wireless headphones, felt more socially comfortable and reduced external noises.
- Feeling enthusiastic.
- Started using some techniques in the day, didn't feel like they worked as efficiently as it does with the support of ambient voice + noise

Figure 1 Autoethnography

Activities

Calm is wellbeing and mindfulness application that introduces techniques for improving sleep, meditation and relaxation, with currently over 40 million downloads. Calm delivers an array of guided courses (Figure 2), and as a part of the introduction, I decided to follow the recommended course for beginners, "7 Days of Calm", an introductory course featuring seven sessions focusing on the concept and application of mindfulness, with each session lasting between 10 to 15 minutes. Progress

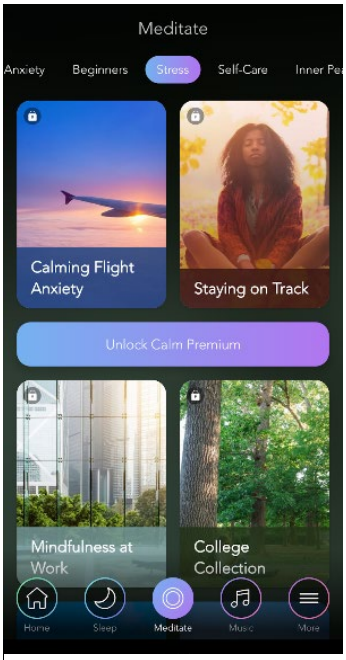

Figure 2 Mediate Screen

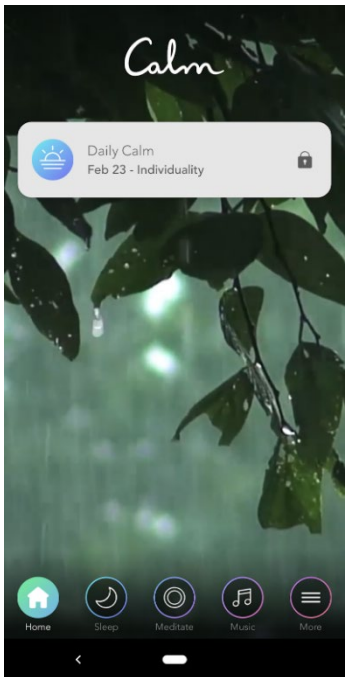

Figure 3 Homepage Screen

throughout Calm was visualised through a streak count, based on users daily usage, this was displayed on a monthly calendar accompanied with other quantified values such as; time spent meditating, longest streak, and total completed sessions (*Figure 4*). Another notable feature of Calm was the ability to select a form of ambience while either browsing or participating in a session by simply swiping across either the homepage or directly in a session, switching between rainfall, silence, wilderness, and lakeside ambiences (*Figure 3*).

Strengths and Limitations

Through my daily participation of the autoethnography, I was able to elicit some of the subtleties and nuances that could possibly hinder the adoption and usage of Calm by experiencing rather than observing them. One of the biggest strengths I found was its potential for revealing user experiences during periods of time not normally accessible to a study. However, I was also aware of some of the generalisations I made within my findings in relation to my perspectives and psychosocial contexts, discovering that my motivations and attitudes towards the Invention weren't shared throughout my group. During the autoethnography, I found that many of the features that aimed to encourage and engage users could quite easily have the opposite effect. Where many of these features are designed around the optimistic reality that all users will change their behaviour easily and not fail throughout the process. While the autoethnography illuminated some of the potential issues users could face it was clear that the interpretation of these issues was subjective as the findings were constructed on personal narratives producing highly individualised insights. Another limitation I found was the intrusive nature of the autoethnography and how the emotional involvement of the researcher could easily distort the outcomes. At certain points throughout my autoethnography, I questioned the necessity of recording personal or embarrassing aspects of my experiences. Overall I felt that there are significant benefits that designers can gain from using an autoethnography when defining requirements for a system or product, however, these findings should be in support of primary research based on actual users.

Autoethnography Opportunities

Given the opportunity to conduct the autoethnography again, I'd change the way it's structured. I found that parts of my findings became repetitive and started to include unnecessary details, to solve this I'd accompany each diary entry with prompted questions that focused on eliciting specific responses that would be in line with the research objectives. I also felt the length of the autoethnography was too short, In relation to how long it would naturally take to fully integrate a new behaviour change. By extending the autoethnography over a two month period I would be able to get

Figure 4 Streak Count Screen

a better understanding of the reasons why I'd stop using the application and possibly get insights into how and why I'd uptake the behaviour change again.

Findings

Social factors: I found quite early on in the autoethnography that social factors had an influence on my usage of the app, reporting, "*Decided to use my wireless headphones instead of using the phones inbuilt microphone, felt more socially aware of the idea of mediation and didn't want my flatmates to hear the session*". I felt that my experience of using the app and talking about the app in social contexts where very different and had polarising effects on my interpretation of the behaviour change. Interpreting this in terms of the Reasoned Action Approach [1] the subjective norm had a strong influence towards my initial motivations in the uptake of the DBCI, and during the autoethnography, I found talking to others about their experiences with the app encouraged my usage further. However, when using the app in a social context, I recognised that I was more socially aware of other people's presence, having a negative impact of the usage of the app in certain social contexts and at times altering my own attitudes towards the behaviour change.

Guilt and disappointment with self: Failure was a big part of my autoethnography, in relation to the RAA, I observed that my perceived behavioural control had completely changed after multiple failures to use the app on a daily basis, *"Hungover and didn't even think about the app."* I noticed that there was a shift of the causations around not using the app, initially finding that the majority of incomplete days were based upon external factors that were mostly out of my control, *"Felt disappointed, but I had to work late."* While nearer the end of the autoethnography these causations shifted towards more personal decisions around valuation and sacrifices, *"I wanted to read a new book, and didn't want to sacrifice it over a session".* Guilt played a large part in the downfall of my intentions and goals towards the behaviour change, I felt that Calm included multiple misguided features that lacked contextual awareness of real users. One of these features was the streak count (Figure 4) which initially increased my engagement and created a sense of achievement, "The app notified me on my 3-day streak, felt a sense of achievement". However, often, events out of my control would alter my routine, and while my intentions towards the behaviour change had not changed, the streak count would visually suggested that the streak break was a failure of choice or lack of discipline. Over time this feature became redundant, losing the potential of providing me motivation and engagement with the behaviour change.

