

Exploring the Potential of MSM Social Media Dating Apps in HIV Prevention: Features, Interactions, and User Perceptions

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ABSTRACT

In New Zealand, men who have sex with men (MSM) bear a disproportionate HIV burden. Over time, their dating behaviours have evolved, with many now using social media dating apps to connect and meet. These apps, commonly utilised for arranging sexual encounters, could also serve as effective channels for disseminating HIV prevention information. The study investigates the potential role of MSM social media dating apps in HIV prevention, specifically examining the communication capacity of these platforms regarding HIV prevention, including the identification, documentation, and evaluation of HIV-related features, as well as users' perceptions of these features.

Grounded in the Uses and Gratifications Theory (UGT) and the Political Economy of Communication (PEC) framework, the research employed content analysis of dating app features and semi-structured interviews with their users. Three key questions guided the research: the presence of HIV-related features in MSM social media dating apps, the influence of the design and functionality of these features on their usability, and user perceptions of these features.

The findings revealed a limited presence of HIV-related features in MSM social media dating apps. Although the apps presented HIV-related information in an accessible, usable, and credible manner, the design leaned towards simplicity, lacking interactivity and engaging multimedia elements. Users acknowledged the importance of integrating HIV-related features but expressed a stronger reliance on the Burnett Foundation Aotearoa as a more reliable source of HIV-related information.

This study highlights both the potential and limitations of MSM social media dating apps in HIV prevention. Despite technological advancements, a gap remains between the platforms' capabilities and users' needs. The findings underscore the importance of user-centered design improvements to enhance the usability, trustworthiness, and engagement of these apps. Ultimately, this research offers valuable insights for app developers, policymakers, and public health professionals, guiding the development of more effective HIV prevention strategies.

Keywords: MSM community, social media dating app, HIV prevention, HIV-related feature, content analysis, semi-structured interview, thematic analysis.

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ATTESTATION OF AUTHORSHIP

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Chapter 1: Introduction

The emergence of digital technology and social media platforms has significantly transformed the communication landscape, influencing many aspects of daily life. A area of impact is that of romantic and sexual relationships, where the surge in popularity of online dating applications has altered traditional forms of interaction. Despite the increased use and popularity of these platforms, their role in addressing major health-related issues, such as HIV prevention among men who have sex with men (MSM), is an emerging and rapidly evolving field of interest. This study navigates this juncture by concentrating on the potential of social media dating apps to support HIV prevention among MSM in the New Zealand context, with particular emphasis on the HIV-related features within these platforms. The subsequent sections offer a discourse on the problem statement, research aims, methodology, and the significance of the study, setting a path for the chapters that follow.

1.1 Context and problem statement

The ongoing presence of the human immunodeficiency virus (HIV) remains a obstacle in the realm of public health, affecting millions of individuals and communities worldwide. HIV infects the body's immune system by targeting CD4 cells, which are key to maintaining immunity and fighting off infections (Joint United Nations Programme on HIV/AIDS, 2019). By the conclusion of 2021, there were around 38.4 million individuals worldwide who were living with HIV, and it is estimated that approximately 650,000 deaths occurred due to HIV-related illnesses during that year (World Health Organisation, 2023).

The importance of HIV/AIDS research cannot be understated. The findings from this field can potentially influence the health and wellbeing of not just the 38.4 million individuals living with HIV worldwide, but also the populations they interact with (WHO, 2022). Additionally, the presence of individuals unknowingly infected with HIV who continue to spread the virus inadvertently results in the emergence of new infections (Hirsch, 2012), further emphasising the need for ongoing research in this area.

Despite substantial advancements in treatment methods, such as antiretroviral therapy, the eradication of HIV remains a challenge due to multiple complex factors including stigma, limited access to healthcare, and certain high-risk behaviours.

One demographic group that is disproportionately vulnerable to HIV is MSM (CDC, 2021; Hessou et al., 2019;), a term originating from the 1980s (Woodyard et al., 2000). The term MSM is used to describe male adults who engage in sexual activity with other men irrespective of a person's sexual orientation or gender identity. It is not limited to the meaning of men who identify as homosexual. Instead, MSM consist of all the men who have sex with men, including individuals who identify themselves as gay or bisexual, straight while having sex with men to survive or make money, and those who define themselves as same-sex-loving or sexual freaks (Mays et al., 2004).

A range of factors contribute to the increased prevalence of HIV among MSM, including inadequate access to comprehensive sexual health education, and restricted availability of HIV testing, preventive, and therapeutic services. Additionally, risk behaviours such as unprotected anal sex, multiple sexual partners, and drug usage while engaging in sexual activities can increase the risk of HIV transmission among MSM (Beyrer et al., 2012; Ending HIV, n.d.; HIV.gov, 2017; Millett et al., 2012).

