NAVIGATING THE CHALLENGES OF DESIGNING FOR WOMEN'S HEALTH: A FRAMEWORK FOR EMPOWERING USER-CENTRED INNOVATION IN DESIGN EDUCATION

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ABSTRACT

The field of Design for Women's Health (DfWH) has gained momentum with the rise of FemTech, a sector dedicated to addressing women's healthcare needs. From fertility trackers to menopause management tools, FemTech is expanding rapidly. Many of these products face criticism for lacking scientific validation or failing to meet real healthcare needs, prompting deeper discussion on their actual impact on women's health outcomes. In design education, student interest in women's health projects is increasing, reflecting a broader shift toward gender equity in healthcare. However, these projects present challenges, including limited access to comprehensive research, difficulties in reaching affected women, and ethical and wellbeing concerns when addressing sensitive health topics. Additionally, constraints in real-world testing and prototyping hinder product refinement and validation.

This paper proposes a model for integrating women's health projects into design education by emphasising interdisciplinary collaboration, specialised resources, and alternative testing methods. Partnering with healthcare professionals and researchers can provide students with valuable insights and access to gender-specific data. When real-world testing is not feasible, virtual simulations and indirect user testing can serve as effective alternatives. With the right support, students can navigate the complexities of designing for women's health. By fostering collaboration, providing tailored resources, and encouraging creative problem-solving, this research posits that design educators can empower students to develop innovative, meaningful, and scientifically sound solutions for women's healthcare.

Keywords: Design for women's health, FemTech, design education, women's health, user-centred design

1 INTRODUCTION

Designing for women's health remains an under-explored area, largely due to the historical stigma and taboo surrounding topics like menstruation, reproductive health, and menopause. This has resulted in a dearth of research and innovation aimed specifically at addressing women's healthcare challenges. While FemTech products attempt to fill these gaps, the industry often faces barriers such as limited research, insufficient clinical trials, and lack of user input, which impede the creation of effective solutions. Product design education can help bridge these shortfalls by building awareness and equipping designers with the confidence and, more importantly, the competence to develop solutions that are appropriate and sensitive to people's needs. Undertaking DfWH projects at the UG level, however, presents unique challenges compared to more traditional project topics. Navigating these challenges can be difficult for novice design students (hereafter referred to as designers) and design educators. To successfully undertake women's health projects, design educators must offer students specialised support, resources, and alternative methods for product development.

This article examines a range of design projects at UG level, analysing how students navigated these challenges. It highlights innovative approaches, such as using indirect methods to gather user insights, employing creative prototyping techniques, and exploring alternative validation approaches when direct access to users or testing environments is not feasible. This article begins by contextualising the need for DfWH projects before introducing four case study projects (n=4) that explore the experiences of both designers and educators. It concludes with key recommendations for effectively integrating DfWH

projects into undergraduate design education, fostering a more inclusive and informed approach to developing meaningful solutions for women's health.

2 BACKGROUNDS

Despite significant advancements in medical research, women's health remains critically underfunded and overlooked. Only 4% of global medical research funding focuses on women's health issues, a disparity that perpetuates gender inequity in healthcare innovation [1]. This neglect is compounded by gender biases in technology and healthcare pathways, where products and services often reflect limited scientific rigour and fail to consider the unique ways the physical world, diseases and conditions impact women [2]. The women's health industry, including FemTech and MedTech, is experiencing rapid growth, projected to exceed $60 billion by 2027 [3]. Despite this expansion, the sector faces significant challenges, including systemic gender disparity, limited funding, and entrenched stigmas surrounding women's health issues [4]. These factors hinder the development of solutions that are inclusive, ethical, and effective [5]. Historically, sensitive topics such as menstruation, reproductive health, and childbirth have been stigmatised, limiting open dialogue and impeding innovation in these areas [6].

Ethical considerations are central to responsible design for women's health, requiring a gender-sensitive approach that respects privacy, autonomy, and cultural nuances. Addressing stigma and challenging taboos is critical to fostering trust and inclusivity. Additionally, the lack of robust regulation and bias within the FemTech industry has allowed noncompliant practices to persist, further exacerbating issues of clinical safety and efficacy [7]. These gaps underscore the need for stronger oversight and evidence-based frameworks to ensure products meet the highest ethical and clinical standards. Participatory and human-centred design approaches are particularly effective in addressing these challenges. By actively involving women and clinical healthcare teams in the co-design process, designers can incorporate peoples lived experiences, identify unmet needs, and develop solutions that are both meaningful and practical. This approach not only amplifies women's voices but also challenges traditional biases in healthcare design, fostering inclusivity and equity [8].

