

# Safe and Seen: Codesigning Technology to Address Disparities in Access to Sexual and Reproductive Health by LGBTQ+ People with Uteruses in the UK

Dilisha Patel  
dilisha.patel@ucl.ac.uk  
Global Disability Innovation (GDI)  
Hub, University College London  
London, United Kingdom

Ella Woods  
ella.woods12@gmail.com  
University College London  
Interaction Centre (UCLIC),  
University College London  
London, United Kingdom

Aneesha Singh  
aneesha.singh@ucl.ac.uk  
University College London  
Interaction Centre (UCLIC),  
University College London  
London, United Kingdom

## Abstract

Existing research shows that LGBTQ+ people with uteruses (PwU) experience poorer quality of reproductive and sexual healthcare (SRH) compared to cisgender individuals. We explored how the design of technology can support the experiences of LGBTQ+ PwU when seeking SRH in the UK. We undertook two studies: (1) An online survey (n=32) investigating UK SRH access barriers for LGBTQ+ PwU and (2) Asynchronous co-design sessions (n=8) in which LGBTQ+ PwU designed technologies based on the survey insights. The survey results showed participants' fears and safety concerns associated with in-person care. The survey findings were used to frame the co-design sessions, where participants developed three technology designs to facilitate safe and appropriate SRH care for LGBTQ+ PwU. We provide critical insights into the needs of LGBTQ+ PwU accessing SRH, and how technologies could foster safe, discrimination-free environments and providing information suited to the range of identities within the LGBTQ+ community.

## CCS Concepts

• **Human-centered computing** → **Human computer interaction (HCI)**.

## Keywords

Sexual and Reproductive health, LGBTQ+, Co-design

### ACM Reference Format:

Dilisha Patel, Ella Woods, and Aneesha Singh. 2024. Safe and Seen: Codesigning Technology to Address Disparities in Access to Sexual and Reproductive Health by LGBTQ+ People with Uteruses in the UK. In *Nordic Conference on Human-Computer Interaction (NordiCHI 2024)*, October 13–16, 2024, Uppsala, Sweden. ACM, New York, NY, USA, 14 pages. <https://doi.org/10.1145/3679318.3685380>

## 1 Introduction

Prior literature indicates that LGBTQ+ (lesbian, gay, bisexual, transgender, queer, questioning, intersex, asexual, and more terms such

as non-binary, pansexual) people [18] with uteruses (PwU) receive a lower quality of reproductive and sexual healthcare (SRH) compared to cisgender (people whose gender identity corresponds to the sex registered for them at birth) people [2]. This inequality predominantly stems from the absence of comprehensive sexual and reproductive health (SRH) education tailored specifically to LGBTQ+ individuals within both healthcare training programs and the community [26, 60]. Moreover, entrenched discriminatory attitudes among some medical personnel may further exacerbate this divide. [41]. In response, members of the LGBTQ+ community have adopted strategies such as screening healthcare providers and relying on community [2, 75] to maximise their chances of receiving better healthcare. However, the success of these strategies often relies on relative economic and social privilege, thereby causing access to SRH to be inconsistent throughout the LGBTQ+ community [17]. Additionally, researchers suggest that unregulated information and advice-seeking coupled with the avoidance of professional healthcare services could lead to negative health outcomes [5, 12].

This research responds to the dearth of understanding of how LGBTQ+ PwU can be better supported in accessing SRH services and information, specifically within the United Kingdom (UK). Existing investigations on this topic have primarily occurred beyond the UK; prompting us to investigate the experiences of seeking SRH services and information within the UK's distinct healthcare landscape. We hope to contribute to a larger goal of providing equitable and safe care for all.

This paper reports two studies, an online survey with 32 LGBTQ+ PwU participants, to investigate their experiences and access strategies within the context of UK-based SRH. Findings revealed the importance of healthcare providers' empathy and LGBTQ+ specific medical and cultural knowledge in shaping positive or negative SRH experiences, a widespread perception of in-person SRH services as unsafe due to past experiences or precautionary fears, and proactive information seeking among participants, driven by a belief in the inadequacy of mainstream SRH providers knowledge and information for LGBTQ+ care. The second study consisted of eight co-design sessions with individual participants and was based on survey findings from the first study. Through sketching and discussions with eight participants, three conceptual designs were developed. (1) Technology to locate and screen providers in order to avoid negative and discriminatory care (2) LGBTQ+ Information hubs for both LGBTQ+ individuals or healthcare providers and (3) AI Informants to replace in-person care.



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*NordiCHI 2024, October 13–16, 2024, Uppsala, Sweden*  
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ACM ISBN 979-8-4007-0966-1/24/10  
<https://doi.org/10.1145/3679318.3685380>

Key contributions made by this research are an advancement in understanding the challenges faced by LGBTQ+ PwU seeking SRH information and services and how future technologies could be formalised to facilitate the access to safe and inclusive SRH care. In stating our findings and contributions, we recognise that whilst there was diversity within the sample with regards to identity and gender, our participants mostly identified as bisexual women. We acknowledge that any technology designed within the space of LGBTQ+ healthcare should reflect the variability of the LGBTQ+ experience and not homogenise all those who identify under this umbrella as having the same SRH related needs or experiences.

## 2 Related Work

### 2.1 Sexual and Reproductive Health in UK

Sexual and reproductive health (SRH) refers to an intersectional field of healthcare and social activism. Reproductive health is defined by The WHO as a state of “complete physical, mental and social well-being” with regards to autonomous reproduction and a safe and pleasurable sex-life [20, 50, 82]. To be sexually and reproductively healthy, an individual should have full, judgement-free autonomy over who they choose to have sex with and access to all information and services necessary to maintain a healthy body free of sexually transmitted diseases and unintended pregnancy [53, 81, 82].

Within the United Kingdom (UK), SRH services can be accessed free of charge using the National Health Service (NHS), associated providers or on a private, paid basis. Alternatively, some publicly funded charity organisations provide local access to specialist SRH advice and treatments for members of the LGBTQ+ community [10, 44]. SRH services can include, but are not limited to, contraception provision, sexually transmitted infection (STI) screening and treatment, abortion care, treatment post-sexual assault, pregnancy planning and the provision of SRH information[58].

### 2.2 Technology use in SRH

UK SRH services are undergoing mass digitisation as patient communication and information provision now increasingly rely on applications, instant messaging, and video streaming technologies [25, 46, 51]. Online sexual health services provide users with free contraceptive screening and contraception without the need for in person interactions; they have risen in popularity, with uptake especially high during the pandemic [72, 73]. Research indicates that online clinics may be preferable to women and non-heterosexuals compared to in-person services; additionally, they are highly rated by transgender and non-binary people [21]. Online chat functions and chatbots have been implemented within health providers for both logistical and advice-seeking purposes [64] and found to be preferable for sexual health information [24, 74].

The use of technology for sexual and reproductive health is prolific, especially but not limited to the realm of menstruation and fertility, [15, 27, 29, 65] to generate data-driven predictive insights for the purpose of either general monitoring or fertility planning some of which incorporate physical, ubiquitous technologies such as thermometers, arm-bands and cervical fluid analysers [6, 19, 40, 56]. Many fertility-tracking systems also provide users with access to free SRH information, effectively disseminating this information

to large audiences regardless of user location [54]. Whilst there is a move towards being in-touch with the body in the absence of apps, [16, 37], there remains concern that existing apps and tools propagate inappropriate information towards non-cisgender SRH requirements.

