

**Understanding apps concerning gender
and sex(ualities): A scoping review**

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Abstract

The use of apps with regard to gender and sex(ualities) has received increased attention due to the recognition of its theoretical importance and practical relevance. However, it is somewhat difficult to navigate the expanded literature as it comes from different disciplines, geographical areas, and contexts. By conducting a scoping review, we concentrate on the social science domain. Through this review, we introduce a typology highlighting the heterogeneity of app use concerning gender and sex(ualities) across different contexts. We point out the four related areas, as an app in the context of dating online, sexual education, gender-based violence, and health. Our review reflects on the apps in the abovementioned contexts and suggests future research avenues.

Keywords: app, gender, sex(ualities), scoping review.

1. Introduction

The rapid development of digital technology and its application to societal needs and challenges significantly influenced how mobile applications (apps) in particular have been developed and used nowadays. App use became a globally widespread phenomenon that has been applied to different spheres of life. In this article, we draw attention to the academic literature focused on the apps relating to gender and sex(ualities)¹.

Most of the studies concerning apps on gender and sex(ualities) have focused on the apps as a tool for sexual education activities (Harley *et al.* 2020; Safi *et al.* 2019), provision of sex health information (Chiou *et al.* 2020; Grace *et al.* 2020), and as an interaction medium with romantic partners (Macapagal *et al.* 2020; Reid *et al.* 2022), as well as part of the gender violence prevention measures (Lauckner *et al.* 2019; Wilson-Barnao *et al.* 2021). Social science scholars' growing interest in app representation of gender and sex(uality) is attested by the increasing number of publications about apps in leading journals. Previous literature reviews highlighted various aspects such as the use of the smartphone apps to find sexual partners (Anzani *et al.* 2018), dating apps in general (Wu and Trottier 2022), critical analysis of sexual and reproductive self-tracking apps (Lupton 2015). In intersecting between gender and sex(uality) apps undertake different roles: as a tool to reach vulnerable groups of the population (Groves *et al.* 2016; Kongjareon *et al.* 2020), as information carrier devices (Polonijo *et al.* 2022), and as a communication medium (Cassels *et al.* 2020).

¹ In the whole article, 'sex(uality)' stands for different conjugations of the word 'sex', to comprehend the whole spectrum of sex and sexualities in relation to gender and apps. The gamut of sex and sexualities will be further analysed in the discussion of the recollected articles.

Nevertheless, with the increased popularity of apps, only a limited number of studies examine relations between gender and sex(uality) and app scripts, development, and design of the user profiles. Rather the attention of researchers is still on the emergence of the global phenomenon of apps in social relations. Most of the studies, have exclusively focused on the experiences and practices of app users.

Dating apps popularity is a highly prevalent and important phenomenon worldwide (Curry 2021). Due to the global prevalence of dating apps and their high importance, it has received increasing scholarly attention over the last years. A decade after Tinder was launched several studies portray the benefits and drawbacks of dating app use (Ferris and Duguay 2020; Miles 2017; Ranzini and Lutz 2017). Researchers indicate that dating apps became a reflection of one's self-representation, romantic identity, and relationship construction.

Apps are also popular information sources used in sex education and health promotion. Most of the studies focused on the promotion of health information (Richman *et al.* 2014; Rogers *et al.* 2020), including HIV prevention (Sallabank *et al.* 2021), as well as apps for parenting (Byrt and Dempsey 2022; Wendt *et al.* 2022). The advances in communication technologies provide an online modality to address comprehensive sexual education and health promotion programs. Moreover, as studies demonstrated, it has the potential for reaching vulnerable and underrepresented groups of the population. Although, the detailed information concerning gender and sex in certain cases might negatively influence people to whom it relates (Albury *et al.* 2021).

With regard to gender violence, studies mainly underlined the use of apps for the prevention and reporting of gender violence (Henne *et al.* 2021). Studies included in this article indicate that such apps became a lifeline, predominately for women, to report the risk of violence. At the same time, as Wilson-Barnau *et al.*

(2021) underline apps are also seen as potential body trackers that can protect women and at the same time expose them to the risk of violence.