Given these risk factors and the emerging behavioural patterns among MSM, it is vital to understand the transformation of social interactions that influence these behaviours. Among these transformations, the evolution of dating practices plays a significant role. Dating, acknowledged as a pivotal part of romantic relationships (Smith, 2019), allows individuals to form deeper connections and get acquainted with each other. The concept of dating over the years, has undergone a significant transformation. In its traditional form, the process of finding a suitable match was heavily reliant on the involvement of families and friends (Rosenfeld et al., 2019). However, as society advanced and championed individual independence, individuals began to exercise greater control over their own romantic lives.

The advent of technology, particularly the introduction of online services, has led to considerable changes in the dating scene. This rise in online dating services, attributed to the pervasive influence of the internet and mobile technology, has revolutionised the way romantic relationships are initiated and developed. These services have not only made it easier and more readily available for people to encounter potential partners but have also expanded the dating pool, enabling connections with individuals globally (Ansari & Klinenberg, 2015; Finkel et al.,

2012; Ranzini & Lutz, 2017; Sharabi & Timmermans, 2021).

In the year 2022, reports indicated that the number of individuals utilising online dating services was 57.44 million in America (Dixon, 2023). Globally, the user base was larger still, with over 366 million people utilising online dating services. Future projections suggest a continuation of this upward trend, with an estimated 440 million people expected to seek romantic connections through these services by 2027 (Dixon, 2023).

Moreover, as of July 2022, it was reported that 20% of adults in the United States, aged 18 to 29 and currently in a relationship, acknowledged that they had connected with their current spouse or partner by using an internet-based dating platform (Dixon, 2023). This data underscores the integral role of these digital services in contemporary social and romantic interactions and their swift assimilation into mainstream channels for relationship formation.

Within the vast user demographics of online dating, MSM represents a significant proportion. Dating apps are increasingly popular among MSM (Goedel & Duncan, 2015). They offered a convenient and accessible way anywhere and anytime for MSM to connect with potential partners without having to leave their homes. By using GPS technology, dating apps show users potential partners who are located nearby (Anzani et al., 2018). Users can create profiles and connect with others without revealing their real names or personal information because of the anonymity of dating apps. The user-friendly interface and the ability to filter potential partners based on specific criteria further enhanced the dating experience for the MSM community.

However, the rise of these apps has also introduced new and complex challenges. The ease with which connections can be made has fueled a culture of hookups and casual encounters, characterised by a focus on short-term, non-committed relationships, and often a disregard for traditional dating norms (Boodram, 2009; Dye, 2011; Freitas, 2013;). While some users may find this culture appealing, others have found it shallow and unsatisfying. More concerning, though, is the correlation between MSM who seek sexual partners using apps and a higher likelihood of having STIs, including an increased risk for HIV (Wang et al., 2018; Wade, 2017).

Despite the challenges identified, effective strategies for preventing HIV among MSM exist, such as access to HIV testing and antiretroviral therapy treatment, promotion of the use of condoms and other barrier methods, access to pre-exposure prophylaxis (PrEP), reduction of substance abuse, promotion of safe sexual practices, targeted HIV prevention campaigns, and reducing stigma and discrimination (CDC, 2019; CDC, 2021; HIV.gov, n.d.; Mayer & Venkatesh, 2010; WHO, n.d.). Through addressing multiple factors that increase the risk of HIV transmission, the burden of HIV among MSM can be reduced, and public health outcomes improved. The popularity and accessibility of dating apps within the MSM community present a powerful tool to engage this community, particularly by promoting HIV prevention and sexual health. Educational content related to HIV and sexual health, including knowledge about HIV transmission, prevention methods, and the importance of regular testing, has also been integrated into these platforms (Grindr, n.d.; Scruff, 2023), helping to increase understanding of HIV, reduce the spread of misinformation, and promote healthier behaviours.

This connection between dating apps and HIV prevention becomes particularly relevant when considering the frequency with which MSM utilises these platforms. Evidence indicates that gay and bisexual men use dating apps more frequently than their heterosexual counterparts. Gordon (2014) found that gay men utilised dating applications more frequently, with an average of 21 uses per week and a 96-second session duration. Similarly, a study by Prestage et al. (2015) of over 4,000 Australian males found that MSM prefer online dating as a method of seeking romantic partners. More recent data supports these findings; according to a 2020 Pew Research report, sexual minorities are approximately two times more likely to use online dating platforms than heterosexual individuals (Anderson et al., 2020).