Future Work

Going forward in a larger scale study, I'd encourage more contact time with participants, having regular discussions about their experience and feelings with the goal of gaining deeper insights into their thinking. In addition to this, I'd have multiple bespoke variations of the autoethnography that are designed towards different types of users, taking into account experience, demographics, and self-described routines. These bespoke autoethnographies could help improve the intervention of the autoethnography itself and also enhance the possible findings, along with the ability to cross analyses multiple data sets.

Activity 2: ICU Dashboard

Aims

The aim of this activity was to understand the user needs of a newly implemented interactive dashboard in an Intensive Care Unit (ICU) within the UCL Hospital. Through the process of conducting two interviews with potential users, we could then critique the existing design and discover design opportunities for improvement. Finally introducing a refined prototype design that would be more useable, useful and attractive to the staff within the ICU through the process of addressing the needs we discovered.

Strategies

Our research consisted of two semi-structured interviews with an Anaesthesia Registrar and a Senior Nurse, including an contextual inquiry of them both using the existing dashboard, with each session lasting around one hour. Our focus during these interviews were clinical targets, however, both interviews covered multiple pain points throughout the rest of the dashboard. During the contextual inquiry of the dashboard we used a think-aloud approach to uncover both interviewees impressions around the information, layout, and aesthetic. After transcribing both interviews, an in-depth analysis was conducted using thematic analysis across a plotted affinity diagram (Figure 5), extracting common themes. Additionally, we created a workflow analysis based around clinical targets, helping us understand the various patterns that create the users routine, attaining both positive and negative outcomes around the decisions that could be made.

Figure 5 ICU Affinity Diagram

Decisions & challenges

One method that we found helped uncover potential issues and needs, was a think-aloud approach, this helped us gain a deeper insight into the participants thinking and expectations. One of the biggest challenges during this activity was understanding the complexities of the terminology and tasks understood by health professionals; both interviewees had a broad and deep knowledge of what their job entitled, along with the accompanied processes and mechanisms used.

Activities

Integrate it into my workflow: The first factor that emerged during our analysis, which was emphasised by both participants, was the importance of ensuring that the dashboard integrated into their existing workflows. As one participant expressed their concern, "You run around for 12 hours, like a headless chicken continuously doing work, going to handover meetings etc... and it's got to fit into that.". In addition, another participant stated, "The biggest barrier will be trying to integrate the dashboard into my routine". Additionally, the dangers of interpreting and utilising large amounts of patient-data in a fast paced clinical environment [2] highlighted the need for information to be quickly accessible but

informative, as expressed by one participant “You have to make a decision based on a lot of information, efficiently. Otherwise you lose time or make errors.”

Evidence based triggers: The second factor we identified was the need for evidence based indicators that would justify triggering reviews of specific patients, as one participant states "you need a trigger to review it, not necessarily a graph, just a trigger to say to go and review this patient." and "like an alarm which wants you to do something about the problem.". Adams and Blandford [3] detail the way information needs change over time via an ‘Information journey’, and how utilised alerts could keep clinicians aware of frequent changes. In addition to understanding about the need to be informed about ongoing changes, we were also able to identify the kinds of informational needs that should be supported through a triggering mechanism. Stated by one participant, “I’m looking for things that trigger a review: "creep in ventilator adjustment, where people make small changes over a period of time and gradually pushes up and up and you're like hang on, why?". Participants also showed concern when validating what was shown on the dashboard, "where are you taking metrics from? percentage of flow balance?”, in relation to this, researchers have explored how we can improve the sense making process by considering a person informational needs, through the ability to edit, compare, and cluster components [4].

Strengths and Limitations

One of the main strengths of the existing prototype was the relevance of content included, as both participants pointed out metrics and analytics that could improve their workflow. However, certain areas of the dashboard included information that they didn’t expect to see, such as the ‘Serious Incident Report’, "I'm not going to the dashboard to read this document", adding, "I'd expect this to be part of an email chain of an email chain or something to say this happened". The kinds of visual affordances that were used across the existing prototype formed mixed responses as certain graphs used green, which one participant stated, “Green to me means good so that's not quite intuitive”. One of the themes we identified was the need for personalised targets, where the existing prototype seemed to be limited in its ability to accommodate the variety of clinicians that could use it.

The prototype was refined around the user needs we identified and the feedback we received around the existing prototype. This included a simplified navigation scheme, based around a trigger mechanism which encouraged; awareness, responsibility, and reflection. By recreating the existing workflow (Figure 7) we were able to identify the different users’ needs over the period of a task and understand the design requirements needed. Additional, we also recognised the importance of reflection and learning, as one participant stated “sit down with your team couple hours before, and go okay look guys, we’ve only done 35% of our targets today, let's set ourselves a new target, let’s go and get that 100 before the end", along with, “The fact you're measuring fast hugs speaks volumes, I can actually imagine this being used as a reference in our morning fast hugs to help improve on yesterday's mistakes”. As a result, one of the main strengths of the refined prototype was our expansion of the dashboards workflow, including design solutions that visualised scenarios around failures to maintain targets (Figure 6). Another factor we wanted to build upon from our feedback was providing deeper insights into what metrics are affecting specific patients, rather than limiting the