The growing FemTech sector must not only address ethical concerns surrounding equity and advocacy but also prioritise sustainability and responsible practices. This includes minimising waste generation and resource consumption through purposeful design, such as employing circular product lifecycles, responsible materials, innovative business models, and energy-efficient practices [9]. However, strict regulations and concerns about safety and infection risks often present significant barriers to adopting more sustainable medical device designs [10]. Given that the healthcare sector contributes 4.4% of global net emissions [11], it is imperative for DfWH to lead by example in reducing environmental impact while maintaining high standards of safety and efficacy.

3 METHOD

This research is based on a Case Study model comprising four undergraduate product design projects that addressed women's health challenges. The projects are the work of final year UG on a BSc. Product Design & Technology at the University of Limerick. Therefore, a certain level of design experience and standard of work was assumed, albeit these were still novice designers nearing the completion of their design education. The data collection comprised interviews with each of the designers and an analysis of their project process books which document the entire project in visual and written format. The data from these two primary sources was triangulated with transcripts and field notes taken by design tutors during interviews and over the course of the projects. Through examining these cases the researchers could explore the process and methods undertaken by the designers when working across all project stages.

Table 1. Case study descriptions and research approaches

Case study	Project Title	Types of participants	Participatory methods used	Additional and alternative methods used
C1	Artificial Reproductive Treatment (ART), specifically In vitro fertilisation (IVF) experiences.	People who have participated in ART. People who could potentially participate in ART. Obstetrics & Gynaecology	Convenience sampling. Purposive sampling. Interviews. Focus groups. User Diaries. Expert interviews. Observations in situ.	Secondary interview data shared from previous project. Instagram, forums & online blogs & vlogs, podcasts. Simulated testing with proxy users.

		(Obs & Gynae) clinicians and healthcare workers.		
C2	Improving Intrauterine Device insertion procedures	Women who have had IUDs inserted in the past. Women who may opt to have an IUD in the future. Obs & Gynae clinicians and healthcare workers. FemTech innovators	Convenience sampling. Purposive sampling. Snowball sampling. Interviews. Surveys. User journeys. Expert interviews. Procedure Observations.	Forums & online blogs. Scenario role play. Product analysis & teardown. Simulated user testing with proxy users. Anatomy model.
C3	Feminine Healthcare for women with vision impairment.	Women who have vision impairment / are blind. Advocates and support service providers. Obs & Gynae clinicians and healthcare workers.	Purposive sampling. Snowball sampling. Interviews. Advocacy Group. Expert interviews.	Simulated testing with proxy users. Empathy mapping. Social media. Online forums. Sympathy testing with self.
C4	Postpartum Recovery	Women who have given birth between 3 and six months prior to the research. Experts & clinicians in birth and postpartum care. Own network	Convenience sampling. Purposive sampling. Snowball sampling. Survey, Interviews, Expert interviews, Journey mapping.	Simulated testing with proxy users. Empathy mapping. Social media, Online forums. Testing with self.

4 FINDINGS

The findings from the data analysis provided valuable insights into both the student experience as designers and the project process from the perspective of the tutors guiding them. By examining these dual perspectives, the research highlights the challenges, learning curves, and key moments that shaped the designers' journeys, as well as the strategies tutors employed to support them effectively. The data was coded across multiple themes, with both recurring patterns and singular instances considered equally significant. While common themes help identify overarching trends, outliers often reveal extreme cases that offer some of the richest insights, shedding light on unique struggles or breakthroughs that might otherwise go unnoticed.

The following sections analyse and discuss these themes, incorporating reflections from designers on their specific cases alongside broader insights from design educators on navigating DfWH projects. This dual perspective provides a comprehensive understanding of the opportunities and challenges inherent in integrating such topics into design education. It must be noted that the design educators in this instance are the authors of this article.