However, the heterogeneity and multidisciplinary nature of the literature on apps, gender, and sex(uality) makes it difficult to navigate, leaving gaps and opportunities for research. To connect themes and trace their contamination, such as dating online, health, sex education, and online gender violence, we conducted a scoping review (Arksey and O'Malley 2005; Armstrong *et al.* 2011; Munn *et al.* 2018). We aim to address the following research questions: *How does academic literature portray apps dealing with gender and sex(ualities)? How have gender and sex(ualities) narratives concerning apps developed in academic literature over the past decade?*

To provide answers to these questions and to show the progress of knowledge, we organised and critically analysed research on apps concerning gender and sex(uality). Our theoretical contribution is twofold. First, we provide a typology highlighting the heterogeneity of app use, gender, and sex(uality) across different domains. Second, we draw on the proposed typology to establish a research agenda that reflects gaps from past work to outline future research developments in the landscape of social science studies.

2. Methodology

The purpose of this article is to give a detailed summary of the status of mixed-method research concerning gender, sex(uality), and mobile apps in different research areas. A scoping review was considered a valuable and most appropriate method to collect and examine a broader corpus of work in diverse areas of examination (Munn *et al.* 2018). Additionally, scoping reviews enable the inclusion of the greatest amount of work in a certain area without the requirement for inten-

sive data synthesis or quality assessment (Armstrong *et al.* 2011). The scoping review, moreover, remains of great help to “clarify key concepts/definitions in the literature [...] to identify key characteristics or factors related to a concept [...] to identify and analyse knowledge gaps” (Munn *et al.* 2018, 2).

In line with the scoping review methodology presented in the work of Arksey and O’Malley (2005), the procedure of our review observed the following steps: (1) identifying the research question; (2) identifying relevant studies; (3) study selection; (4) charting the data; (5) collating, summarizing and reporting the results” (lvi, 22)

Since the research question aims to understand how academic literature portrays apps concerning gender and sex(ualities), the scoping review has been produced via an analysis of articles in Scopus in November 2022.

The selection criteria for this literature review are presented below. The keywords chosen were ‘app’, ‘gender’, and ‘sex*’² aiming to collect a wider array of articles, to familiarise best with the topic to identify the codes, themes, and analytical categories. Those search terms were chosen to outline connections between those research areas and determine how they mutually influence social science research. Studies were full-text accessible and only articles in English were examined. As the focus of our study was based on peer reviews journal articles only, books, book chapters, and conference papers were not included in the sample. This paper reviews qualitative, quantitative, and mixed-methods studies considering the use of apps for gender and sex(uality) under several analytical lenses. We limited the timeframe of publication of the literature, to the last decade (2012-2022).

Through the recollection of the articles in Scopus, we identified a total of 114 articles in the section related to the social sciences macro-area. Following all the

² By using ‘sex*’, we aimed to gather a broader constellation of articles which dealt equally with ‘sex’, ‘sexuality’, ‘sexualities’, and other declensions of the word ‘sex’. In the whole article, ‘sex(uality)’ will be used to describe the selected keyword.

selection criteria above mentioned (English-written peer-reviewed journal articles only, full-text accessible), the final sample of articles included in this study was a total of 76 articles, which were ultimately published from 2014 to 2022. No articles complying with the selection criteria are published between 2012 and 2013.

The collected articles were organised in an Excel spreadsheet with the following information: (1) Author(s), year of publication; (2) Gender and sex(ualities) of the study population; (3) Mobile apps used or mentioned; (4) The age group of the population; (5) The research questions; (6) The methodological approach used.

The outcomes of data collection associated with the relationship between app, gender, and sex(ualities) can be split into four broad categories (macro-themes), under the recurrency of the determined topics, generated by codes (as portrayed in Table 1). These are the macro areas of the study of apps regarding gender and sex under diverse perspectives and levels of analysis. Each category, namely dating, sex education, violence, and health will be discussed in the findings section.

The topic related to dating was identified through the readings which were related to the digitalisation of romance (digital romantic dating/relationships as social practices). Different subthemes were coded subsequently, to help understand the realm: digital romance as social practice; dating app affordances and surveillance performed by them; the gendered use of technologies for dating purposes; the portrayal of masculinities in digital dating spaces; self-presentation practices in dating/social media apps; intersectionality and stigma depicted in those digital spaces.

Another theme that was found in the set of data collected was sex education in digital spaces. In this case, articles were connected to the accessibility to sex education through apps and how sex education was embedded in the discourses about apps in general.

The third theme examined was the topic of violence: here, articles described how apps in different contexts were connected to gender violence (in particular for gender-based violence reporting apps and apps used in platform economies).

The last macro-theme found was linked to health. Here, the discourses around apps, gender and sexuality were developed around health promotion, HIV prevention, parenting, and specifically indicated apps.