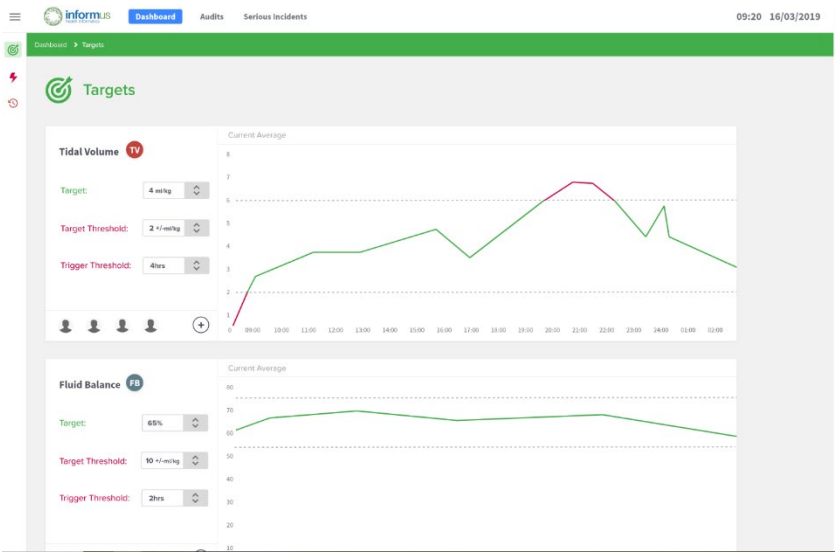

Figure 6 Dashboard Target Screen

dashboard to global averages. The refined prototype also enhanced the visual affordances used, as we introduced different types of metric and trigger-scale badges (Figure 8) which provided users the ability to identify a specific patient's state at a glance. While bringing awareness to failures that could help avoid future incidents, we recognised that this feature could also have polarising effects. While having the visibility of an individual or teams failures advertised on the dashboard for others to see, possibly including curious relatives, could have damaging effects on the wellbeing of individuals at work and create emotional distress for visiting relatives.

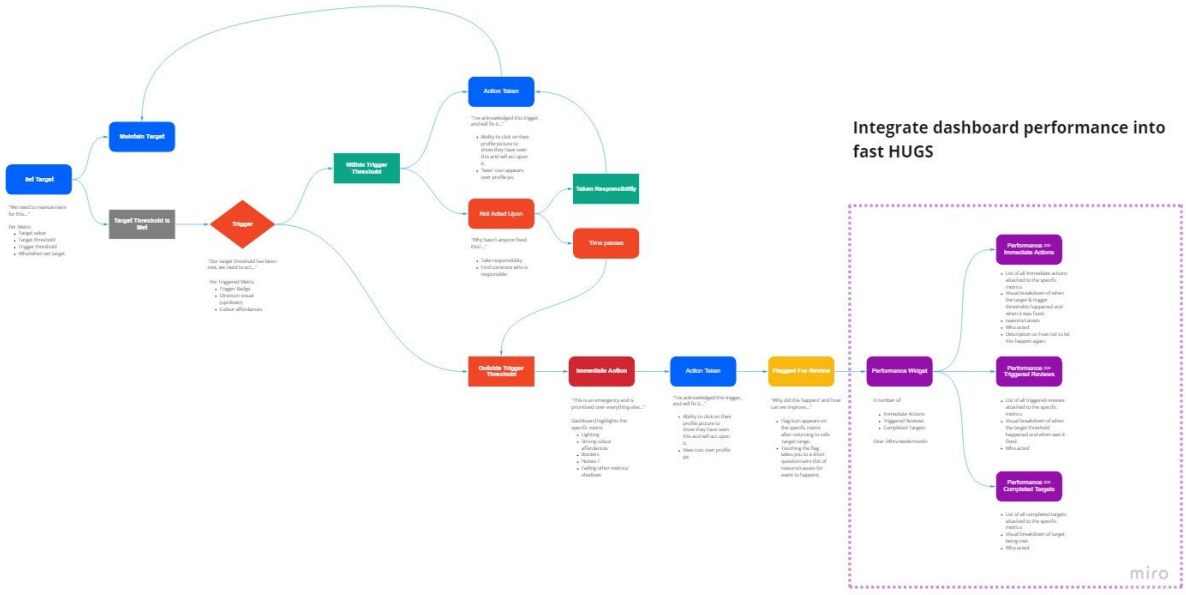

Figure 7 ICU Workflow

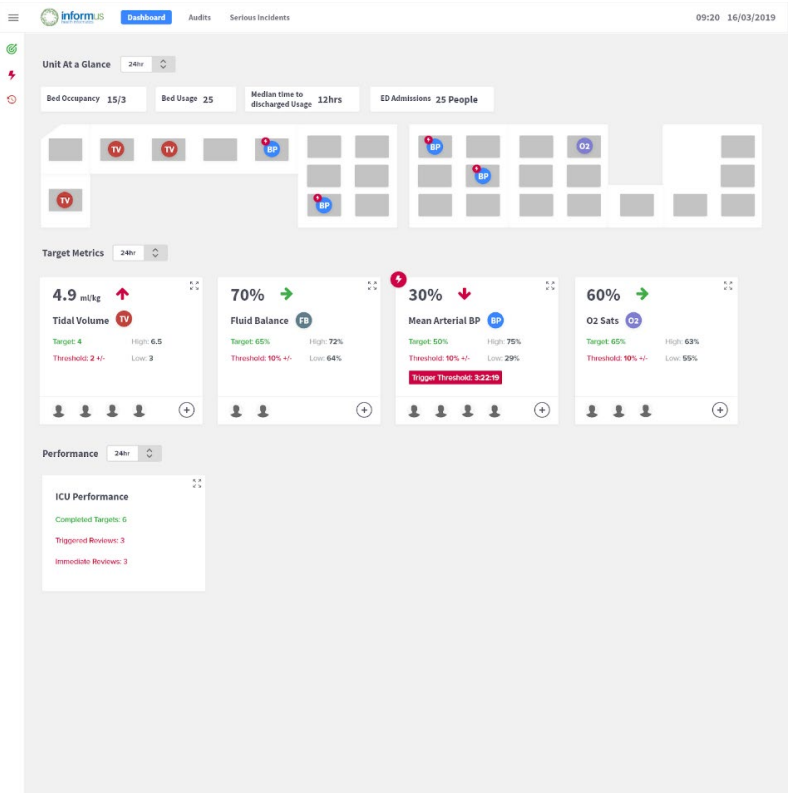

Figure 8 Dashboard Home Screen

Opportunities

Given the opportunity to repeat the study, I'd ensure that each participant was given specific tasks when interacting with the dashboard, focusing on both the behavioural aspects of their interaction and, as we did in our study, collect opinions and thoughts around these interactions. I found conducting the interview in the same environment that the dashboard would later be used in was an advantage, as it added an insight into the contextual awareness that should be considered when designing the dashboard. In addition to this, I also felt in reality the dashboard would be a tool that could serve multiple people at once, and through our one-to-one interviews I wasn't able to observe how these interactions could unfold.