### 2.3 LGBTQ+ Safety

Creating safe spaces for LGBTQ+ communities encompasses multiple dimensions, including physical, emotional, psychological, and social. The growing awareness of the unique challenges faced by individuals within the LGBTQ+ spectrum has prompted a concerted effort to design environments that foster inclusivity, understanding, and acceptance [45]. These safe spaces extend beyond physical spaces to online platforms, workplaces, educational institutions, and various other settings where individuals seek refuge from discrimination and prejudice.

Understanding the needs and experiences of the LGBTQ+ community is at the heart of designing safe spaces [4, 22, 63, 69]; issues such as heteronormativity, microaggressions, and fear of discrimination can hinder the well-being of LGBTQ+ individuals. Thus, the design of safe spaces involves not only the absence of physical threats but also the cultivation of an atmosphere that actively promotes diversity, equity, and respect [69]. Designing for safety for LGBTQ+ communities involves a holistic and evolving approach that considers physical, emotional, and social well-being [4] committed to inclusivity and a deep understanding of the unique challenges facing this community; it involves collaboration, empathy, and a continuous effort to create spaces that empower and protect.

There has been much research in HCI that has explored safe spaces for non-cisgender people (e.g., [31, 70, 71]), and how LGBTQ+ communities create and navigate safe spaces online [45]. These works highlight how online spaces are often utilised, and often can be concerning, for collaboration, support, and activism.

### 2.4 Disparities in Accessing SRH

LGBTQ+ PwU face increased challenges when accessing SRH compared to those within the cisgender, heterosexual majority [43, 70]. These disparities include a lower likelihood of being offered STI screenings due to low-risk assumptions, increased stress during pregnancy and pregnancy loss, and refusal of services [66]. The absence of culturally competent care and subsequent direct or indirect discrimination faced by patients can cause major disruptions to health seeking behaviours [28]. Within the context of SRH LGBTQ+ care, this necessitates a knowledge of correct terminology, the avoidance of heteronormative assumptions, and knowledge of LGBTQ+ specific challenges [4].

Reports of a lack of formal LGBTQ+ sexual education have been attributed to the heterocentricity of sex education in UK schools, which can leave LGBTQ+ youth without the knowledge necessary to navigate adult relationships safely [26]. This can facilitate the spread of health misinformation, placing LGBTQ+ individuals at an elevated SRH risk due to misinformed advice from clinicians and their peer networks [43]. Some LGBTQ+ patients report taking on the additional burden of educating medical staff about non-heterosexual relationships and parenthood [41].

LGBTQ+ healthcare disparity has been largely attributed to the lack of LGBTQ+ specific healthcare education provided to healthcare professionals [12, 48]. 84.9% of UK medical students surveyed, reported a lack of LGBTQ+ specific education with specific deficits in “sexual and gender terms, deciding the ward in which to nurse transgender patients and discussing domestic abuse with LGBTQ patients” [60]. The inappropriate attribution of heteronormative assumptions by SRH providers can cause affected patients to feel embarrassed and marginalised. Heteronormative treatment includes clinicians asking inappropriate questions and gendered communication that assumes cisheterosexual partnership in both written and verbal formats [36, 47]. Clinicians not feeling confident in treating LGBTQ+ people can also lead to the refusal of services due to staff not feeling knowledgeable enough to advise LGBTQ+ couples [68].

## 2.5 Strategies to Overcome SRH Disparity

In response to SRH disparity, LGBTQ+ PwU have developed strategies to navigate mainstream healthcare systems safely [17]. Young LGBTQ+ PwU are both exposed to and independently seek SRH information at a higher rate than cisgender, heterosexual women [76]. Through seeking and socially sharing information, some LGBTQ+ people can better understand and advocate for their health needs, in addition to combating feelings of isolation that may result from continued interactions with heteronormative healthcare systems [23, 39]. Social media such as Tumblr, Reddit and Facebook are often central to LGBTQ+ information-seeking behaviours as they facilitate the sharing non-heteronormative medical advice, and a feeling of community within the context of SRH [4, 23]. Despite the benefits of social media networks, the spread of misinformation, exclusion based on traits of intersectional identity, and content moderation practices can form barriers to accurate access to information and lead to poorer health outcomes [3, 4].

LGBTQ+ in-person social networks also facilitate access to SRH, as members often advocate for each other’s healthcare needs by assisting in their search for LGBTQ+ friendly healthcare providers and attending appointments for emotional support and advice [39]. However, some seek to prevent potential discrimination and gain control of their health decisions by avoiding mainstream clinics, thus demedicalising SRH procedures [12]. Within the context of a pregnancy journey, demedicalisation can refer to the use of online social networks to answer fertility-related questions normally directed to a clinician and complete the insemination procedure using a known donor in a non-medical environment [67]. Alternatively, within the context of abortion care, demedicalisation can result in at-home abortions performed without clinical supervision, often causing negative health outcomes such as the self-infliction of bodily trauma and ingestion of harmful chemicals [52].

## 2.6 Study Rationale

Despite forming a central part of how some members of the LGBTQ+ community negate health disparity to safely access SRH, the relative social and economic privilege of individual LGBTQ+ PwU can disproportionately affect the success levels of their access strategies [17]. This study addresses these disparities by investigating needs and strategies that could be formalised via the co-design of free-to-use technologies to facilitate safe SRH access for LGBTQ+

PwU. Additionally, whilst there is evidence on LGBTQ+ sexual and reproductive health disparity in the UK, much prior research on LGBTQ+ PwU experiences in SRH is not situated within a UK context. Therefore, we explore whether similar challenges exist when LGBTQ+ PwU seek SRH within the UK, to support equitable access for all.

To this end, we start with a survey study to explore, (RQ1) What are the healthcare experiences of LGBTQ+ PwU in the UK context? Through understanding the lived experiences of the LGBTQ+ PwU community, we then utilise co-design methods to address our second research question: (RQ2) How can technology facilitate access to SRH services and/or information for LGBTQ+ PwU in the UK?

## 2.7 A Reflexive Note

We approach this body of work as UK-based HCI researchers who have significant experience exploring lived experiences of marginalised populations, including in healthcare. We view equitable access to healthcare information and services as a right for all and critical to wellbeing. Our goal is to embed social justice principles into our research and interventions that we design [8].

## 3 Methods

**Study Design:** To answer RQ1, we distributed an anonymous online survey investigating the experiences and opinions of LGBTQ+ PwU accessing SRH healthcare and information. The structure of this survey and the questions asked were informed by literature and intended to compare the findings of previous global research with the lived experiences of participants residing in the UK. The survey narrowed the scope of the project by identifying a clear set of SRH barriers encountered by the participants and uncovering the functionalities that the participants believed should be included within a technology designed to address them.

To explore RQ2, we conducted a series of co-design sessions where participants were introduced to and discussed key insights gleaned from responses to the survey. We utilised fictional user personas created from the survey responses and completed sketching exercises to visually communicate how participants believed the survey insights could be actualised as a technology.

A co-design approach was adopted, as it has been demonstrated to be an effective approach within digital reproductive health and LGBTQ+ specific design [7, 31]. To achieve a co-design methodology, the lived experiences, perspectives, and knowledge of LGBTQ+ PwU were consulted at every stage of this research, from defining a problem scope to designing solutions, thereby ensuring any outputs are informed by and relevant to LGBTQ+ PwU’s SRH needs [83].

In presentation of survey findings participants are labelled as (Px), from those who participated in the co-design activities are denoted as (Dx).