CODES	MACRO-THEMES
<ul style="list-style-type: none"> • digital romance • app affordances and surveillance • gendered use of technologies • intersectionality • masculinities • self-presentation • stigma 	Dating (37 articles)
<ul style="list-style-type: none"> • apps for sex education • apps for retrieving sexual health advice 	Sex Education (7 articles)
<ul style="list-style-type: none"> • gender-based violence reporting apps • apps in platform economies 	Violence (8 articles)
<ul style="list-style-type: none"> • health promotion • HIV prevention • specifically indicated apps • parenting 	Health (24 articles)

Table 1 - Identification of codes and macro-themes for the findings

3. Mapping the field

To comprehend how the field has developed through the years and in relation to the themes we coded, we decided to chart the findings analysed (Fig. 1). Most of the articles were published between 2020 and 2022, with a substantial rise in papers dealing with research subjects related to dating and health. The topic of violence appears in the last few years, but with a limited amount of research within social sciences, while sex education papers are shown from 2014, there is no significant trend in the timeframe studied.

In the body of articles found, 37 articles were analysing apps, gender, and sex from a dating perspective, which could be either from the use of a dating-specific app or the goal of digital interaction through diverse media. The timeframe of publication is between 2016 and 2022, with a growing trend throughout the whole period, a peak in 2021 and a considerable low in 2018 and 2019.

The subject of violence was portrayed as a thematic focus in articles published in 2019 and 2022, and half of them were issued in 2021 in different journals.

Lastly, considering the specifics of health-related papers, articles started to be published in 2016 (with no publication in 2017 and 2019), with an ongoing growth trend until a climax in 2022, with 8 articles issued as the highest number.

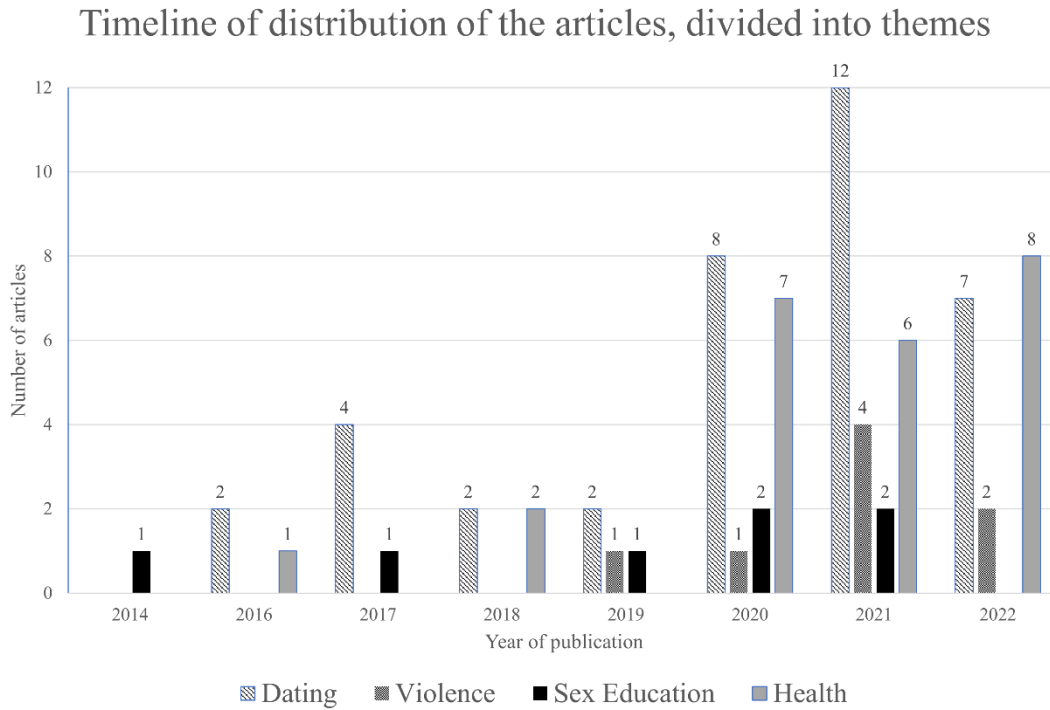


Fig. 1 - Timeline of distribution of the articles

4. Findings

4.1. Dating

Several aspects of *digital romance* have been investigated in the literature, including dating as a digital social practice, the relevance of digital romance for the LGBTQIA+ community, the effects of the recent Covid-19 pandemic, and the impact of alcoholism on dating app use.