Reflection

One of the key insights I found throughout this research was the clinicians concerns and reluctances around integrating new technologies into their current workflow. I felt that involving the clinicians throughout the research and development process, not only helped us understand them, but also reassured some of their concerns. There has been an increased focus towards applying design thinking techniques to public and healthcare services, as Robert et al., (2015) describe the experience based co-design (EBCD) approach, which makes patients and clinicians co-designers of the health service they use.

Activity 3: Risk Assessment

Aims

The aim of this activity was to identify risks to data privacy and patient safety in the design of the ICU dashboard. Conducting two user-centred risk analyses: one focusing on the risks of privacy violations in relation to sensitive patient data, and the second on the risk of patient safety. Through the process of interviewing health professionals and analysing the findings through an affinity diagram, we were able to extract risk based scenarios relating to potential privacy and safety incident - visualised though both workflows and storyboards. Finally evaluating each identified risk through probability-harm matrixes to effectively propose measures that could mitigate these risks.

Challenges & Benefits

Both risk assessments required a deep understanding of what was being shown on the dashboard, and how that data could be interacted and interpreted by a variety of users in a wider context. While we were able to gain some insights from both of our interviewees, we lacked knowledge around the existing systems and processes that the dashboard would be embedded within. With our research being limited to time restricted interviews, meant we could only identify and validate assumptions through the participants, often short, reflections. In relation to patient safety, our short visits to the ICU benefited us with the ability to uncover observable hazards and risks to both the physical and virtual aspects of the dashboard. With both interviews being conducting in the ICU, we were able to get an indication of the amount of people that would come into proximity of the dashboard, highlighting the possible dangers of unauthorised individuals accessing it from an unintentional or malicious standpoint. Although, both of the risk analyses we conducted were based on limited scope of research, I believe we were able to identify some of the larger privacy concerns through the conversations we had with both health professionals. Uncovering the causation and consequence of potential risk-related scenarios around patient and relative access, and poorly managed or misinformed clinical metrics.

Insights & Risks

The most prominent theme that emerged from our risk analyses was the possibility of curious relatives misinterpreting or intervening with the dashboard as a result of the association between the information shown and their family member. We identified that the current location of the dashboard could easily be accessed by relatives, and the dashboard doesn’t require any form of identification to be accessed. After discussing this potential safety risk with both of our interviewees, we received a mixed response, as one interviewee emphasised their concerns around anxious relatives intervening with doctors rounds, having a negative impact on the doctor’s ability to accommodate the emotional needs of the relatives and successfully maintain their daily tasks. Further, stated the high probability that most relatives would misinterpret the information that is currently shown on the dashboard and result in unnecessary anxiety and stress, proposing that the dashboard should not be located in a public space. Whereas, one interviewee, while also in agreement with the potential negative effects on the patient and relative wellbeing, strongly felt that individuals should have the right to access and understand their own healthcare. Stating, "i don't mind sitting down and taking them through the tidal volume of nine mils per kilo. Yeah it's a bit too high, but in context, it's been very difficult to ventilate. Patients should be allowed to see and decide on their healthcare”. However, also acknowledging that is requires time and patience that most doctors or nurses don’t have, suggesting that the introduction of the dashboard into the ICU would require a wider conversation about its capabilities and restrictions with both the staff and incoming relatives. Another risk to patient safety which we identified was the danger of inaccurate data either hiding serious health threats or misleading treatment to healthy patients. As in the refined dashboard prototypes we referred back to the clinical targets

workflow (Figure 7) to get a better understanding on the causation and consequences of decisions made during that process, and how inaccurate data could play a part in that failure. Recognising that both hardware malfunctions and technical bugs could result in inaccuracies with the data, we proposed that the data shown mustn't be the only source of evidence that is required for medical attention and the dashboard should have regular maintenance, along with a rigorous quality assurance process that prevents any visual misinterpretations. In relation to risks around data privacy I recognised the involuntary nature of the patients data to be displayed in public view, and while the dashboard doesn't currently include any strong indicators towards an individual's specific illness, it could inform others (unwanted) of your current health status whom may profit from it.

Summary

In summary, some of the key insights that I discovered emphasised the importance of understanding a wide variety of backgrounds and experiences when designing products. During the autoethnography I was able to uncover inmate personal experiences that the current design of Calm hadn't taken into consideration, such as the dangers of highlighting failure when users have no control over a situation. Additionally, during my time at the ICU helped uncover the variety of needs and constrains different health clinicians are under. In the future, I'd consider using an autoethnography during the initial stages of the design to help identity some generalised insights that could be validated later in the design process or prompt further research. In relation to designing health systems, I've learned the necessity of designing for each possible user, not just the average, as many specific tasks and requirements are crucial in ensuring the safety of patients.

References

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Appendix

Appendix 1

Autoethnography of Calm

Day 1: Evening

7 Days of Calm (12 mins)

- *Was too aware of external noises and environment (need to wear headphones next time).*
- *Did feel more balanced and calm afterwards.*
- *Felt enthusiastic towards the app.*
- *Before starting the session felt it was hard to fit into my evening routine (too tired, can't do anything after).*

Get better sleep (10 mins)

- *Was close to sleep.*
- *Breathing was calm and felt relaxed.*
- *After the session ended I repeated the exercises and I couldn't recreate the experience, couldn't settle: rolling around, couldn't concentrate on my breath: was too loud.*

Day 2: Evening

7 Days of Calm (12 mins)

- *resistant, felt like a task.*
- *However, afterwards I felt better for doing it. Mixture of general benefits and achievement.*
- *Used wireless headphones instead of using the phones inbuilt microphone, felt more socially aware of the idea of mediation and didn't want my flatmates to hear the session.*
- *Feeling enthusiastic.*
- *Started using some techniques in the day, didn't feel like they worked as efficiently as it does with the support of ambient voice + noise.*

Get better sleep (10 mins)

- *Starting falling asleep at a more consistent time.*
- *Feel like I'm getting a better night's sleep.*

- *Didn’t continue checking my phone or listening to a podcast after the session finished.*

Day 3: Evening

7 Days of Calm (12 mins)

- *Less resistance towards doing it, feels like a part of my bedtime routine.*
- *The app notified me on my 3 day streak, felt a sense of achievement and increased motivation.*
- *On reflection feel like this has a beneficial impact on work/study life so far.*