**Ethical Considerations** This research was ethically approved by [institution-anonymised] No identifiable information was collected through the survey. Participants completed a consent form before proceeding to the main survey. After completing the survey, participants could register interest to the co-design sessions through a link to a separate data entry point, ensuring their survey contributions remained anonymous.

Participants were given the option of attending a co-design session on a one-to-one basis or as part of a small group. This was due to the sensitive nature of topics discussed and the consideration that participants may not feel safe revealing themselves as non-cisgender or non-heterosexual to strangers. Participants were asked to share their preferred pronouns prior to the commencement of the co-design sessions, ensuring that the researcher would not accidentally use misgendering language. All data from the sessions was anonymised using pseudonyms and stored on a password protected device for analysis. Gendered language was avoided in all communication with participants across both studies in accordance with the guidelines of Scheuerman et al. [71].

### 3.1 Survey

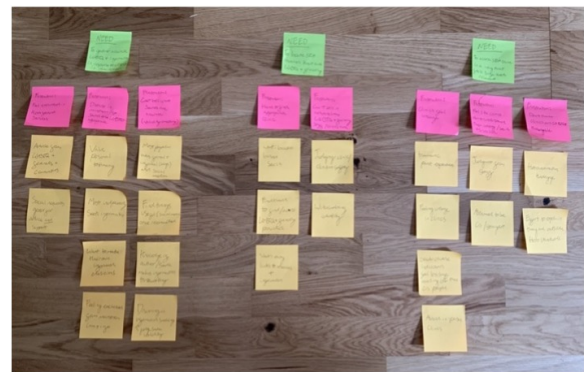
**Participants:** All participants completing the survey self-identified as a member of the LGBTQ+ community, had female reproductive organs (a uterus) and resided in the UK. The survey was distributed through convenience and snowball sampling, and the social media pages of local LGBTQ+ community groups 32 participants responded to the survey, of whom 74.2% were between 18 and 24. 61.3% of participants identified as bisexual. 13% of the participants chose to self-describe their sexuality as either pansexual (6.5%) or queer (6.5%). 74.2% of participants identified as women; 25.8% of the participants identified as non-binary, and 2 participants (6.5%) self-described their identity as gender fluid.

**Materials:** An anonymous online survey was selected as a data collection method due to its ease of distribution and reach. The survey contained both quantitative and qualitative questions. Furthermore, the anonymity this format affords was intended to help participants feel more comfortable sharing their honest experiences and opinions [80]. The survey was created using Qualtrics. The survey collected basic demographic information, investigated the past experiences of the participants using SRH services in the UK, including the frequency and purpose of at which services were accessed. Questions also covered perceptions towards their preferred methods for seeking SRH information outside established clinics, and what they value or would value in a health technology in this context. Open questions were included to provide space for participants to share positive and negative encounters experienced when accessing SRH services. To ensure respondent anonymity, open ended questions included a reminder for respondents not to include personal information in their responses. Before distribution, the survey questions were piloted. Consequently, the question enquiring about the respondent's gender identity was split into two parts according to the guidelines introduced by Scheuerman et al. [71]. In the interest of participant comfort, no questions were compulsory, so participants could skip any that they felt were too personal. All questions were phrased to be gender neutral and skip patterns were used to prevent participants from being asked questions that did not apply to their experience [38].

**Data analysis:** Responses to scenario-based likert scale questions were assigned a numerical value from 1 (never) to 5 (always), from which an average score was calculated. Responses to qualitative questions were thematically analysed through a process of inductive coding to identify themes [14]. Initially, the first 16 responses were inductively coded. These codes were then discussed

and refined by the research team into a codebook. The remaining qualitative responses were coded using the codebook. We then reviewed the entire corpus again to validate codes which arose through the analysis. The data was read multiple times and continually discussed with the research team. We identified insights that highlighted the experiences and needs of LGBTQ+ PwU within an SRH context, for example, "service avoidance", "distrust in mainstream education" and "heteronormative treatment". We then defined these into three broad themes: (1) In-person SRH services, (2) Online SRH care, and finally (3) System requirements, which we detail in Section 4.

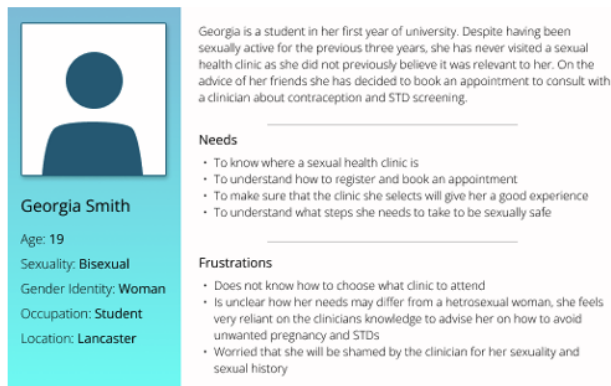
Following the methodology of van Greevenbroek et al. [79], user personas were generated from the survey insights. A thematic approach was taken when creating personas with the intention of grounding the co-design sessions in the real experiences of LGBTQ+ PwU. An affinity diagram of the survey insights was formed, which were then grouped into clusters based on similarity; each cluster represented a user frustration which in Figure 1, which exemplifies how codes and insights were clustered. The identified frustrations were then grouped based on their narrative cohesion, forming the basis of each persona.



**Figure 1: Image of clustering activity of themes. Personas were created by grouping insights (orange notes) into frustrations on an affinity map and grouping frustrations (pink notes) by narrative cohesion**

### 3.2 Co-design sessions

**Participants:** Participants were recruited by convenience sampling, social media advertisements, and a shared sign-up link after completing the survey, ensuring we had a combination of participants who had completed the survey and those who could bring new ideations to the co-design discussions. To protect the anonymity of the responses, the sign-up link directed the participants to a separate form that was in no way connected to their previous responses. Participants were compensated for their time with a £10 Amazon voucher. All participants identified as members of the LGBTQ+ community, having female reproductive organs and residing in the UK. Eight co-design sessions were held; all participants chose to attend the session online and alone. All participants identified as cisgender women; six participants (75%) identified as bisexual,



**Figure 2: ‘Georgia’ persona represents the frustrations of ‘not knowing how to locate a clinic’ and ‘cannot tell how LGBTQ+ friendly clinic is before attending’.**

while two (25%) self-described their sexuality as queer. 87.5% of the participants were aged 18-24, and one was aged 25-34.

**Materials:** The co-design sessions were held virtually on video conferencing software, by choice of the participants. The participant sketched ideas using pen and paper and Miro. Paper sketching was used by participants in the initial idea generation exercise due to the time-pressured nature of the task; participants later shared an image of their sketches. In addition to auto-transcription, insights were noted manually throughout the sessions.

Personas were used in the co-design sessions due to the personal nature of the topics discussed. Personas have been shown to benefit participatory design sessions by encouraging participants to share opinions or emotions they may not be comfortable expressing when talking directly about themselves and their own experiences [11, 34]. Additionally, personas can prompt participants to consider perspectives beyond their own experience, and encourage them to consider diverse needs when engaging with co-design [57]. Whilst the summation of these personas represents all key themes identified in the questionnaire responses, each individual persona represents only a selection of themes which have been grouped together based on their narrative cohesion. Each persona included a user description of age, sexuality, gender identity, occupation and location. We also included a characteristic bio that outlined why they were seeking SRH care, their SRH needs and frustrations with accessing SRH. Participants were given the choice to refer to the personas rather than themselves when participating in the co-design sessions. An example of a persona is shown in Figure 2.