Dating seen as a digital social practice shows how deep the impact of technologies on digital romances and sexual lives in terms of meanings, goals, affordances, and individual skills, even between heterosexual users and non-users and in emerging young adults (Reid *et al.* 2022; Tomaszewska and Schuster 2020; Sumter and Vanderbosch 2019).

Sexuality minorities, especially non-heterosexual men (for example, identified as men who have sex with men - MSM - or sexual, gender minority people assigned male at birth etc.), are being considered in the study of geosocial networking mobile applications for dating purposes. Here, there is a problematization with the use of Grindr for self-esteem and anxiety (Jayawardena *et al.* 2021), or the role of digital dating as a liberating way for marginalised community members (Baker 2021) and the use of apps for erotic practices negotiation (Bonner-Thompson 2021). Moreover, the use of mobile apps for dating purposes in these types of stigmatised identities is investigated between dating-specific apps and social media apps, by their patterns in use and the type of sexual encounters (Macapagal *et al.* 2020). Finally, the impact of digital dating interactions on the urban space for creating the feeling of queer communities (Renninger 2018) and the hybridisation between offline and online dating through the use of dating apps to look at the technology efficiency and the boundaries of private and public spaces for queer men is shown in these articles (Miles 2017).

The Covid-19 pandemic's impact on everyday life, and specifically relationships and sexual lives, is portrayed in Ting and McLachlan (2022) as an important element towards trends and challenges for digital romance in the time in which physical contact was not permitted. In the work of Harkness *et al.* (2021), dating apps are investigated partially, analysing their "new" use (not only for hook-ups) during the pandemic by Latinx sexual minority men.

Addressing the impact of alcoholism, according to the study by Flesia *et al.* (2021), the association between using dating apps and drinking may be mediated by underlying characteristics (sexual elements, reasons for using the apps, and the intensity of use).

Dating has been observed through the lens of *app affordances and surveillance* in different articles, concerning (health) safety, self-presentation, consent, and the definition of online sexual interactions. Surveillance is shown from two diverse

perspectives, one (Light *et al.* 2018) points out ethical implications in research which uses big data of dating apps (such as location in apps for men who have sex with men), and the other shows how the increased amount of surveillance implied in dating apps for avoiding sexual harassment and abuse might lead to a less safe space for marginalised and stigmatised app users (Stardust *et al.* 2022). The interconnection between affordances and surveillance highlighted in the work of Zytko *et al.* (2021) in which consent to sexual activities on Tinder is seen as computer-mediated through determined affordances. In this case, if specifically created to facilitate consent exchange, the paper shows that dating apps might act as possible sexual violence prevention tools. Casañ-Pitarch's (2020) study shows that the use of emojis in profile descriptions in dating apps has an impact on the desirability of a profile, looking also at variables such as gender and sexuality. Another outlook on the use of dating apps through their affordances gives a hint to the use of dating apps for people who are experiencing sexual health issues to gain important information and health prevention resources (Fields *et al.* 2020). Last but not least, in Handyside and Ringrose (2017), Snapchat affordances are seen as an important tool to comprehend youth digital sexual cultures, their temporality and affect.

The literature found here also draw attention to the *gendered use of technologies* in dating scenery. Looking at the interactional scripts in dating apps, Comunello *et al.* (2020) and Christensen (2021) define the influence of gendered performances and negotiation for any hook-up apps user and especially for heterosexual young women. Affordances, norms, and practices can play an important role in the possibilities for challenging or restraining normative gender role expectations. From another point of view, the gendered use of apps in particular for dating purposes seems to help figure out "normativity" (Hanson 2021) for heterosexual young college students, in which men can find online dating as fun and playful whereas it can be seen by women as a dangerous practice. Conversely, it can lead to a

transformative approach towards normative gendered online dating through affordances, practices, and uses in apps, such as Bumble (Young and Roberts 2021).

Race, gender, and sex(ualities) are connected and intersected in some articles which portray their impact on the use of dating apps. *Intersectionality* is seen in the work of Hill *et al.* (2022) in apps in which “Among those who used commonly identified social media sites or dating apps (Facebook, Grindr, Tinder and Twitter) more than half of the participants reported they felt welcomed and included as Aboriginal and/or Torres Strait Islander and LGBT+ people” (Ivi, 13). For Lee (2021) and Peck *et al.* (2021), responding to racialization, gendering, and sexualization in partnering culture through the image-focused dating app Tinder, women of colour perform their race processed through ongoing negotiation with social structures and their own lived experiences.