Get better sleep (10 mins)

- *Started to go bed a little earlier to accommodate the sessions.*
- *Another good night's sleep.*
- *Didn’t continue checking my phone or listening to a podcast after the session finished.*

Day 4: Evening

7 Days of Calm (12 mins)

- *Went to sleep instantly, felt that the ambience outweigh the techniques being taught.*

Day 5: Incomplete

- *Broke the streak, the app gives you a visual timeline of session streak your on.*
- *Felt disappointed, but I had to work late.*

Day 6: Morning

7 Days of Calm (12 mins)

- *Decided to switch the sessions to my commute in the morning to avoid forgetting to do the session or being overtired.*
- *While there was a lot of external noises I still felt I was able to gain some spiritual awareness, once again I’m thinking this has a lot to do with the visual and audio ambience.*

Day 7: Morning

7 Days of Calm (12 mins)

- *Once again did the session on my morning commute.*

- *This was a great session, it actually helped me pause some anxious feelings about doing a presentation at work. It slowed my thoughts down and helped me adjust from an negative outlook to a positive one.*
- *Decided to also fit in a sleep session later that evening.*
- *Had a good night's sleep.*

Day 8: Incomplete

- *Ran to work so decided not to do the session till the evening.*
- *Celebrational drinks after work, didn't get home till later.*

Day 9: Incomplete

- *Hungover and didn't even think about the app.*

Day 10: Incomplete

- *Overslept and still felt sluggish from the Thursday, was out with friends most of the afternoon and evening didn't get home till later.*
- *Felt slightly guilty as I swiped clear the reminder notification.*

Day 11: Morning

Reduce Anxiety (12 mins)

- *To break out the mold I went on a run. During the run I decided to take a break to do a session.*
- *Felt It increased my mood, and made me aware of how much support and love I have, resulted in me feeling more grateful and having a positive outlook.*
- *Afterwards I decided I would start writing things I'm grateful for on a daily basis, lost motivation that evening as other distractions came up.*
- *Felt disappointed, but justified it by the fact I'd already done one session today.*

Day 12: Evening

- *Didn't get home till late, and wasn't thinking about the app.*
- *Before going to bed, checked my phone, and saw the reminder notification. Decided to put a sleep session on, fell asleep instantly.*

Day 13: Incomplete

- *Ran to work in the morning, so decided to push the session in the evening.*
- *Opened the app but decided that I wanted to read a new book instead, and didn't want to sacrifice it over a session.*

- *Opened the app and had a look at my profile and was reminded by how many days I didn't complete a session in the streak count, decided to read a book instead.*

Day 14: Evening

Reduce Anxiety (12 mins)

- *Was in a rather good mood (not anxious) and felt like I was doing the session because of the autoethnography.*

Appendix 2

Interview Transcript

Interviewer: We're masters students studying human-computer interaction program.

Participant 1: Yep

Interviewer: Do you mind if we record this conversation? And could you sign this?

Interviewer: Do you mind talking about your role again because we haven't recorded?

Participant 1: Yep sure. I'm affectively the senior clinical nurse in the department and my role is both to work within the department and also to think about and the take part of the moving of patients in and out the department from the wards in particular and today I'm working with a team that really focuses with these patients outside of the ward. Now the person that runs the intensive care unit superficially, is called the matron, now she's not here today, she's on a day off so on her days off I try to a little bit of what she does when she is here which is looking at the patients that we've got looking at the staff and maybe advise a bit how we're doing things in the unit so that we've got the right people, the right patients at the right time to ensure safety and that's her everyday job and in her absence other people have to do it. Now she has a couple of deputies, one of them is here today. I'm much more senior to them I suppose so my job is to in part support them to give the decision.

Interviewer: So, what are the biggest challenges that you face day to day?

Participant 1: So, the biggest challenges are day after day after day are the demand for a bed on the unit exceeds the supply, the physical part, we have 35 beds here. But above that each bed needs to be staffed, there needs to be a nurse standing by each bed and it's difficult for us and any of this to man each bed 24/7 365 days and it's not just about having a person, it's about and we need a few extra people to man there side rooms, we have 11 side rooms. So not only do you need someone by the bedside, you also need someone who's going to come in and out periodically and sometimes you need three or four people to go through the procedure. Or the person needs to go and lunch so I kind of fill in for that so there is a

constant strain while we sort of manage that.

Coordinator - Just to tell you what a side room is, it means a patient is in their own room by themselves. It's usually quite sick patients, people who have an infection and have a need to be, whereas much of the research is bays where you have more than 5-6 people in each room. This side of the unit is usually the sickest patients in their own rooms, there will be a nurse in there with them all the time so obviously that nurse will need have a break and someone's got to come in.

Participant 1: So, we're focusing more on clinical targets and are challenges where if you did have access to more, to data about clinical targets, would that help with your work?

Until we've had this kind of arrangement, we've never been a position, where I can see, how we're doing collectively so its kind of a surprise to us, that on some of these measures, we're not doing that well to say that we're a fantastic department that delivers perfect care.

Interviewer: How do you usually access this kind of information?

Participant 1: Well, it's never normally done as an overview, what you've got here. So patient by patient, but theres a bit of tendency to look at is a single snapshot in time so even if you're not hitting a target in this particular hour, what we're looking at and what we're probably should be putting more time into is...is it one hour or two hours or eight hours. We just don't go back in time enough to look at that and probably in our own mind we think that this is just a temporary blip, I can't see that this is wrong but it's just a temporary thing and I need not worry that much about it. Whereas what you're doing here is that you're showing us that in some cases, well in the last 24 hours there might be patients that have not hit the targets at all and it's potentially excusable to have not achieved it for the last hour. The last previous 23 were ok but if they hadn't been ok for such a long time then that's a whole different thing and we need to change our practice as a result.

Interviewer: Was there a particular time where you can think of that you needed this information and how something could have changed if you had this information?