**Procedure:** All co-design sessions followed the following 6-step process apart from the first session, which was unable to incorporate step 6 due to there being no prior designs to evaluate:

- (1) Introduction and ethics procedures: Participants were welcomed and presented with an information sheet and informed consent form. To create a safe environment, participants were reminded that they could end the session or request a topic change at any time. The participants also received a brief oral summary of what to expect in the session and the types of topics that would be discussed. This

exchange also offered an opportunity for a rapport building conversation designed to put the participant at ease.

- (2) Familiarising participants with survey insights, participants were given a short oral summary of key survey findings key themes and desired system elements. These findings were displayed for their reference throughout the session.
- (3) Considering personas as potential end-users, participants were introduced to three end-user personas and asked to study them. They then asked clarifying questions about what they were designing and for whom they were designing.
- (4) Crazy-8 sketching: Participants were asked to draw on the survey findings and their own experiences to sketch 8 ideas for technologies addressing the needs of the personas in 8 minutes. They sketched on paper for ease and speed and shared these drawings with the research team after the session. The participants presented each idea to the researcher while collaboratively sketching it onto the Miro board.
- (5) Expanding on a chosen idea: participants selected the one idea and worked with the researcher to elaborate the sketch in more detail, expanding upon its mechanics, aesthetics and usage scenarios.
- (6) Discussing previous concepts: Participants were given the opportunity to view and comment on the outputs of previous sessions undertaken within this study. They were asked to compare their ideas and those of previous participants, reflecting on their similarities and differences, whether they believed the concepts would be useful, and how they could be improved upon.

**Data analysis:** Each design produced by the participants was placed on an affinity diagram to identify thematically similar technologies. Once distinct categories of technology had been identified, further context was gathered by analysing the transcripts and notes taken during the sessions. Three conceptual designs were developed based on the dominant design ideas, which combined a synthesis of participant’s sketching and discussion of other’s ideas as the final conceptual designs.

## 4 Survey Results

We present the three key themes from the survey study which fed into the generation of the personas and outline of the co-design sessions. We then present insights from the co-design sessions and how these led to the presentation of three conceptual design ideas intended to assist LGBTQ+ PwU in accessing SRH services and information. We present a walk-through of the conceptual designs and how they would facilitate access to SRH services and information for LGBTQ+ PwU.

### 4.1 In-Person SRH Care

The frequency with which people reported utilising sexual health services ranged from once a month (6.5%) to only one or two times prior to the time of survey completion (22.6%). However, most respondents had used sexual health services in the past (83.9%), and those that had never used SRH services (16.1%) stated that this was due to either not feeling a need, not knowing how, or feeling uncomfortable accessing SRH services due to the past experiences of their peers, *“I have not yet desperately needed access to these*

services. *With contraception in particular, many people I know have had bad experiences regarding their medication/implant, and so I take steps not to need this contraception.*" (P16).

Of the respondents who had accessed SRH services in the past, all respondents utilised NHS services, 8.3% also utilised private services and 1 respondent (4.2%) visited an LGBTQ+ specialised clinic.

**Safety** When asked to rank how often they felt safe revealing their gender identity to medical professionals on a scale of 1 (never) to 5 (always), participants gave an average of 3.5 (sometimes - often). However, this average fell to 1.5 (never - occasionally) when the responses of cisgender participants (74.2%) were removed. Respondents indicated that they never - sometimes (1.48) experience discrimination based on their sexuality. On average, participants occasionally (2.17) choose a provider based on their reputation of LGBTQ+ treatment.

A common perception among participants was that their sexual or gender identity would lead them to feel unsafe when visiting in-person clinics. For some participants, this stemmed from past experiences of assault, discrimination, or judgment within the context of SRH services. Others reported feeling fear that these experiences could happen to them. *"I (a person in a relationship with an assigned female at birth lesbian) was given condoms for 'if I wanted a bit of a change' which made me very uncomfortable as this came from an older male medical professional"* (P13).

*"I walked to the nearest hospital, [the] receptionist was disgusted with me [...] At the second hospital, I refused an examination as I didn't consent to taking my clothes off and tried to leave, but they wouldn't let me..."* (P15).

Participants described engaging in protective strategies to negate the risk of having a negative experience, including adjusting their level of identity disclosure or avoiding mainstream clinics altogether. *"If the only answer is to seek medical attention I will, but I would normally try anything else first"*(P11).

**Competent Care** The importance of cultural competency in healthcare providers was key, as the quality of a participant's experience primarily hinged on them feeling understood and affirmed during consultation. Participants who reported positive experiences said that clinicians demonstrated that they understood and empathised with their identity and culture either through shared humour, accommodating their needs, inclusive language, or a shared identity. *"I had gay-friendly GP who was willing to accept that I was not at risk of pregnancy despite being sexually active"* (P32).

Alternatively, many participants attributed negative experiences with SRH services to a lack of LGBTQ+ specific cultural knowledge or the attribution of heteronormative assumptions and standards. The advice and treatments offered to patients were focused around a heterosexual or cisgender experience, causing them to feel marginalised as the care they received didn't match their needs. *"I feel that as a bisexual woman, I am often assumed to be straight, and so assumed to need much of those services, but not in a way that really reflects my needs."* (P16).

*"they defined 'losing virginity' as penetrative sex breaking the hymen. I found this to be very outdated, medically questionable, and not applicable to me. The impression was given that losing your virginity as a lesbian doesn't count. The whole experience was quite uncomfortable, invalidating, and confusing"* (P13).

These experiences led to some participants to doubt the competency of the healthcare providers to provide them with correct and relevant advice, expressing a desire for medical professionals and online resources to be more knowledgeable on LGBTQ+ terminology and challenges. *"Medical professionals/official NHS websites don't always feel like they are knowledgeable enough about specific or niche concerns"* (P4)

## 4.2 Online SRH Care

85.7% of participants reported seeking SRH information outside of SRH clinics, such as NHS websites. Other popular sources of information included in-person conversations (80%), informal online resources such as blogs (i.e. "Quora") (76%), and social media (56%). Respondents that did not independently seek SRH information regretted their decision, *"I regret not looking into other information as I was repeatedly given advice that didn't match my needs"* (P22).

The use of academic sources was the most popular method of confirming the trustworthiness of information (95.8%) followed by recognising the original author or organisation that produced the information (75%) Only 16.7% of participants indicated that the complexity of language would increase their trust in information.

When asked how often they interact with social networks for SRH information, 17.9% responded they never did, 71.4% said it would depend on their health needs, and 10.7% said they interacted with social networks every time they had an SRH need. Of participants who interacted with social networks, 63.6% utilised online networks and 54.5% interacted with in-person groups, these social groups were made up of friends over family members (86.4%). *"I probably see more online content about sexual health than I talk about it, but talking about it in real life is much more helpful, I find that much easier to trust"* (P16). Although seeking advice in-person may be beneficial, this strategy is reliant on situational privilege and therefore is largely unavailable to people who have not disclosed their identity: *"It is difficult to seek in person advice since I am closeted"* (P32).

Participants shared that official information sources such as schools and healthcare providers could not or would not provide them with accurate LGBTQ+ sexual health information; many participants described taking an active role in the maintenance of their SRH by independently engaging with healthcare information online such as Instagram or YouTube. *"as I was not informed about safe lesbian sex practices earlier [...] I had unknowingly put myself at risk. Thankfully, YouTubers had shared videos on how to have safe lesbian sex and this [...] made me feel reassured about how I could protect myself. I have not found any information as clear and accessible as this in schools or from healthcare providers, I think this needs to improve."* (P29).

