FACILITATING DESIGN STUDENTS TO APPLY USER CENTERED RESEARCH METHODS WHEN DESIGNING FOR HEALTHCARE ENVIRONMENTS

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ABSTRACT
Creating respectful and sensitive engagements in design students is essential for conducting research in complex healthcare and social environments. These skills help students understand the diverse experiences of different stakeholders, ensuring respectful and relevant interactions and design solutions. This paper presents the design and development of a new approach to teaching user-centred research methods for an MSC programme in design for health care. The approach focuses on the development of building block projects that equip students with observation and qualitative research skills, ensuring sensitivity and empathy before engaging in real-world projects. Three projects are described. The first two building block projects took place within the university: the first involved observing the First Time User Experience of a product with users within the student's network, the second involved interviewing paramedic students in role-playing scenarios and the third project, external to the university involved an immersive real-world experience, where students collaborated with various stakeholders—patients, caregivers, and healthcare professionals. The students showed significant growth post focus group, in qualitative research skills, improving their ability to navigate complex human contexts and translate findings into actionable design insights. These findings emphasise the importance of developing these skills in an educational setting before involving students in real-world healthcare contexts.

Keywords: Design for health, design research, user centred design, empathetic research, design education

1 INTRODUCTION
The motivation for this study came about from conducting previous real word projects in clinical setting where the students were a little unprepared for the experience, failed to gain trust and in turn failed to fully capitalise on the research opportunity. This project aimed to address these challenges.
Lam and Suen [1] highlight that contextual learning with real users prepares design students for the future. However, immersing students in sensitive contexts, especially when working with vulnerable populations, may not be advisable without proper preparation. Building empathy and sensitivity is essential when students engage in research within complex social and healthcare settings, especially concerning vulnerable user groups. Recent literature stresses the importance of fostering empathy to ensure user-centred solutions, particularly in sensitive social and health-related contexts.
One challenge in allowing students direct access to vulnerable users is ensuring they are ready to navigate the ethical complexities involved. Bülthuis et al [2] note that students often lack the experience to engage with vulnerable populations in a respectful, ethical manner. Without proper training, there is a risk of exploiting or retraumatizing participants, especially in health-related settings where the stakes are high. Students may also struggle to balance their role as researchers with the need for compassion [3].
To address these concerns, several studies advocate for integrating training on ethical considerations and emotional intelligence into design curricula [4]. This includes training on informed consent, cultural sensitivity, and the psychological effects of design interventions. Observing professionals or participating in role-playing exercises can offer valuable experience, helping students navigate sensitive situations. [5] emphasise mentorship, suggesting that experienced professionals can guide students in managing complex emotions and ethical dilemmas during fieldwork. Additionally, the importance of reflective practice in developing empathy is emphasized. Shah et al. [6] argue that reflective exercises

allow students to process their interactions with vulnerable users, enhancing their understanding of the emotional and social dynamics in design research. Educators can help students develop sensitivity to users' lived experiences by encouraging self-reflection on their own reactions and experiences.
In conclusion, creating a learning environment that prioritizes empathy, ethical awareness, and emotional intelligence is crucial for preparing design students to conduct research responsibly in sensitive environments. By equipping students with the necessary tools and guidance, educators can cultivate compassionate designers who are mindful of the diverse needs of the people they serve.

2 METHOD

Two building block projects were developed to equip students with user centred skills. The skills learnt on these projects were then applied to a third Real World Project, see Table 1.
A focus group took place at the end of the module to evaluate the students' progress throughout the three projects. Further evaluation was conducted of the student's process books which document the entire project in both visual and written format. As part of each project process book the students were also asked to reflect on their own progress in one to two paragraphs. Tutor field notes also contributed to observations of the students' progress. Six students took part in the module, four were from design backgrounds, one was a physiotherapist, and one had a computer science degree.

Table 1. Case study descriptions and research approaches

	Project Title	Nature of project	Types of participants and interaction
1	First Time User Experience (FTUE) of a medical product	Group project in teams of three. 2-week project To identify user, experience issues	Peers and own network Participants were recorded carrying out a user experience test on a medical product.
2	Paramedic problem-based learning class activity to identify opportunities for design	Individual project Simulated scenarios with roleplay interactions with patients and equipment 4-week project To identify user, experience issues	Observations of Paramedic students and tutors carrying out roleplay scenarios of first response interactions with patients, interviews and assisting in roleplay.
3	Project A: Civil Registration process Project B: Paediatric referral process	Individual project Real world project 4-week project To identify service system issues	Observations of service users and staff interacting with processes. Observations and interviews with management and staff.

3 FINDINGS

Overall, the building blocks that the three projects created allowed the students to learn the skills of empathetic research by firstly facilitating them to learn by working with their classmates and close contacts to then working with people from other disciplines within the university to then being equipped to work on real projects external to the university for a client.
Project1: The students all found that the first project worked as an ice breaker. It introduced skills for those that were new to design research and was a refresher for those who hadn't practiced in a while. As the students were from different backgrounds, they were placed in two teams where one member had previous experience carrying out user centred and empathic research. At least one student per team had no prior experience of carrying out design research. Being part of a team allowed those students to learn from the ones that had.