Participant 1: I think with pretty much all of them. There's a constant tension between getting people enough fluids for that to be a component of the blood and the blood moves oxygen around the body and that is critical and organs need to be fused with fluid so there's an inbuilt tendency to give lots of fluid because none of these places of drinking so we're giving them by artificial needs and yet, if you give too much. It's quite often an insidious process that goes over hours and days and days, then the body tissue gets water logged effectively. And then it's really hard to get oxygen in the blood to the key parts of the kidney or the brain or the heart or the gut or whatever it is because threes all this excessive water in the way and

then we have to dry the patient out and give them drugs to make them pass more urine then they would otherwise so it's kind of basic. So, on one hand, it boring and prosaic but on the other hand, its really, really important so having it made quite vividly displayed. It is absolutely important and you know, well the number keeps changing but accentually how it's going from 70 – 90% that's quite rapid alteration, I don't know why that is and I'd like to know why that is.

Coordinator: so just to say that except for this which is live data, this is all fake data.

Participant 1: So that would be really weird, wouldn't it? If it literally changed minute by minute.

Coordinator: yeah that wont happen

*Participant 1: This is a critical thing so we believe that when people are sick... *** is an outdated phrase and I'm surprised that no-one has chastised you for that. If Merlin Singer would have seen that...*

Coordinator: Merlin Singer hasn't seen it.

Participant 1: Sepsis is an outdated term.

Would you see yourself having time to come and view this?

Participant 1: Well the lucky thing about my position and the way that I work is that I do and I already try to seek out information. So, before I came in this morning, in that room there's a big whiteboard on the wall with a list of all the patients and it looks after a little bit of information. For example, it says, one to one and one to two. Basically, someone's made a judgement that they need one nurse for one patient or in some cases one nurse for two patients. And, so, I look at that and this so in total we need this number of nurses. Although, of course there's a couple of patients which are one to two and then they'll have a operation and they'll turn into one to ones. And that's something which is really useful to see. It's on a whiteboard, with someone doing it with a felt marker, every four hours so obviously not really in time. Erm and then I come out here, so erm, this is useful. This is pressure on the unit. People coming through ED, what I would want to see is a trend over time but if there were lots and lots of people coming into the emergency department and then need to some to the intensive care unit, putting more than average pressure on us.

Interviewer: So, if you were only interested in the target metrics, would you find that all the other information would distract you? Is it a bit of an information overload or is it not?

Participant 1: No, I think all this information is ok.

Interviewer: Dependent on the performance in general, you'd get rid of one of these.

Participant 1: I think there are two aspects, one is, what do I think we do badly on. I know we

do badly on that, we do badly on that.

Coordinator: We are doing well right now.

Participant 1: Yeah, that's true. But as a general rule. Professor Singer.

Participant 2: Are you being tested?

Participant 1: I am. This is your, these are your patients being over ventilated Melvin.

No they're not being over ventilated right now.

Participant 2: Errrr...well.

Coordinator: Well this is not real data...

Participant 1: Are you sure this isn't real?

Coordinator:

I'm

sure,

it's

not

real!

Participant 1: Look! This is Melvins group of patients.

Participant 2: All I can say is piss off! Don't give me crap from him. If he misbehaves just kick him. Is it Bristol or somewhere where they've got something like this and it's on the wall and it's more open.

Coordinator: Yep

Participant 2: You've been there?

Coordinator: No but we've heard.

Participant 2: Apparently, it flashes, and everyone is like "looooook, you're not doing it properly".

Coordinator: When things are out of target or something?

Participant 2: Yep yep.

Coordinator: We've been trying to meet the Bristol guys to go and see theirs but he's in Antarctica. Tim Gould.

Participant 2: Is he?

Coordinator: Yeah.

Participant 2: There must be someone else doing it.

Coordinator: I know but they're not responding to use so I think we just have to show up to the doorstep.

Participant 2: Yeah but know. It's sort of name and shame.

But you can cheat. You know why? The true thing is...but how accurate at the time are the machines doing the tidal volume.

Coordinator: I don't know.

Participant 2: Plus and minus 20%.

Coordinator: Really?

Participant 2: Yeah mmm, makes you think doesn't it.

Coordinator: Yes, it does. Indeed.

Participant 2: Because they're corrected for BMS and pressures. And you know Clair Black? Talk to her about the accuracy of the ventilators.

Participant 1: I guess that would be true of all numbers.

Participant 2: Yeahh, completely. But, we're fixated on it. I don't think it's a bad thing but how accurate is it? It's the same with blood pressure.

Participant 1: Well we can count all those bubbling chest ranges coming from your side Melvin, coming from the over ventilation.

Participant 2: Yeah, only 20 in one person but apart from that. Is it the number of drains or number of patients with drains?

Participant 1: Bit of both.

Participant 2: So here...

There's no such thing as severe sepsis.

Coordinator: Yeah, we've had that. And even if we do believe that there's a right number for that, out there on the wards, what would be..

Participant 2: That's a rubbish one, that's not a good metric at all.

Coordinator: Ok, why?

*Participant 2: Well theres no real evidence...if you read the literature, it's dogma. Rather than evidence, that early antibiotics saves lives. Ever prospect and trail looking at it shows that there's 0 effect if you get it within a four hour window. So, in fact in the US they were using pneumo*** as a metric of quality and time to administration of antibiotics for pneumonia, this was a few years ago, and there was a joint statements by the American college of emergency medicine and blah blah blah, basically abandoning it and saying that all it did was just increase the antibiotic use, unnecessarily.*

Interviewer: Is that not accurate in general because tidal volume is not accurate or is it that the person who sets it....

Participant 2: Well there's two things, a) how accurate is the height, so this is not real tidal volume, this is predicated on the patients height which is a bit of a guestimate itself and how

accurate do you measure the height and then how accurately does the machine measure tidal volume. So, I'm throwing curveballs. It's the same with blood pressure, when we have blood pressure measured intertribally Or with a blood pressure cuff? Which one do we pick? And they're both different.

Participant 1: The best one.

Participant 2: The human factor is that we pick the one that we like, than what is accurate. So, we pick the one which suits us. We are prone to bias and dogma, there's a lot of dogma. I'm not saying there should be a long delay..."oh well, weve got another two hours and 20 mintues to give it" you know. It's just like the imperative. Especially nice for you, you often have patients who've got a temperature and you think well, leave them alone, that's an infection. But often, we just sit with the patient, we don't necessarily just jump in. Up to 40% of patients with a diagnosis of Sepsis, are likely not to have an infection. Sorry, I'm a bit cynical about that because all that does is it drives bad practice. So, what they do in causality and it's been shown that there's been a huge increase in antibiotic use and there's no evidence of improved outcomes.