When discerning the trustworthiness of SRH information, author credibility, grasp of LGBTQ+ terminology and their inclusion of academic citations were used as metrics. *"Sometimes I notice that language is inclusive which makes me like using the resource because it means I would happily share it with my friends"* (P8).

The gathering of trustworthy LGBTQ+ specific SRH information empowered some participants to take agency as they felt able to make informed decisions regarding their healthcare options.

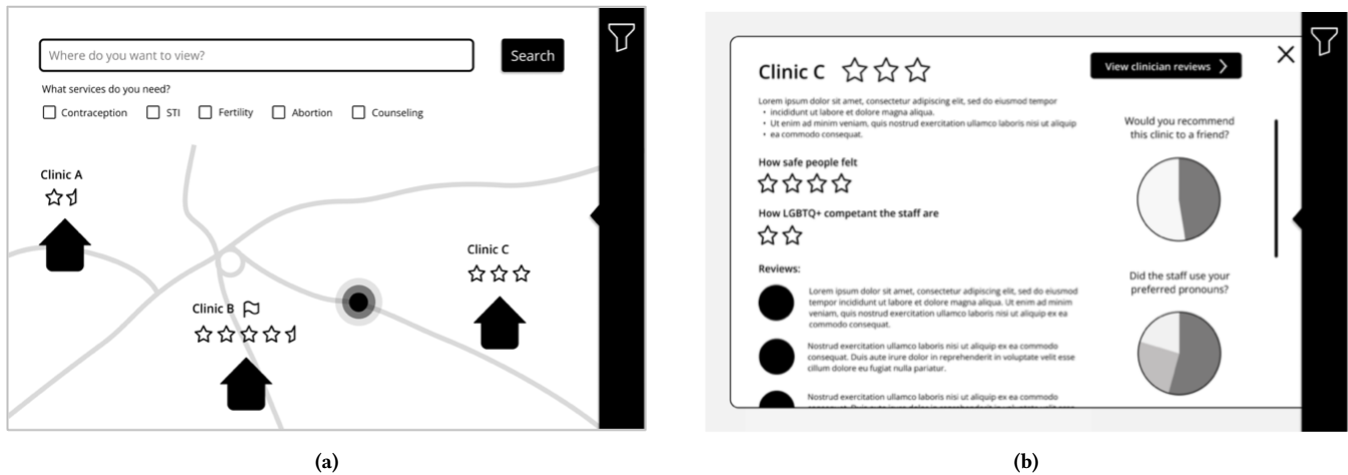


Figure 3: (a) ‘Screen 1’ - Filter by need and see clinics in local area rated in term of LGBTQ+ suitability. (b) ‘Screen 2’ - See detailed breakdown of clinic reviews.

### 4.3 System requirements

When asked what would be preferred in a digital system that facilitates access to SRH information and services; “medically vetted information” was ranked most important. Participants indicated that they would like information relevant to their biological needs and SRH services available to them to enable informed decisions about their healthcare needs. [I would like] “Some type of information that explains everything in full, or tells you where to access this information, so that you can make all of the right choices and be fully informed about side effects, pain levels, and how different choices (e.g. methods of contraception) compare to each other.” (P22).

Information that was clearly referenced and personal testimony were seen by participants as trusted informational resources. ‘Reviews of how LGBTQ+ friendly providers are’ was ranked as the second most important feature in a technology. Ease of access to SRH resources was important as when asked what would be useful in an SRH technology, multiple requested the inclusion of a function that displays SRH resources based on user location and quick links that facilitate access to services. “I think it’ll be great to have an app which has a map of all the sexual health services on it where people can anonymously rank how friendly/ helpful/ comfortable services are”(P7).

Technology needed to be simple to use, gender-neutral in its aesthetics and language, and inclusive of non-heterosexual, non-cisgender experiences. “I don’t see or know about any resources that are inclusive of nonbinary identities, do not centre female or feminine language, or that value the queer experience.” (P29).

Participants also expressed a reluctance to store menstrual or other reproductive health related data on a digital device. They often cited the recent overturning of Roe vs Wade in America (revoking the right to abortion) and a subsequent fear of facing future prosecution for accessing abortion care as the reason for their caution [59]. “I am wary of using any app that tracks my menstrual cycle in the wake of anti-abortion laws in the US and recent legal cases here in the UK.” (P12).

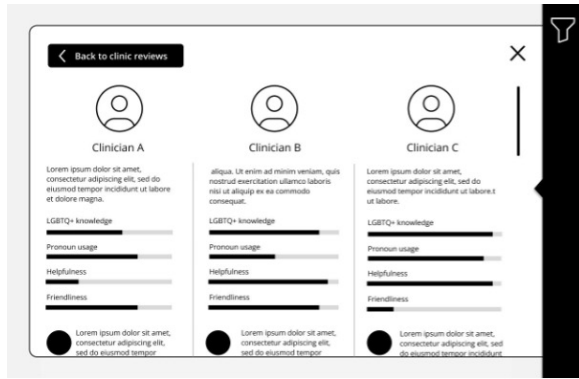
## 5 Co-Design and Conceptual Designs

We discuss how technologies were thematically conceptualised by participants during the co-design sessions and how they evolved into three conceptual technologies created from a synthesis of the functionality of participant ideas.

### 5.1 Locating and Screen SRH Clinics and Clinicians

In order to avoid negative experiences at in-person clinics, many participants explored the process of selecting LGBTQ+ friendly clinics with the aim of ensuring end-users could avoid discrimination and receive care appropriate to their needs. D8 suggested indicating acceptable clinics with an “LGBT flag” icon, the LGBTQ+ friendliness of a clinic was communicated primarily with a star rating. Many participants suggested that this indicator could be expanded to view reviews left by previous attendees alongside metrics detailing how safe they felt and how knowledgeable staff were about LGBTQ+ topics. “(my idea is) like a Yelp for clinics. Rating is based on perceived normalcy when speaking about LGBTQ sex or related issues, consistency with pronoun usage [...] and specificity of advice. The ratings are like a system rather than just how competent you perceive the doctor. [...]specifically about how safe and seen you feel.”(D8)

Alternative methods of indicating clinic’s LGBTQ+ friendly status included a fact checking browser extension that would flag any claims made by a clinic that were contraindicated in patient reviews (D8) or a secret review system in which people would use SRH in-person services and publicly record their experiences (D6). In addition to generally rating clinics, users could also rate the LGBTQ+ competence of individual clinicians and select which member of staff they would like to be seen by accordingly “this whole idea is getting to know the person you’re gonna be working with, knowing that they can actually help you and knowing that other people have had a good experience with them. ‘Cause even if someone



**Figure 4: ‘Screen 3’ - View reviews of medical professionals who work in the selected clinic.**

is a specialist and they’ve got 100 degrees in this area, if they’re not a very nice person then you wouldn’t want to go see them.” (D5)

Some participants wished to ensure safety from negative clinic experiences by removing the risk of encountering discrimination or misinformation entirely. D1 devised “dumb cancelling headphones” that would block the sound of any misgendering, incorrect terminology or misinformation. D7 designed a robot to be remotely controlled by an LGBTQ+ user and attend the clinic in their place, disguising the users voice and face so that they could control their level of identity disclosure. Alternatively, D8 opted to manage identity disclosure by devising a technology that informed the consulting clinician of their patients’ sexual and gender identity before meeting thereby preventing them from needing to ‘come out’.