"So, I tried to copy how she did it and I applied that in my projects."

The students found it less daunting to work with peers and close contacts. Carrying out participant research with participants you don't know even if they are classmates can be very uncomfortable.

"It was the 1st day, and I didn't know her. So yeah, yeah, I wasn't feeling comfortable."

In the first project the students were instructed to use each other as participants, and it was a means of allowing the students to get to know one another. They were also encouraged to use participants within their own close contacts to carry out the FTUE and they found this easier than recruiting strangers.

"My granddad was pretty used to the whole like being the older geriatric patient. He's used to being thrown all the medical devices. I told him I was doing a user test with him. He knows what that is from experience. He knows he can't ask me questions he has to do the task, and I have to watch."

The students recognised the importance of explaining the objective of the project to the participants and highlighting that it was the device that they were interacting with, that was being assessed and not the participants. They recognised the importance of explaining why the session was being recorded. This showed a level of emotional intelligence amongst the students that participants may not be comfortable being recorded. The students found that trying the experience out themselves made it easier to be empathetic towards their participants and helped them to pilot the task and work through any logistic issues.

"That helps with empathetic design by trying to experience what it's like to be in that person's shoes of not understanding when something goes wrong and then feeling like, do I say something or am I just being stupid or is there actually something wrong with the device?"

One student found the process uncomfortable when the device was not working for him, and he was conscious of being recorded.

"I was really confused because the batteries didn't work properly, and she was recording me, and I felt really uncomfortable."

They also found that writing out the task for participants for participants to remember the exact task.

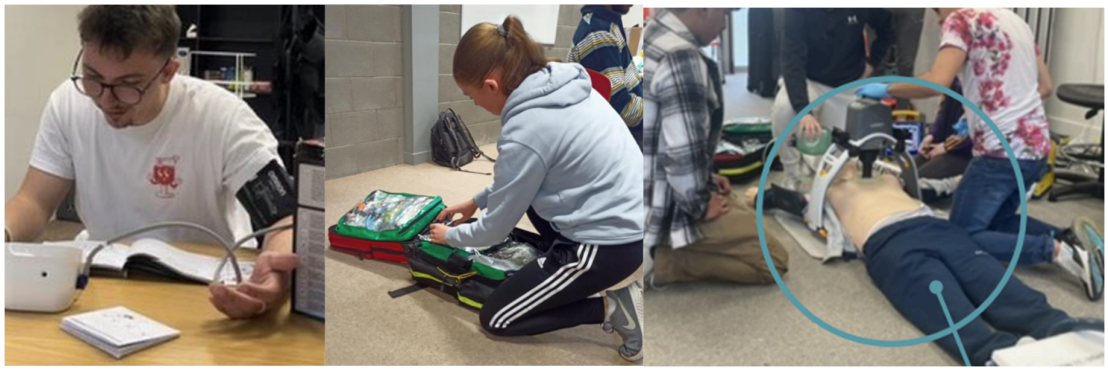

Figure 1. FTUE test and paramedic observations

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Project 2: The students found that the first team-based project helped to set them up for the next project which was more difficult as it involved stepping out of the classroom and working with strangers in a more complex and unknown discipline.

"You've to observe everything. you want to be a lot more kind of in depth."

During this observation session some students felt that preparation was essential to be ready for the data collections. One student felt he didn't have enough context of the paramedic environment, the technical language or the knowledge of the details of the activity in the class. The brief did not provide the breakdown of this detail which he felt would have helped him to get up to speed.

"I have also learned the importance of pre-immersion preparation, in the form of background research, stakeholder mapping, anticipated activities and processes and developing a coding scheme for observations. From doing this preparatory work I was able to better understand the scenarios I was immersed in and it greatly helped me in analysing my raw data."

They found it difficult to keep up with note taking due to the pace of the activity and had not realised that it would have been permissible to record. They did ask midway through but had felt that the paramedic students that they were observing may not have wanted to be recorded.

"It would throw off the students. Yeah, because a lot of them were, like, not of experience."

They felt that in hindsight they could have divided out the topics to focus on due to the fast pace of the activity and made sure that each observer was in a different location in the room for better visibility. They did share notes which was a good way of validating what happened. They also noted that it would impact the participants negatively to have too many people doing observations in that room and believed it worked that the six students were divided into two separate classes to observe in threes.

"Getting observations together would have been harder if there were more of us."

Throughout the session the students recognised the need to be more proactive to get their task done. The tutor from the paramedic course facilitated the students to ask questions.

"I also learned the importance of asking questions when given the opportunity in an immersion setting to further enhance my learning, along with the benefit of taking videos, pictures and recordings to reflect on later."

Once trust was established the other students in the class also began to share their knowledge with the design students:

"She was like, oh, they're not going to know what this means. And then she let me take pictures from her textbook and stuff like that."

Carrying out 'Fly on the Wall' observations of an activity can be very challenging as the students found it difficult to see what was happening at times but also inappropriate to get too close without overstepping and getting in the way. They learned to ask the tutor from the course to explain in more detail.