A focus is given to the impact of apps on *masculinities* under different lenses. Academic literature shed a light on the role of mobile technologies (mostly dating apps) in the presentation and depersonalisation of women for “incels”, namely the Involuntarily Celibate Men (Preston *et al.* 2021). In the work of Chan (2019), masculinity in the heterosexual landscape is also studied in the context of Momo, a particular Chinese dating app. In there, heterosexual masculinity is studied in its construction and its impact on the research of casual sex encounters. Meanwhile, masculinities are analysed through the embodied social practices on Grindr on the profile pictures (Bonner-Thompson 2017).

Self-presentation in dating apps and in social media in which gender and sex(ualities) are performed is also one theme which is profoundly investigated through the literature. It can be found as a focus on Tinder self-presentation (Ranzini and Lutz 2017), addressing also women seeking women (Ferris and Duguay 2020). In the dating terrain, a deep analysis has been conducted for men who have sex with men (MSM) on diverse platforms for connecting the function of images with the MSM online dating culture (Miller 2020).

Moving to a more general social media perspective, the works of Duguay (2016) and Leong (2016) examine stigma and identity presentation for LGBTQIA+ people and young adults through mobile platforms affordances and the dispersion of self-images (selfies).

Another characteristic of dating apps investigated is the *stigma* which can be found for non-normative sexual orientation, intersecting with race, or other forms of discrimination (such as victimisation for sexual assault, robberies, and other acts of violence).

Sexual and racial discrimination is studied in the work of Filice *et al.* (2022) remarking on the experiences of bisexual people in dating contexts and in Conner's (2022) study aiming for a more intersectional understanding of prejudices in Grindr, looking at the affordances, apps are offering to users to avoid this phenomenon. Social sexual stigma for discriminated sexual orientations, instead, can be avoided by using dating apps in specific territories, as suggested by the findings of Phua (2020).

Moreover, exposing oneself as the victim of an act of violence on dating apps becomes a stigma in relation to the possibilities offered by the apps themselves for relationships (Evans *et al.* 2022).

Qualitative research methods were implemented in most of the research work discussed here, considering various approaches such as state-of-the-art review, literature review, narrative interviews (appnography), experimental audit design, analytic abduction of comments from forums, online structured questionnaire, focus groups, interviews, participant-observation, case-study, ethnography, participant research diaries, comparative walkthrough method, thematic analysis. Quantitative approaches such as (online) surveys and quantitative psychometrics analysis were employed as well but in few cases.

4.2. Sex education

This dimension refers to the investigation of how sexual education is embedded in the discourses related to the use of the apps. Most of the academic literature regarding sex education and its representation in apps refers to an assessment of sexual health behaviour, and general interest in mobile health applications to improve and manage sexual health (Macharia *et al.* 2021; Richman *et al.* 2014). This examination mainly explored the potential of mobile health technology to be employed for healthy sexuality and decision-making among college students aged 18-24. Moreover, with the rise of digital technology more studies address how applications could be incorporated to study gender and sexuality-related topics in various domains, such as medicine, and urban health (Safarnejad *et al.* 2017; Safi *et al.* 2019). In recent years, studies concentrated on the investigation of specific applications for sex education, for example, TuneMe, intended to compare the distribution of content related to sex education in the app and other sex education websites (Rogers *et al.* 2020). The study focused on sex education articles published on the Zambia-specific TuneMe site. Harley *et al.* (2020) examined physiological indicators during interaction with Edmonton Queer History (EQH) app by concentrating on the changes in the empathy levels pre- and post-app interaction.

Another example of the specific app application shed light on the understanding of disparities in resource access for adolescent gay and bisexual men with data from the iReach app within and between four high HIV prevalence corridors in the US (Sallabank *et al.* 2021).

Following the examples of the investigation of the specific apps related to gender and sexuality, we consider two main dimensions: 1) assessment of technological possibilities of apps; 2) content-related examinations of specific apps. Methodologically most of the studies used surveys as data collection methods.