These led to the development of a conceptual design to locate and screen SRH clinics and clinicians. This online technology affords users the ability to view clinics in their local area filtered by the services they provide. As discussed by participants, not every person who identifies under the umbrella of ‘LGBTQ+’ has comparable experiences; therefore, the user can filter information displayed by their sexuality or gender demographic. For example, a person who identifies as gender diverse may face very different challenges to a cisgender woman; therefore, it may be useful to highlight reviews written by other non-cisgender people.

The user can explore clinics based on a location (Figure 3a) The clinics shown can be filtered by the service wanted, ensuring that they do not consider providers unsuited to their needs. Each clinic on the map has a star rating above it communicating a user consensus of how LGBTQ+ friendly it is. Clinics marked with an additional LGBTQ+ flag have demonstrated competency by voluntarily undertaking additional training initiatives in LGBTQ+ healthcare, this is inspired both by participant designs and the ‘pride in practice’ map developed by the LGBT foundation [42].

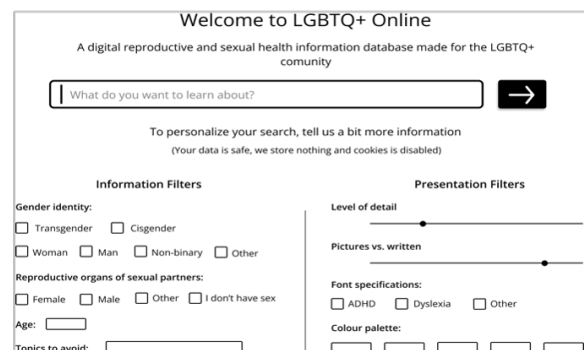
Once a clinic is selected, more information is shown detailing the services provided by the clinic and a breakdown of their star rating into categories of ‘How safe people felt’ and ‘How LGBTQ+ competent the staff were’ (Figure 3b). Reviews written by past attendees on their clinic experiences are shown, giving more context to the charts and star ratings. The button ‘view clinician review’ directs users to a page on which the names and photos of medical staff based at the clinic are listed with scores under categories such

as ‘LGBTQ+ knowledge’, ‘helpfulness’, and ‘pronoun usage’ (Figure 4). This is a similar rating system to the ‘Trans\*- friendly GP’s list’ which has been collated online through grassroots efforts [1]. Reviewers can also leave comments providing context to their ratings. In response to some participants’ concerns for the safety of GPs being reviewed, this section of the technology would moderated.

## 5.2 LGBTQ+ SRH information hubs

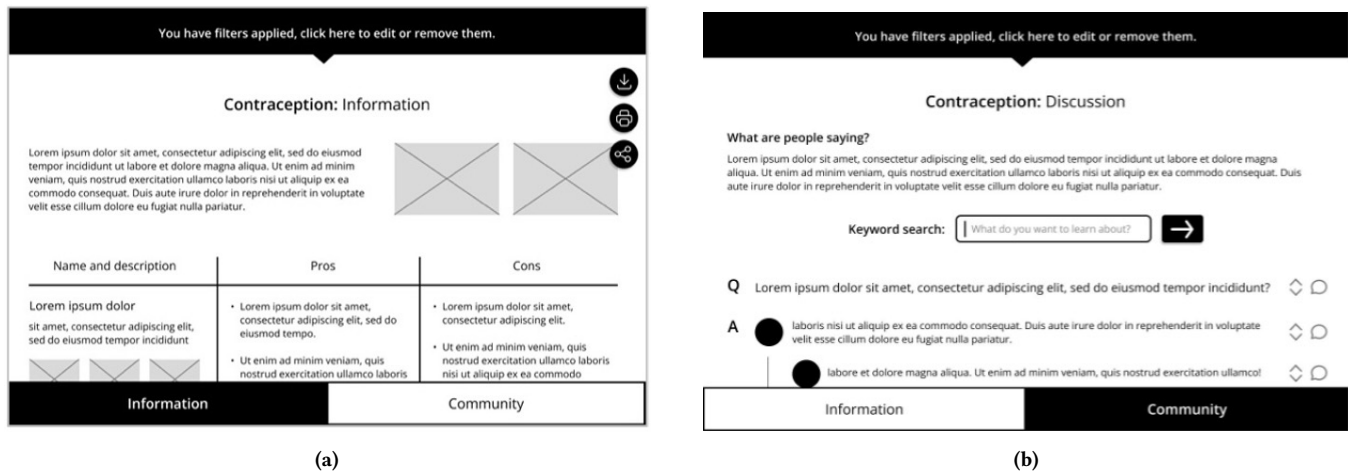
Many participants sketched design which contained the collation of LGBTQ+ specific SRH information, often navigating through a system of information funnelling based on user sexuality, gender identity, information need, or the reason for query. This was in reflection of the great variation in the experiences and needs of people identifying under the LGBTQ+ umbrella. “a lot of queer experiences don’t come neatly packaged [...] Some contraception might mess with testosterone and I’m very glad that information exists, but it’s not relevant to me and equally some of my information is less relevant to him (a transgender man).” (D3). When discussing methods of filtering information, two participants suggested forms of sentence completion in which a user would respond to a prompt such as ‘I am. . .’ with their personal identity markers such as ‘transgender’ or ‘bisexual’. This filtration would lead to an information page customised to the user and their goal in a context specific to their identity. Many of these pages also incorporated community discussion in the form of a “reddit style” forum in which LGBTQ+ users could discuss their experiences. “I feel like especially young people like gen-z are so used to Reddit and really care about their anonymity online so that’s something that would be really appealing.”(D5)

When evaluating the concept of filtering information based on identity, D4 expressed concern that excessive filtering may unnecessarily restrict information, leading to “extreme additional feelings of isolation” where information scarcity can lead to feelings of otherness as a user feels that other users of the technology are unable to relate to them. D3 expressed concern regarding the safety of user data when navigating these databases and specified that their design idea did not store any information input by the user. “Privacy has to start from bottom up. It’s a whole different process [...] even Planned Parenthood takes cookies that become vulnerable to journalists who are able to buy the data from Planned Parenthood clinics and see who visited them.” (D3)



**Figure 5: ‘Screen 1’ - Filter by personal characteristics, information need, and presentation need**





**Figure 6: (a) ‘Screen 2’ - View, download or share personalised page of information. (b) ‘Screen 3’ - a discussion forum with same topic filters applied showing posts from people with similar identities and problems.**

D7 designed a technology that further customised the presentation of SRH information through the generation of infographics based on a user’s presentational needs. These infographics could be printed or saved digitally for personal edification or as information packets to be distributed by doctors or displayed in classrooms. Customisable features were shared by D7, regarding the level of detail and language complexity, image vs text-based communication, neuronal-divergence based presentation needs, and colour schemes. “Say you’ve got chlamydia. Some people want to understand the biology of chlamydia and what it’s doing and that kind of thing is gonna be relatively dense in detail. So you can say I have ADHD, so I want the beginnings of the words to be bold which makes it easier for me to read and I want there to be more pictures.” (D7)