"He gave us more of a deep, slower pace to write notes and stuff, but that was also our initiative."

At the end of this project the students felt that they had learned to be more objective when observing.

"This has helped me to be more objective…considering the consequences for patients and paramedics and avoiding erroneous conclusions from my previous knowledge and experience"

The students showed an understanding of their participants perspective demonstrating empathy.

"One student felt uncomfortable performing actions leading to missed steps."

Project 3: At the third project stage the students felt in a much better position to carryout research in a real-world context. They prepared well in advance with background research, stakeholder mapping and a coding scheme, which was facilitated by the tutors. These were again new contexts, and the students did not know the staff involved. In both projects the teams found that it was useful to carry out more than one round of research with breaks in between to allow for reflection. They analysed the data and then returned to the research field to gather further information or confirm their data and assumptions. They found that the time to analyse a days' worth of observations and interviews was extensive so would have preferred two weeks between these sessions rather than the one they had.

"So, you need that kind of reflection time between the session. Yeah, trying to figure out whether we're asking the right questions or like there's a lot of the I guess even deciphering the interviews."

Capturing only one day's research can be just a snapshot and doesn't mean that every day will be the same so repeated visits can be necessary.

"Then the second day that we were there, they worked so differently."

In project A, emotional intelligence was evident as the team found that they needed to be highly sensitive to the staff members who may have felt that they were being judged. This also extended to keeping facial expressions neutral.

"I'd be very careful with how I phrased questions; I didn't want to offend anyone. I think one of my questions was picked up in the wrong way, and then the person I was interviewing got defensive and I actually retracted that statement, (and said) oh, I'm sorry, and rephrased the question."

There were two aspects to the project, one about the space efficiency and one about the workflow. The students found that the staff were also more supportive to the issues around space layout rather than their work practices. This in turn prompted the students to ethically pivot and adapt during the session.

"We always referenced something to the building, or we would politely change wording to make it sound like we were potentially talking about the workflow through the layout of the building.

The students on project A also recognised that staff were also uncomfortable about talking about their work practices when their manager was present. Team B found when they had an online interview with two clinicians at the same hierarchy they spoke freely with them.

"I think the online sessions kind of encouraged staff to talk about their frustrations more as well, yeah, because they were in a room by themselves talking to us. So, there wasn't the hierarchy."

In project B the team also had to adapt quickly. They joined a Teams call where they thought it was going to be an observation session with two occupational therapists however the occupational therapists had been asked to do an interview with the students. While a miscommunication was the issue it is something that can happen and hence the students were quick to pivot and adapt and rely on their research questions. One student reflected:

"Be prepared for whatever might happen."

In project B the students valued the opportunity to do pre interviews with a gate keeper from the organisation in advance of observations to learn more about what they were going to observe and to then follow up after the observation session to clarify. This helped them to judge what was ethical to ask people.

"I liked the combination of being able to ask people directly, yeah, questions before the meetings where we had to be like fly on the wall… I think it's very important for like putting context to observations and knowing what to look at.

Despite this the students found "It took a few sessions to get it, yeah to get what was going on." Team B had five different sessions between interviews and observation which deepened their understanding. "It wasn't until the fifth meeting that I copped."

In both projects the students presented back to their client mid-way through with wall sized journey maps which outlined the pain points in the process. This was invaluable to clarify the current processes, and both sets of students made several adjustments to these maps based on the feedback given to them. The students felt that they would have got up to speed sooner if they could have been provided with a detailed information pack to provide the context for the project. The students also found the disciplinary specific language hard to follow and that an explanation of this in advance would have helped.

Figure 2. FTUE test and paramedic observations

Overall, the students demonstrated respectful engagement throughout the project, through careful preparation and reflection they understood the concerns of their participants displaying emotional intelligence assuring participants that they were not being judged only the workflows and avoided potentially confrontational questioning. Midway presentations allowed them to check assumptions and validate findings. Empathy was reflected in the solutions in the final project, students for example developed private space for registering a death within the civil registration project and described it as:

"A versatile and client friendly design that balances privacy, openness and flexibility for efficient meetings and comfortable interactions."

On project B the students developed a more equitable appointment booking system removing the current possibility of families being refused an appointment from different units of the service.

In summary, the findings have highlighted the benefits of creating building block projects that afford students to make mistakes in advance of real-world settings. By the third project the students understood the importance of learning about the context and objectives of the participants in advance which supported respectful and empathetic research. Tutor facilitation, mentorship and reflective questioning was key to embedding these skills.

3 CONCLUSIONS

In conclusion, this study demonstrates the significant value of practice to develop user centred design methods amongst design students, including respectful, sensitive interactions and empathy, when conducting design research in healthcare and complex social environments. The tutor facilitated progression of the stepping stone projects from initial peer interactions to, working with another course discipline, to real-world healthcare contexts embedded students with essential qualitative research skills, such as preparation, observation, reflection, and ethical awareness. By fostering a deeper understanding of users' experiences and emotions, over the first two projects the students were equipped to conduct the final project in a real healthcare and social setting.

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