4.3. Violence

Violence is one dimension which refers to the academic narratives related to the use of apps, connected with sex(ualities) and gender. Specially, academic literature regarding mainly *gender-based violence reporting apps*, bots, and digital intervention for intimate partner violence analyse the negative impact of them on racial-patriarchal capitalism (Henne *et al.* 2021, Renee *et al.* 2021; Wilson-Barnao *et al.* 2021) and positive approach to mental health. Above all, those apps and bots encourage surveillance of racial capitalism applications' use of data to support narratives of violence that are institutionally comprehensible, bringing to light previously unnoticed racialized aspects of the data capital they produce (Henne *et al.* 2021). Moreover, in the work of Wilson-Barnao *et al.* (2021), the apps studied were picturing "women visible, tracked and protected (according to the definitions of patriarchal consumer surveillance)" (p. 44), so anti-violence apps are used to directly monitor women's bodies. Meanwhile, positive outcomes emerge in the digital intervention for intimate partner violence for mental health in people who undergo violence (Emezue and Bloom 2020).

Concerns about the *impact of apps on women's lives are seen in the works which analyse platform economies* in India, Mexico, and Ecuador (Annavarapu 2022; Sabogal-Cardona *et al.* 2021; Cordero 2022). Especially, women's safety is a big issue for ride-share apps, ride-hailing apps, and on-demand delivery apps.

Considering the role of ride-share apps, women developed strategies and tactics for their self-presentation and perception of sexual risk when in city spaces linked to class relations, but also apps developed tools to intervene on their infrastructure to create a more friendly and safe experience for their product (Annavarapu 2022).

For ride-hailing apps, gender plays a crucial role in the employment of the services, as women in Mexico are using on-demand service transportation more than men and it is linked also to the degree of care responsibilities in the household (Sabogal-Cardona *et al.* 2021). Meanwhile, for on-demand delivery apps (Cordero

2022), women are more vulnerable to sexual harassment and care task overload. They also must work harder to advance into leadership roles in a highly masculinised industry. Besides, women who are working in this platform economy system can organise themselves and resist bad working conditions through a transnational network.

Lauckner *et al.* (2019) focus mostly on the damaging features of dating sites and apps for rural sexual minority males, highlighting risks and negative experiences for a vulnerable population in digital spaces. Among all, catfishing, discrimination, cyberbullying, harassment, and coercion are portrayed in detail.

Considering methodological approaches, both qualitative and quantitative methods were taken, such as interviews and participant observation, oral history archives and surveys.

4.4. Health

The latter dimension refers to the relationship between apps and health-related topics concerning gender and sex(uality). The analysis of our articles suggests that the focus of the articles was constructed around *health promotion* through mobile applications. The study of Polonijo *et al.* (2022) exemplifies that apps and social media play important roles in the multimodal distribution of information among MSM while promoting HPV and/or meningitis vaccination during community-based rapid HIV testing in California, US. Authors emphasized that the advertisements on social media sites, such as Snapchat, Instagram, and TikTok, and dating or hook-up apps, such as Grindr, Growlr, and Scruff could be an additional source of health information for MSM without worries that printed posters can be found by their relatives or friends. Also, apps can be seen as a useful tool to engage with young adult bisexual smokers to investigate non-smoking and smoking situations via direct reports including situational factors impacting everyday smoking routines (McQuoid *et al.* 2018).

Several studies concentrated on *HIV prevention* (Bineau *et al.* 2021; Chen *et al.* 2021; Chiou *et al.* 2020; Grace *et al.* 2020; Kongjareon *et al.* 2020; Shrestha *et al.* 2020; Sizemore *et al.* 2022). In this category, studies cover different gender groups, such as sexual minority men (Grace *et al.* 2020; Sizemore *et al.* 2022), men who have sex with men (MSM) (Bineau *et al.* 2021; Chen *et al.* 2021; Chiou 2020; Kongjareon *et al.* 2020), transgender women (Shrestha *et al.* 2020).

Apps₇ have been shown to assist in HIV prevention: the safe behaviours and screening (SBS) app deployment in the study of Chiou *et al.* (2020) showed that app usage can decrease HIV risky behaviours among MSM and be applied to HIV prevention and nursing intervention. In a study conducted by Grace *et al.* (2020) sexual minority men, including men living with HIV discussed how HIV undetectability was communicated online, including through sexual networking apps, such as Grindr, Scruff, and Tinder. They underlined that in some cases it was explicitly mentioned in online profiles and the term “undetectable” was widely used in sexual networking applications. A study by Bineau *et al.* (2021) shows that dating app users among MSM in rural areas of the Southern USA were more likely than non-app users to have more positive attitudes and interest in taking PrEP. Moreover, during the interviews, participants expressed support for integrating HIV prevention information into dating apps. Schwartz *et al.* (2022) indicated that MSM surveyed obtained information about HIV most often from dedicated organizations but also from dating/hook-up apps, like Growlr, Scruff, and Grindr.