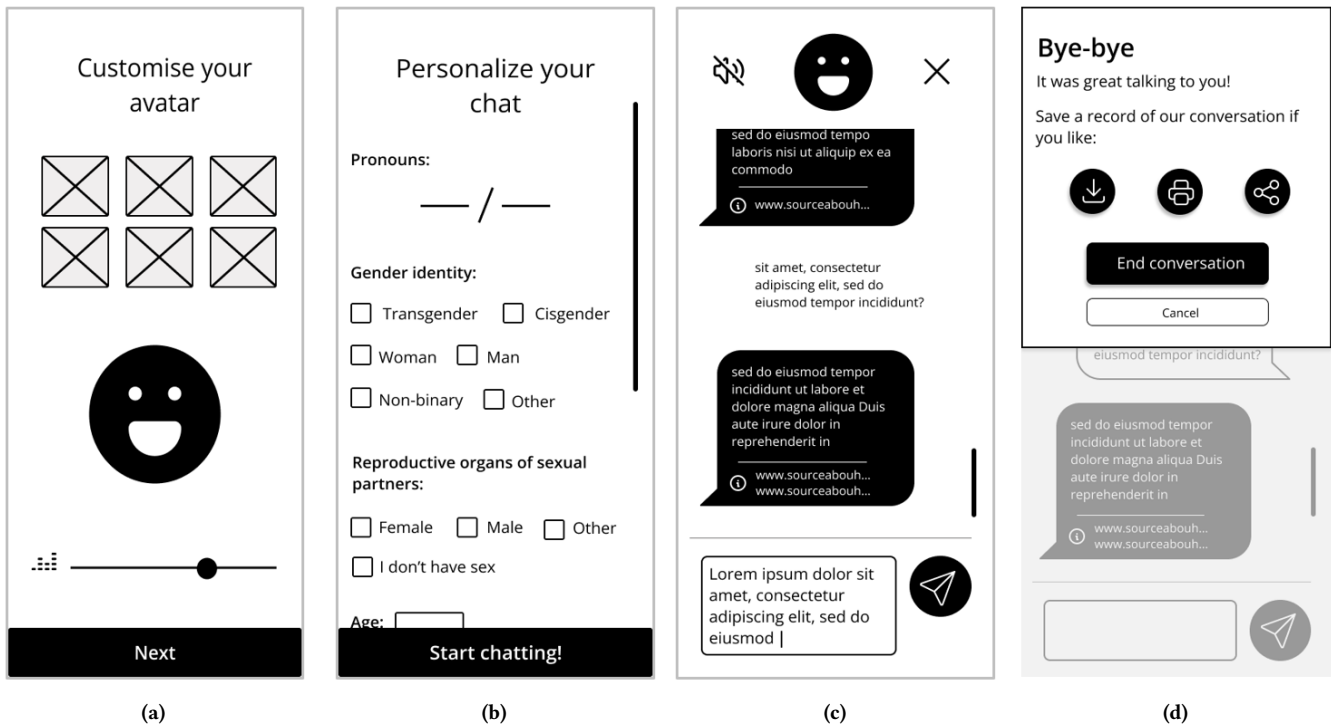
Although most of the databases designed by participants were intended for use by LGBTQ+ patients, some were also intended to support clinicians who wish to better understand and support their patients. D1 designed “queer-o-pedia”, an application that could inform doctors of correct LGBTQ+ terminology, queer-specific medical knowledge, and cultural issues specific to the community. When evaluating queer-o-pedia, D4 worried that presenting medical staff with too much information could be overwhelming and lead to “the user having reduced services, especially when they’re (being treated by) traditional or conservative doctors”.

These insights led to the development of ‘LGBTQ+ Online’ an online database of SRH information with a detailed filtering system tailored to the needs of the LGBTQ+ community, inspired by the numerous database and forum focused designs produced by participants. The user is first presented with a simple search bar to navigate to general information on an SRH related topic. To further specify their search, the user is invited to provide information about themselves, including gender, sexual identity, and age. This filtering system can also be used to specify presentation preferences such as level of information complexity, specialist fonts, image vs. text balance, and triggering topics to avoid (Figure 5). This technology could be utilised both by LGBTQ+ people to specify information about themselves or by medical professionals to customise information to their patients’ needs either for the purposes of learning

mid-consultation or preparing information hand-outs. Once the user has entered as much detail as they feel is necessary, they are presented with information that has been generated to suit their needs, including comparison tables when appropriate and links to the sources (Figure 6a). Filters can be adjusted or removed at any point if the user finds them too restrictive or broad. These information pages can be downloaded onto the current device, shared via instant messaging, or printed directly from the site. The user can tab between their tailored information page and a community page on the same topic that automatically has the same demographic filters applied to ensure the discussion’s relevance (Figure 6b). A short summary of the discussion is shown at the top of the page for ease of reading, users contributed questions and answers make up the remainder of the discussion forum. Users can upvote, downvote and comment on these posts.

### 5.3 AI informants

Technology was suggested by multiple participants as a replacement for human interaction, to negate fear of judgement or feelings of otherness that stem from in-person consultations. D4 devised a “robot that doesn’t identify as either female or male” for patients who are distrustful of medical staff to access and interact within a private space. D4 designed a digital avatar that would resemble the user and explain SRH concepts to them as “the customer can relate to the person without feeling judged because it’s literally themselves speaking to them”. Similarly, D8 designed an AI chatbot in which a customisable avatar would share SRH information with users through audio and text modalities. D8 reasoned that using an AI in place of a human, the user would not be at risk of being misgendered or experiencing otherwise misinformed language. “You can type in the preferences of what you want your pronouns to be, and then it’s not like human error making a mistake.” (D8) An AI capable of human phrasing was also discussed by D4 as they proposed a chatbot inspired by the subreddit r/explainitlikeI’m5 that would phrase complex information requested by the user in accessible language.



**Figure 7: (a) ‘Screen 1’ - Create an avatar which will represent the AI. (b) ‘Screen 2’ - Personalise discussion to ensure relevance. (c) ‘Screen 3’ - Chat with the AI in a text format with sources given. (d) ‘Screen 4’ - The user exits the technology with the option to save a record of their conversation.**

This chatbot was designed in response to this popularity of AI among participants and is intended to function as a substitute for in-person interaction. The user first selects either a default or custom avatar that will represent the AI throughout their chat; no elements of the avatar creation process are inherently gendered (Figure 7a). The user then inputs information such as their pronouns, gender identity, and any triggering topics that the AI should avoid (Figure 7b). This process tailors the chat to their individual needs and ensures the AI will not misgender or enforce hetero-cis assumptions on the user.

The user can interact with AI in both written and audio forms (Figure 7c), as some participants suggested having audio output could foster trust and relatability. The tone of this AI is human-like, it explains concepts in simple language, and the text conversation format invites the user to ask for as much clarification as they wish to. As citations were indicated as the most important form of information verification, sources informing AI claims are indicated at the bottom of relevant messages. Users can save a record of their conversation including key talking points and information sources. This record can also be downloaded onto their device (Figure 7d).

## 6 Discussion

This research utilised mixed methods to understand the specific experiences and challenges faced by LGBTQ+ PwU in accessing SRH services within the UK, and how these experiences can inform the design of supportive technologies. Through this we investigated the subsequent access strategies adopted by LGBTQ+ PwU residing

in the UK, and present three conceptual designs intended to support this community in accessing SRH services and information. The findings of this research indicate that the negative healthcare experiences described in prior global literature are also prevalent within the UK as participants reported facing heteronormativity, discrimination, and a general fear of interacting with in-person clinics.