Further supporting these trends are findings that suggest gay men spend more time on dating and social media applications compared to heterosexual men. Goedel and Duncan (2015) discovered that men access these apps an average of 8.38 times per day and use them for 1.31 hours in total. Similarly, Grindr's (2022) investor presentation revealed that the average daily app usage time was 61 minutes in December 2021. A survey carried out in Spain reflected these trends, revealing that gay dating app users spend an average of 30 minutes per session, three times longer than heterosexual users who invest an average of 10 minutes per session (Growth from Knowledge, 2019). These findings highlight the potential impact that

interventions implemented through these platforms could have on the MSM community.

MSM are using dating apps more and more frequently, leading many researchers to investigate the possibility of using these apps as a tool for HIV prevention (Badal et al., 2017; Bineau et al., 2021; Contesse et al., 2020; Eleuteri et al., 2018; Goedel & Duncan, 2015; Goldenberg et al., 2014; Hecht et al., 2022; Hirshfield et al., 2012; Hoenigl et al., 2020; Holloway et al., 2014; Kesten et al., 2019; Mitchell et al., 2016; Muessig et al., 2013; Newcomb et al., 2016; Rosser et al., 2010; Su et al., 2015; Ventuneac et al., 2018). MSM social media dating apps could offer a convenient, accessible, and supportive platform for accessing information and resources related to HIV, building social connections and communities. They have the potential to be a useful tool in the ongoing efforts to stop the transmission of HIV and improve the health and well-being of the MSM community.

Though some studies suggest the potential of MSM social media dating apps as channels for HIV prevention, further research is necessary to assess the implementation and user perception of HIV-related features. A review of existing literature reveals a gap; a comprehensive overview of HIV-related features within these apps, the perceived interactivity of these features, and user perception is lacking. Additionally, the geographical scope of most research is limited to Australia, the United States, and Asia (Anzani et al., 2018). Little is known about similar research conducted in New Zealand. That could raise concerns about the generalisability of the foreign findings to New Zealand due to variations in policy, environment, and practice.

1.2 Research aim, question, and methodology

In the long-standing battle against HIV/AIDS, every minor advancement has been the culmination of the wisdom and hard work of countless pioneers. This research journey commenced within this vast and challenging yet promising domain. The beacon that guided it into the depths of HIV prevention research was an invaluable internship at the Joint United Nations Programme on HIV/AIDS (UNAIDS) in 2015.

During this internship, the researcher had the privilege of collaborating with public health experts and engaging in in-depth conversations with HIV-positive individuals, which deepened the understanding of HIV prevention strategies. Additionally, a

noteworthy phenomenon was observed: the HIV testing feature on Blued, an MSM social media dating app, successfully boosted the number of HIV tests conducted at several testing centers in Beijing. Although there was no direct participation in this project, the data changes were deeply impressive.

At that moment, the researcher profoundly recognised the immense potential of MSM social media dating apps in HIV prevention. This realisation sparked a deeper contemplation on the potential role of MSM social media dating apps in HIV prevention.

This study aims to investigate the communication capacity of MSM social media dating apps in relation to HIV prevention. It seeks to identify and analyse HIV-related features within these apps and assess users' perceptions of these features. This study employs an integrated theoretical framework, combining the Uses and Gratifications Theory (UGT) and the Political Economy of Communication (PEC). UGT provides insights into the motivations driving MSM individuals' use of social media dating apps, while PEC affords a understanding of the dynamics shaping the presence of HIV-related features within these platforms. A more detailed discussion of the application of these theories will follow in Chapter 3.

- RQ1: What HIV-related features are present on MSM social media dating apps

The process of answering this research question involves identifying the MSM social media dating apps in use in New Zealand and classifying the HIV-related features within these existing platforms. This question aims to understand the existing MSM social media dating apps' HIV awareness interventions in the market. It is needed to know what apps are available in New Zealand, as well as, how common is the existence of HIV-related information in these apps. Examining the HIV-related features of MSM social media dating apps is a critical step in assessing their potential for HIV prevention among this demographic and supports subsequent research.

The study began by capturing and consolidating HIV-related features present in MSM social media dating apps. Apps were chosen from the Apple App store and Google Play store. Screenshots of all the HIV-related features were then captured. The outcome is a dataset of HIV-related features present on MSM social media

dating apps. The results are presented in Chapter 5 and used to discuss the phenomenon and trends of MSM social media dating apps including HIV-related information.

- RQ2: How does the design and functionality of HIV-related features in MSM social media dating apps impact user interaction?