4.1 Choosing the topic

Choosing the topic was a pivotal moment for the designers. Their motivations were primarily driven by personal (often negative) experiences (C3) or observations from close family members (C1 and C4) and friends (C2). They noted that these topics are often overlooked and underdeveloped. All designers expressed a desire to select a topic they were passionate about and where they could create a positive impact on people's lives.

> *"I always wanted to do something even through my all my four years of product design. I always wanted to do Women's Health because I'd love to get into that industry and like [sic] make a change in it."*

Initially, some had concerns. One designer (C3) hesitated, fearing she might not do the topic justice and *"was worried that people would sort of let take it less seriously"*. However, these apprehensions quickly faded as she received positive reactions, reinforcing the importance of addressing the issue. This sentiment was echoed across other cases, with participants responding enthusiastically and recognising the designers' efforts to drive meaningful change. Many welcomed the opportunity to discuss their experiences, as such conversations were rare, and they felt empowered knowing that *"someone cared about them and their experiences and was doing something to help."*

Key to the students feeling confident about their topic choice in an underexplored and sensitive area like DfWH, is the reassurance of the tutors. Showing examples of previous projects can assist with this. If design courses create an archive of projects as reference, this may remove barriers to entry and builds a culture of openness towards outlier or taboo subjects.

4.2 Research

4.2.1 Secondary Research

What was noticeable for the researchers was how knowledgeable the designers were on their topics. Their clinical knowledge far surpassed the expectation of an UG design student often veering into the level of expertise expected at postgraduate. When questioned they commented that secondary research was key to their understanding of the topic so they could speak with 'authority' to experts and with sensitivity to people.

"I do feel like you needed, like I needed to be educated going into those conversations. Like, if I did not really understand my research, I wouldn't have been able to, like, lead the conversation."

Academic articles were used to build clinical knowledge, and this was supplemented with online sources such as blogs, vlogs, forums and social media posts. Whilst these might not be perceived a traditional research source, their contribution cannot be undervalued in offering lived experience insights from first person perspectives. These sources offer access virtually to environments that might be otherwise 'out of bounds' for design students. This information can be further corroborated through additional secondary research and primary research.

4.2.2 Primary Research

All designers initially used convenience sampling, recruiting participants from their close networks. This approach was purposive, targeting individuals with past or current experience of the topic. Snowball sampling was then applied, with participants asked to refer others with similar experiences. However, some designers hesitated to reach out to potential participants and/or had failed at their attempts to get responses, limiting participant numbers (C1). In certain cases, it was inappropriate to engage individuals going through difficult experiences- such as a new mother in recovery or people currently undergoing IVF or following a negative outcome with same. For C4, it was agreed that only participants within six months of recovery would be interviewed and C3 would use primary information generated by a previous design student. Tutors reassured designers that smaller participant groups could yield deeper insights than larger, quantitatively significant samples.

In C3, a national support group (Vision Ireland) was contacted, and they included a call for participants in their newsletter. This method successfully recruited four visually impaired women, providing crucial insights from a minority group. Participants accessed through the gatekeeping agency were notably open and willing to share their experiences.

Accessing clinical experts proved challenging across all cases due to limited availability and the lack of visibility of specialists in marginalised health topics. Designers relied on personal connections and, in some cases (C2, C3 & C4), cold-contacted experts they believed could offer valuable insights or fill knowledge gaps. In C2 the cold contact resulted in a clinician inviting the designer to observe a procedure which provided invaluable insights into both the clinical process and the patient experience. Perspectives from nurses, healthcare workers, support staff, and clinicians were essential to fully understanding stakeholder needs. C1, for instance noted that nurses, offered deeper insights to experiences of the individual or couple undergoing IVF as they spend most time with this cohort. These experts also facilitated access to potential users and acted as gatekeepers, ensuring ethical considerations were upheld.

4.3 Taboos

Several stages of the project were influenced by the sensitive nature of the topic. A common challenge was the embarrassment of discussing it in public, with designers citing concerns about being overheard in the library, questioned about their sketches and models, or having conversations with classmates. As one designer noted*, "we wouldn't get asked this if it was a tractor."* Many found group discussions and project reviews, particularly with male peers and staff, uncomfortable at first. However, this awkwardness diminished over time as confidence grew. Once students became more assured in their discussions and spoke factually, they noticed that others adapted to their tone. As one designer put it, those who remained uncomfortable would simply have to *"get over it, as we all came from a mother!*

4.4 Ethical implications

Ethical approval was sought for all projects and was completed at a school rather than faculty level for expedience. The designers, in all cases demonstrated deep sensitivity and empathy for their research

participants by preparing carefully ahead of the research activities and by modifying their mode of engagement based on the specific participant's needs.