### 6.1 Pre-emptive Harm Reduction

Participants described whilst they valued clinical information and guidance, prior experiences and perceptions of clinics and medical professionals led them to want to act preemptively, out of fear of being subjected to negative experiences. Consequently, many participant designs sought to prevent or otherwise avoid negative experiences before they occurred by either screening clinics and clinicians or replacing in-person consultation entirely with an AI perceived as non-threatening. This preference for AI powered chatbots contradicts Nadarzynski et. al [55], implying that the desire of some LGBTQ+ PwU to avoid interactions with clinicians is stronger than any misgivings they may otherwise hold towards AI facilitated consultation. This also indicates that LGBTQ+ PwU may judge the effectiveness of healthcare services according to a different standard from those within the cisgender and heterosexual majority. We find that AI has the opportunity to foster trust, likeability and familiarity, as reported by others exploring other minority groups preferences of health care information-seeking [35].

The desire to pre-screen medical professionals or remove them entirely from the consultation process is indicative of a tension between them and the LGBTQ+ community in which clinicians as a whole are seen as potential sources of discrimination and avoided. Therefore, one can devise that retraining clinicians to be more LGBTQ+ competent in the care they provide would not entirely ease the distrust felt towards them. Therefore, any reform in UK SRH towards equality for LGBTQ+ PwU should therefore be evaluated not only in terms of the binary question ‘is healthcare available’, but by considering the perceptions and opinions of the risk of LGBTQ+ PwU accessing the main SRH services.

## 6.2 Combating Misinformation for Safety

This research identified a tension between participants’ wishes to speak freely and anonymously, and their desire for content moderation to ensure that the information they consume is correct and well-intended. This relates to much research which has also shown how social platforms can help marginalised groups gather information and support [78]. Similar others can find comfort in community level understanding [62, 70].

Whilst some participants indicated that AI moderation may be a solution to this conflict of interest, our research also shows that others feared that an AI may contradict or erase their queer identity and experience. The erasure of queer perspective by AI moderation was investigated by others as they demonstrated how content moderation AIs that do not account for social context when flagging discussions as toxic can create a bias against LGBTQ+ accounts for the use of community-specific language [77]. Thus, there is need for careful and nuanced investigation for aspects that can be moderated and how this moderation is supportive of diverse identities rather than dismissive.

The tension between user autonomy and content moderation becomes especially relevant when considering the context of these conversations, SRH topics can be deeply personal, especially when discussed within the context of identifying as LGBTQ+, meaning that a fear of their experience being flagged as inappropriate or harmful to others may be off-putting to users and prevents people from presenting their authentic selves online [32]. Alternatively, a lack of moderation could facilitate the easy spread of harmful healthcare misinformation and may make it easier for anti-LGBTQ+ entities to infiltrate the space and cause deliberate harm to members. Others have exemplified this struggle by directly comparing two LGBTQ+ specific subreddits, one of which was a heavily moderated ‘safe-space’, and the other a lightly monitored platform for ‘free speech’, finding that while both subreddits had equal rates of participation, differences in moderation style altered the type of conversation [30].

## 6.3 Lack of mainstream LGBTQ+ competency

Participants of this research and those included within studies based outside of the UK encountered heteronormativity whilst interacting with SRH services as they were given advice centring a cisgender, heterosexual experience thereby exposing a lack of LGBTQ+ competency on the part of the clinician [36, 68]. This research also correlates with that of prior global findings by demonstrating that some LGBTQ+ individuals compensate for this lack of competency

by relying on social groups consisting of other LGBTQ+ individuals for advice regarding SRH and support when attending in-person appointments [2, 39, 48].

Many participants reported seeking and consuming LGBTQ+ specific SRH information online in the absence of official educational resources, supporting the suggestion of previous research that lack of formal education is responsible for elevated online SRH information seeking amongst the LGBTQ+ community [17, 75]. Multiple participants mentioned the online sources used to seek SRH information, which correlated somewhat with this and previous research, such as Reddit and YouTube were mentioned by multiple participants [23, 75]. Alternatively, participants in this study did not use Facebook despite its prevalence in the prior literature [4]. This discrepancy in platform usage implies that the digital strategies employed by LGBTQ+ individuals seeking SRH support are not homogenous and may change in response to age, technology-literacy, and information need, which has been reported in with regards to other intimate health domains [61].

Reddit and YouTube are both media sources that facilitate digital community formation through the centring of grassroots voices and facilitation of peer-to-peer discussion. The prevalence of Reddit in the designs produced by the participants in this research therefore implies that they, as members of the LGBTQ+ community, may compensate for a lack of real-world resources that facilitate the discussion of LGBTQ+ SRH through the formation of digital communities. However, many participants in this study also implied distrust in online information sources, either by describing methods of validating the advice sourced in this way or preferring to discuss their SRH issues with close in-person peer networks. This implies that while online grassroots information dissemination and community formation may be an effective strategy in the absence of mainstream resources, it is not a perfect solution and formal education resources must also be amended to facilitate the information needs of LGBTQ+ PwU.

## 6.4 Methodological Value

Through the use of online surveys, we were able to reach a sometimes marginalised population that may have reservations about participating in research if their anonymity and safe space were compromised. This approach enabled the collation of rich insights on which to develop the co-design sessions to explore further the lived experiences of LGBTQ+ PwU when accessing SRH information and care. We build upon others who have used similar methods to ensure that design outcomes align with the community’s needs [24, 33]. The decision was taken to share survey insights with the participants at the beginning of the co-design sessions to enable and encourage transparency and meaningful engagement. If we consider that not all research participants enter the process with a lack of knowledge of the subject area, it makes sense to share and frame the mutual understanding at the outset. This approach has been well documented by others, who also advocate open facilitation to make engagement *inclusive, transparent, purposeful and value multiple kinds of knowledge and experience*. [9, 49]. This approach also supports a shared understanding of the aims and objectives of the research and has been found to encourage participants to share stories of their experiences [31]. However, should

participants feel uncomfortable or prefer not to share personal accounts, we introduced personas that were grounded in the findings from survey responses as an option for participants to identify with and explore technological solutions for negative and sometimes triggering experiences this population reports to experience. This further enabled participants to engage openly in collaborative work whilst still maintaining anonymity over their own experiences if they desired [79].

With this work, we highlight opportunities for the HCI design community to explore how can technology can be designed to formalise and make safe the access strategies used by LGBTQ+ PwU to obtain SRH services, ensuring these strategies are inclusive. We propose a starting block of conceptual designs we call upon others to build upon.

## 6.5 Limitations and Future Work

Whilst this methodology was successful in answering the research questions, the variety of data collected was limited by a small sample size and narrow participant demographics as most participants across both studies identified as cisgender bisexual women. For example, we acknowledge the absence of participation by trans identities in the co-design sessions. We encourage others to explore additional methods of recruiting participants from a broader range of identities and inspect the applicability of our findings to others in the LGBTQ+ community.

The variability of the LGBTQ+ experience became repeatedly relevant throughout this research as participants described differing experiences and concerns dependent on their personal identity and other intersectional factors. It is due to this that the filtering of information and discussion is so prevalent in the conceptual designs presented here. However, the appropriateness of filtering should be investigated and, in doing so, question whether the separation of information and subsequent cyber-balkanization of communities may cause divides within the wider LGBTQ+ group [13].

## 7 Conclusions

This research investigated the experiences of LGBTQ+ identifying PwU when accessing, or attempting to access, SRH information and healthcare services in a UK context and the strategies used by this population to compensate for any barriers they may experience. Asynchronous co-design sessions were then run with LGBTQ+ PwU to design technologies in response to the survey insights on healthcare experiences and needs. The resulting designs sought to address the ability to safely locate and screen providers, access accurate and appropriate information and provide an alternative to human-led in-person care. These designs present opportunities for how technology can facilitate access to SRH care for LGBTQ+ PwU in the UK.

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