Coordinator: Is there anything else which your cynical about on there?

Participant 2: Jesus don't start me. Errr well I think that's probably a good idea because the... it's checking safety so I think. The only downside there is that hoping that one of the people checking realises the prescription is accurate.

Coordinator: So, you're talking about missing double signatures.

Participant 2: Yeah because there's a lot of hospitals that don't bother with signatures anymore. Correct me if I'm wrong john but there are a lot, just to save time but the major problem, if you talk to Rob Sureman. He did a nice paper several years ago that showed when we went electronic, the minor ones were reduced but the major problems, major drug prescribing errors increased and often it's because someone writes it and you just put the wrong dose down o whatever and you are relying on the person, drawing it up and giving it.

Participant 1: And this is a real problem. Say Melvin holds up a bag of fluid and says "can you check this egg white for me?" and because he's already told me what it is, I actually don't bother to look at it. Whereas, if it was just me doing it, maybe I would pay more attention. Because double checking makes a difference.

Coordinator: There must be a body of literature about that.

Participant 2: Yeah, well there is some literature about it and its very unclear that double signatures makes a difference.

A lot of things that we do in safety, if you actually dig deeper. On the surface, it seems like a

good idea, affection control... you know, if you ask, “Can you show me any data?”. They mention Seville Vice and I say, “that was 1856, have you got anything more recent?” And they say, “well there must be” and you know, you’re an affection control person, don’t you know the literature and they don’t, they can’t tell me. If you go somewhere else, they’ll do it completely different to the way that we do it and there’s no good evidence basically. Call me a cynic. I’m probably polar cynical but one of my mantras is that there shouldn’t be any data to support this, and they say there must be, and I say if there is shouldn’t we read it or know it and often the evidence is actually contradictory to what we’re doing. But hey, affection control is a great example. We did a very nice study a couple of years ago, we showed that isolation didn’t work, this is for MRSA, and we had the data published and if anything, there was trend, ok and then we tried to bring it out and no, no we cant. Well we’ve got the data to show we’ve done it, we’ve done the trails that show it doesn’t work in our institution but no, no, we can’t do it, we can’t do it. Snd the microbiologists are like, well, if they say. But you know, you’re in charge but no, no. But we actually published the data showing the opposite working better but they still wouldn’t accept it. So, challenge dogma.

Where were we?

Interviewer: Would you want to add any functions?

Coordinator: Just to tell you this is synthesised data, this is all dummy data, apart from this. This is all dummy data. Um, apart from this, this data here is real. The real tidal volume. Everything else is dummy data. We're just testing it right now.

*(*failed recording)*

Participant 1: Color Code. Green is always good isn't it?

Interviewer:

Which data is most important for your Work?

Participant 1: Out of all of them?

Interviewer:

Yes, this part, targets (metric).

Participant 1: Well because it's more complicated than just saying this is the most important, that is most important when you're looking for (xxx) things. So, I suppose this is ...So the tidal volume is interesting. It's so pretty good evidence based to say that. We often People. Some evidence that the xxxxxx shouldn't xxx here. For blood pressure. All of our the blood pressures are a bit different, probably. So, the right blood pressure for me, it probably a bit different from the right pressure for you. So, and so on. We less, we generally less sure what right pressure is for a given person, I'm looking an average, right? Here we're assuming that

we know what the right target for each person is because we want to set different targets for each person. This is the same target for everybody and... This is a different target for everybody... Often will be probably very similar. There's a couple of variables there, we don't even know if the target is right. And then we're saying, well they don't reach the target or maybe with the wrong target.

Interviewer:

So that means the accurate one, you are saying...

Participant 1: I suppose if I was gonna add one, which might mean taking something else away. One of the important things we do, one of the really important things we do is if you want all these machines, then you're almost always going to have sedative drugs because the machines and the thing has been done to you and maybe the pain will go off your (background noise) and comfortable things so you have given drugs to control the pain, which often we're a bit sensitive and other drugs biologist sensitives and there's a tendency to give people too much sedation. We do try to measure how sedative people are, probably not very accurate, but it's really important what (background noise*) people and you could have that as an individual about how many patient is depressed consciousness (background noise*) and you wouldn't ...You want everybody to be at a level of consciousness so they. It's depressed enough xxx enough to what was going on, but they could still open their eyes, if you say something to them like nod or shake your head at least. So I've personally picked that for example, and it absolutely is... There's an evidence base to show you that if you get too much, too many people, too much sedation, too long than hugely extended time (background noise*) because when you want me to read for themselves, they just don't wake up*

Coordinator: Can you tell them teletracking and whiteboards system?

Participant 1: Yes. This is the whiteboard.

Participant 1: Patient and that variation. You find patients here, but there are some days when that might be only 10 of them. That wouldn't be a lot of work, on other days when many more of them, a lot of work and so the numbers and the skill make people on the bad days need to be quite different than on the good days, so I kind of a synthesis. I think it was very useful. Which is great this board like when things changed, someone's got to come in here and change. often be quite significant Lag.

Interviewer:

Would you be fine with if that board is out there (corridor)?

Participant 1: Well as long as patient's names work concealed on. We knew that there was no patient...patient traffic and what they're doing, some of the wards is they had something like

that big doors, so that's when people are looking at it. They closed the doors on it. If it's electronic, you could find the screen, you can switch it on

Interviewer:

Do you think it would be better if it is electronic because this one you need to come back to check.

Participant 1: Yeah, absolutely.

Interviewer:

I think that is useful board or what is it, it supposes list , isn't it? Doesn't have that sort of visual plan that you do on your electronic one here. Um, there was something about seeing these patients who are one to one or one to two in the bay with, four other people in the one room or in a single room. Just kind of being reminded of that. If watched it long enough. You probably know, but on that board. There's nothing to differentiate the geographical aspects of the patients that with the patients there versus that would there. But these ones here are in big rooms with four or five people in the same room and you need different workforce there because I can briefly say to you are looking after this patient, this one I can say I need to pee keep an eye on my patient when I was in inside room. Someone has to physically come in and be like, yeah.