"A lot of the topics they discussed with me they never discussed with anyone before, I wanted to make sure the participants felt comfortable and at ease, so I took a more conversational approach to the interview questions."

The designers reiterated the importance of being well informed on the topic in advance of undertaking the primary research so they were sensitive and aware of what participants may have experienced and to also prepare themselves for what they might hear.

4.5 Testing and prototyping

In all cases, designers recruited alternative or proxy users alongside the target audience. They relied on close friends, family, and peers for testing and refinement, as these close-tie connections were more accessible and willing to engage in iterative feedback. The designers hesitated to repeatedly seek input from initial research participants, recognising it was inappropriate to test low-fidelity prototypes or ask them to iteratively test minor changes. Additionally, many participants were not readily available, and in one case, while the participant appreciated sharing their experiences and were *"happy to have their stories heard"* they had no interest in the subsequent design phases.

"But I don't think I'll go back to people who I went to for ideation and concept development because I think like for designers it can feel like it's moved on a lot, but maybe for a user group it's as if the project hasn't."

"I haven't tried that on other people. I think when I have more higher fidelity models I will."

It is important, however that all the designers return to their participants to share the project outcomes and formally acknowledge the impact of their participation. The tutor should take responsibility for reminding the designers to follow-up as they reach the end of their projects.

4.5.1 Workarounds

During testing at the ideation and concept development phase participants employed a variety of methods to simulate testing. This involved sourcing model anatomy of the vagina to test solutions (C2); using minimalist clothing such as leggings to test a perinium plaster solution (C4) and "wizard of oz" simulation testing (C3). In all four cases the designers used proxy users to roleplay scenarios and test solutions under development. However, testing was limited, which is generally acceptable in undergraduate design education, especially for medical-focused projects where a fully developed product is not expected.

4.6 Designers wellbeing

Engaging with difficult topics in DfWH projects can be emotionally overwhelming for designers. Many encountered challenging conversations, with some describing moments of feeling *"teary-eyed"* and *"upset"* when listening to participants share harrowing and deeply personal experiences. Given the weight of these topics, it is crucial to ensure that designers are guided and supported in protecting their own well-being. While extra care was taken to safeguard participants—such as providing health service executive contact details and mental health hotlines—an important observation was that designers also require protection. Many young researchers lack lived experience of the issues they are exploring, making them particularly vulnerable to emotional distress. Hearing firsthand accounts of hardship often had a profound impact on them.

"I stopped kind of researching things … because I was a little bit like, Oh my God! Literally because it was just so like, I'd never want children."

"I had to like, emotionally withdraw myself from that because I'm like, ok, that's very traumatic and that freaks me out as a person."

To manage this, tutors emphasised the importance of self-care strategies, including taking breaks and setting boundaries during the research process. By acknowledging the emotional demands of these projects and providing appropriate support, educators can help designers navigate difficult topics while maintaining both their well-being and the integrity of their work.

5 CONCLUSIONS

Design for Women's Health presents significant opportunities and challenges for both design students and educators. While tackling sensitive and often taboo subjects, such as reproductive health or

postpartum recovery, can be emotionally demanding and fraught with ethical considerations, the benefits are profound. These projects allow design students to engage deeply with real-world issues, develop their empathy, and create solutions that can make a meaningful impact on society. The key to successful integration of DfWH projects into design education is offering consistent support, starting from early stages to build both confidence and competence. Educators play a pivotal role in guiding students through these emotionally charged topics by providing resources and individual support, cultivating a studio culture of openness, facilitating access to experts, and ensuring that students approach research with sensitivity, professionalism, and respect. By fostering a culture that encourages exploration of underrepresented topics, ensuring ethical guidelines are followed, and encouraging continuous engagement with participants, design programmes can help students navigate the complexities of DfWH work. Ultimately, embracing and addressing the challenges of DfWH will equip students with the skills to create impactful, ethical, and user-centred designs that contribute to advancing women's health.

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