Yet another aspect of apps exemplified by the historical trends of understanding of connective labour of health care practitioners (particularly those involved in HIV treatment) based on their experience was highlighted by the study of Pugh (2022).

Another group of articles focused on the development/ use of the *specifically indicated apps* (Albury *et al.* 2021; Cassels *et al.* 2020; Choi *et al.* 2021; Griffiths *et al.* 2018; Hollingshead *et al.* 2020; Loosier *et al.* 2021; Schwartz *et al.* 2022; Tavera-Mesías *et al.* 2022; Wallach *et al.* 2020). The particular interest received

several gendered groups: gay, bisexual, MSM, lesbian, straight, queer, bisexual and pansexual (Albury *et al.* 2021; Choi *et al.* 2021; Loosier *et al.* 2021), gender and sexual minority youth (Hiebert and Kortés-Miller 2021). The study of Albury *et al.* (2021) examines 14 Australian trans dating app users' accounts of feeling safer (and less safe) when using apps, as well as their experiences of sexual healthcare. It was found that dating apps together with sexual health services rely on reductive systems of sorting and categorization that reinforce binary understandings of genders and sex(ualities) to facilitate data management and information-sharing practices. But on other hand, these sorting techniques might help trans app users avoid harassment, from intimate connections and seek appropriate healthcare. At the same time, the study of Cassels *et al.* (2020, 618) aimed at understanding the places in which African American and Latinx MSM live and socialize, as well as how these places influence their sexual behaviours, noting that "apps may have an influence on geographic mobility and sexual mixing patterns of partnerships such as race or age mixing".

The study of Moskowitz *et al.* (2022) reports the role of apps in determining the sexual role preference or self-label of Adolescent Sexual Minority Men (ASMM). Thus, sexual socialization factors, such as a greater number of partners, previous geosocial networking app use, and more relationship experience have been positive predictors of adopting a self-label. Another apparent line of research is concerned with fatherhood prevention and *parenting* (Byrt and Dempsey 2022; Wendt *et al.* 2022). In the case of the fatherhood prevention study Wendt *et al.* (2022) found that 'Healthy U', the app-based program specifically designed for male justice-involved youth (14-19 years old) able to fill a gap of sexual health programs specifically developed with and for them. At the same time, Byrt and Dempsey (2022) noted the market-leading apps aimed at supporting new parents of premature infants failed to take into consideration users from same-sex or single-parent families by enacting the narrative that main care work should be done by women.

This leads to the reinforcement of the “traditional” gendered expectations. In this context, we are able to see that the aspects of gender and sexuality are not widely taken into account while developing parenting-related apps.

In a methodological sense variety of methods were used from quantitative surveys and randomised control trials to qualitative interviews and walk-through methods.

5. Discussion and conclusion

With this literature review, we identified four dimensions that became apparent in the last decade in the scholarship on apps, gender, and sex(uality): dating online, gender-based violence, sex education, and health concerns. During the last decade, with increasing de-stigmatization of gender and sex-related issues such as homosexuality and at the same time increasing attention towards the widespread phenomenon of apps, the focus of the researchers shifted from studying the phenomenon *per se* to understanding the role of the tiny digital artefacts - apps in relation to gender and sex(uality) and how digitalisation of such intimate spheres of life could influence the social relations.

This article attempts to illustrate how apps became intertwined with the understanding of gender and sex(ualities) in academic literature. It demonstrated that despite the increasing number of articles concerning the abovementioned topic, most of the scholarly debates focused on apps as rather an instrument for the collecting of data by approaching vulnerable groups of the population (MSM, LGBTQIA+ community). A significant part of the collected articles has focused on widespread apps, such as Tinder, Bumble, and Grindr. Despite paying attention to the apps as important actors in investigating gender and sex(ualities) there is a lack of critical discussion of the power dynamics co-constructed with material relations of software artefacts, as well as norms and values that are programmed

into apps concerning gender and sex(uality). At the same time, the articles we analysed rather confirm heteronormative biases lacking profound engagement on how apps can facilitate the engagement with the users, and what kind of advantages and pitfalls apps can contain by design.