Interviewer

: Do you find it was a problem with mix out? Yeah, and understanding.

Participant 1: So, um, there's a other one, there a bit of an understanding of the geographical components. So, you can see the, these says these are side rooms, which meaning single rooms. There's 10 here and there's one here. And then there were these bays and you can see one, two, three, four, five. There's five people to physically in the same space. And there's a bit of colour coding here. This sort of tells you, obviously these patients names are here. So, I can look at this. Oh, this patient has been allocated a bed for discharge and it tells you which ward is for the patient is quite useful. And down here, just the summary, 35 beds are occupied. We've asked for. Um, so, so there are nine patients who want to come in, we have one to go out, you do the maths, you can see the demand that's there. So, it says this is something it's just stupid, really predicted if we took them all.

Participant 1: What? Because there's a deficit of 35 plus eight is 43. Well we've only got 35 beds so clearly. So that's eight people who want the bed here who can't get in. So, could do some cancellation, isn't it? Stuff going on to cancel.

Participant 1: Yeah. But some of us, you know, we might have to think about. So, I don't, the people that have requested some of them, I might be having surgery and maybe there could

be canceled, but some of them might be really sick and they absolutely got beds somewhere if they can't get in here, where can they go? They might need to be put in an ambulance to go to another hospital. Assuming they've got it bad, what are we going to do differently? We've only got ready, one ready for discharge. Now some of these, if you look here, referrals from other hospitals. So, I guess you assume, well if this patient is already in an intensive care unit, probably coming here because we do stuff here that they don't do it there, but you would hope that they kind of safe there.

Participant 1: So, you don't worry so much about that one. This one is in one of our beds, one of the ward beds and there's a hematology patient. So I'm looking at what's wrong with it, in some patients often really, really sick. They probably need intensive care. So this gives me, again a bit of an idea of demand on

Interviewer

: So, is not just the information for this hospital, it's also...

Participant 1: There's all these other hospitals with patients because UCLH does stuff that they don't and it might be very specialist lifesaving stuff so somebody has to pull this information together, maybe decided the one that will come versus the ones that will not, you know, that's quite a big decision to make know you're depriving...some people in the beds with new choice, really. And I have got that choice ought to be to be based on having as much information as possible to guide the choice so you're providing the most potential benefit from a person who would benefit. It's quite a heavy load to do that effectively. You're refusing other people and this one is kind of another version of that, but what you can see all of these boards have some of the same or similar information, but at the moment I physically got to walk to quite differently on places to get the whole picture, which is just mad, isn't it? That's the case.

Interviewer

: Would you prefer a more mobile version on iPad or?

Participant 1: An iPad would be, yeah. iPad would be good.

Participant 1: There is something about having a big screen anyway and obviously you can get much more on a big screen so that the big screen, if you put all of the things that we've been describing, yeah, onto an iPad probably could do it, but now there's something quite powerful about having a big screen and it also means that there's a bit more collective checking survey. Everybody's looking at this big screen and noticing little discrepancies they can become more of a shared experience. Whereas if it's one person looking at an iPad that's less likely to be the case and you're more likely to cluster around the big screen is a few of

you than cluster around iPad. I mean, people do. I know that's a bit of a difference.

Interviewer

: Where you want to the inform us to put, in this room or other place.

Participant 1: Where do we put it?

Interviewer

: Yeah.

Participant 1: Huh. That's a good question. Um, I think there's a bit of a challenge. I mean more people come here more all the time. So, um, and this is where, if a phone call comes to the intensive care unit for, from outside someone saying, you know, I've got a really sick patient and I wonder if you could take them, um, it's useful for me to actually look up at the board and just to decide, there's already five people needing to come in and we've got nobody going out. So that would be useful if it was right there and I have to run around there and then come back to, you know, that would be more difficult. Um, so I suppose it'd be, I suppose the down side so I can often get quite crowded here because of all the different people that come and the doctors and nurses from other teams tend to congregate in here. So we're actually sometimes, have opportunity to stand here and take it all in and understand what's happening and maybe to do better, more detailed analysis. Quite difficult because there's just so many people in here, this is a bit of a lot of the moment.

Coordinator: I Was actually quite shocked to see how empty it is when I walked in just now.

Participant 1: Yeah, yeah, that's right. It's unusual, isn't it? Yeah. Yeah. It's unusual. So least this tends to be a more.

Interviewer

: Does all of these computers working for, like different system because you said there are different version on those. They do similar stuff, or they do different stuff?

Participant 1: Well, some of it does overlap. Probably quite a lot of it overlaps and then I can show you that I'm very interested actually in six week's time we're all the whole hospitals moving to this one big database. But um, the other system that I look at a lot and so does everybody else that you haven't even seen yet. It's a very text based system

Participant 1: (background noise) time can kind of similar stuff more quickly and just that kind of gushed out if you knew where we're always trying to train up people to do jobs that they wouldn't come and doing to be in charge and so on. I don't think it's funny challenge for them. I'm guessing you will wait, but if you talk to the people who are in charge but haven't been doing it for very long time, that given their understanding of how they assimilate all of this would be interesting. Okay. So finally this is yet another system which has the most*

detailed patient information there.

Interviewer

: Do you want to the clinical targets to be printed out? or Mobile version?

Participant 1: Well, they kind of stuff is um, is fast moving, isn't it? So it's in real time. I suppose. What you could have. No, I didn't have any problem now. I suppose you could say against each place and what the targets are for those different functions. I suppose it could be. You'd still have to go to another place to see if they were being achieved or not.

Interviewer

: Would you left the printed papers around?

Participant 1: Oh well these got left around. You know. There's data security thing. I'm a, I'm, I'm, I'm almost just printed out. Was it today? Yesterday, two days ago, three days ago. (Failed recording)*

Participant 1: Bed names and information about the fact that we aren't or are meeting target. What does that make you think in terms of who would you want to see it with? Not wanting to see it. (Failed recording)*

Participant 1: So what we're interested in the size for tidal volumes were interested in how much pressure? The reason on the chest (Failed recording)*

Interviewer

: For ID card, Is it just for access the building?

Interviewer

: If you use this to access your computer, would it be quicker? And on the big screen? Finished? Wanted to have your own information possible.

Participant 1: Yeah.