Our coding revealed that dating app literature concentrates on several distinctive pathways when it comes to gender and sex(uality), namely, digital romance, app affordances, and surveillance, masculinities and self-presentation, and stigma. While apps used for sex education and health-focused mostly on the potential to improve sex education or health promotion, among them HIV prevention.

The questions about discrimination take a prominent position in the scholarly debate under the dimension of gender-based violence. In this regard, apps became a tool for the reporting of gender-based violence together with a particular focus on women's labour in the platform economy.

At the same time, contamination across the macro-themes can be noticed (especially for the health-related contribution of apps regarding gender and sex(ualities) in dating, sex education, and health). As an example, dating apps are understood not only as applications for hook-ups, in their technological configuration, but also as a tool to gain knowledge about health issues, a social device to perform one self's gender and/or sexual identity, and an instrument for societal changes.

Gender and sex(ualities) narratives concerning apps in this scoping review are presented in a wide variety. Most of the gender identities presented are still considered as binary, with a greater concern for the security and surveillance of women and female-presenting persons (as seen in the violence and dating themes), while for men and male-presenting persons, there is a plethora of studies which examine the different phenomena against a negative frame of the digital activities and spaces. Very few articles include a reflection on the reinforcement of the binary understanding of gender, and how apps can perform it (Albury *et al.* 2021). Moreover, there is an insightful analysis of the performativity of masculinities in

different arenas and topics, but no assessment of femininities and non-binary/transgender identities.

As well for sexualities, most of the research focuses on either the heteronormative perspective (as heterosexuality is seen as the main lens to read the general trends in digital spaces), but also there is a lens of “vulnerability” around the LGBTQIA+ community - mostly non-heterosexual male - in apps as portrayed by the literature regarding dating and health. This treatment is double-sided: on one side there is an academic concern around sexual health and social sexual stigma against these sexual orientations in apps; on the other, there is a positive reading of apps for the possibilities given to create spaces in which these persons can free themselves from societal judgment and discrimination.

Focusing on these two aspects, heteronormativity is well depicted in the description of the use of determined apps in literature (mostly dating and parenting). For dating purposes, the heteronormative lens is used mostly focusing on the scripts performed, but also considering the use of parenting apps, in which only heterosexual couples are included in the studies. The mainstream understanding of societal gendered roles is undoubtedly shown, but no assessment of queer performances in the digital environment of apps in this case is presented.

The narrative surrounding the “vulnerability” of non-heterosexual identities or LGBTQIA+ persons is widely presented in the themes chosen to be indagated in the academic literature. To begin with, the health stigma of sexually transmitted infections (such as HIV) is mostly indagated for MSM, while no considerable analysis of the implementation of apps for this purpose for heterosexual persons. Furthermore, great concerns about privacy and security issues in dating apps are reserved only for gay and non-heterosexual male presenting persons, while no other non-normative sexualities are involved.

The same approach applied to the LGBTQIA+ community could be seen in articles regarding women and female presenting persons. These identities are treated even

if in a heterosexual relationship as the most vulnerable - as presented in the papers about gendered violence - and only in some cases as empowered using apps. In here, it is clear that the heteronormative discourses intersect with the academic lens of the discussions around non-normative identities. Considering the abundance of studies and research around digital sexualities, gender performances in online contexts, and online sexual activities, there is a lack of studies in the case study literature concerning the implementation of apps in contexts such as sexting or sex(ualities) as online performances. Furthermore, sex is not theorised as per se an activity to be played in digital arenas and apps, but it is relegated only to a second step to the approach through a dating app, a health concern, or blurred content for sex educational activities.

Several limitations have to be addressed to this article, including possible additional research to be done from this starting point.

Firstly, the exclusion of certain category of publication might have impacted the narratives and themes collected here. Therefore, to enhance the understanding of what is being said in academia regarding apps, gender, and sex(ualities), other publications as book, book chapters, and conferences papers need to be further examined.

Secondly, the general understanding of the phenomena here presented is shown in English-written articles. Incorporating some non-English language examples could be a possible next step to be done to create a wider and more intensive research about these topics.

As such, the article invites future research to deepen our understanding of apps in relation to gender and sex(ualities) by investigating not only the app content but also taking into account the design affordances of the app, the user interaction with the artefact, and possible implication of disclosure of the user privacy. More-

over, exploration of the apps, gender, and sex(ualities) in specific geographic contexts or on a comparative basis can expand our knowledge of interrelations between concerned topics.

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