This question aims to operationalise measures of perceived interactivity of HIV-related features. Following on is the creation of a MSM social media dating apps HIV-related features' screenshots dataset in questions 1 and 2. This data is then subsequently reviewed using content analysis. The analysis identifies how usable, useful, desirable, accessible, findable, and credible the HIV-related features are in establishing measurements of interactivity. The findings are shown in Chapter 6, which revealed the HIV-related features within MSM social media dating apps are basic and tedious, but accessible.

- RQ3: How do app users perceive HIV-related features within the MSM social media dating apps?

So far, this research has focused on the apps. This research question changes the focus from the apps to the users. The aim here is to understand how the users perceive the HIV features and other aspects of HIV prevention and awareness present in the MSM social media dating apps. The issue's complexity and the topic's sensitivity necessitated the use of semi-structured individual interviews to offer detailed, context-specific descriptions of the experiences and perceptions of MSM social media dating apps users regarding HIV-related features. A total of 15 interviews were conducted with individuals who self-identified as MSM, had been using dating apps for a period exceeding three months, and resided in New Zealand. These interview findings form the basis for a discussion on the potential of leveraging social media dating apps as viable channels for disseminating HIV prevention information and increasing awareness within the MSM community. Detailed findings are elaborated in Chapter 7.

1.3 Thesis outline

This thesis is comprised of eight chapters. The first three chapters of the research serve as the foundation and introduction to the topic being studied, providing

background information and theoretical framework that will support the research being conducted. Furthermore, it offers a distinct comprehension of the setting and objectives of the study, as well as a roadmap for the rest of the research.

Chapter 1 introduces the research topic of exploring HIV-related features within MSM social media dating apps. It outlines the context and problem statement, emphasising the research gaps in academic literature. The chapter presents the research aim, question, and methodology, providing a clear direction for the study. It concludes with a thesis outline, offering a structured overview of the subsequent chapters.

Chapter 2 presents critical background information about HIV, the MSM community, health communication and dating apps, essential to the study. This chapter's significance lies in its role of contextualising the research, enabling a understanding of the current state of information in the field. The first section delivers a broad understanding of HIV and MSM, concentrating on their dynamics in New Zealand and the prevalence of HIV within the MSM community, anchoring the research in a specific socio-cultural context. The focus then shifts to health communication, particularly its eHealth subfield. This thorough review positions the research within a broader academic discipline and highlights the importance of communication strategies in health contexts, especially relating to HIV and MSM. The final segment discusses the role of dating apps in HIV prevention. It cites key studies, underlining the growing importance of digital platforms in health prevention strategies, and underpins the relevance of exploring HIV-related features within MSM social media dating apps. This chapter sets the stage for further investigation and emphasises the knowledge gap the research intends to address.

Chapter 3 establishes the theoretical foundation of this study, combining the political economy of communication and uses and gratification theory to formulate an analytical lens for the research. This chapter also discusses how these theories provide a framework for understanding the HIV-related features within MSM social media dating apps. Furthermore, these theoretical frameworks will serve as crucial interpretive tools in Chapters 5-7, shaping the interpretation of the study's results and anchoring the broader discussion.

Chapter 4 provides an account of the methodology and methods employed in this study. It begins by restating the research aims, as they serve as the guiding

principles for the approach used in this thesis. The chapter delves into the methodological foundation of the research, discussing the rationale behind the chosen methods and the research's philosophical background. The research unfolds in three distinct phases, and each phase is explained. The chapter provides an overview of the research methodology, delineating the selected research design and the methods utilised for the collection and analysis of data. Firstly, it elucidates the app search strategy and the inclusion and exclusion criteria utilised to select the MSM social media dating apps available on both the Google Play Store and Apple's App Store. Secondly, it introduces the content analysis method, which is used to explore the HIV-related features depicted in the app screenshots during the second phase of the study. Lastly, the chapter outlines the procedures for participant recruitment in the semi-structured interviews, including the criteria for inclusion. It also sheds light on the thematic analysis method employed to analyse the interview data. At the end of the chapter, the research project considers ethical concerns, ensuring that the study follows ethical guidelines and protects the rights and welfare of the participants.

The primary body of data analysis and findings is contained in Chapters 5-7.

Chapter 5 concentrates on the question: What HIV-related features are present on MSM social media dating apps? In the first part of the chapter, the combined app results from both stores- the Apple App Store results and Google Play store results are described. This allows for an overview of the available apps in the market. Next, the chapter delves into the presentation of the HIV-related features found within the MSM social media dating apps. These features are categorised and discussed, shedding light on their functionalities and implications. This analysis improves the understanding of the interventions related to HIV prevention that are incorporated into these apps.

Chapter 6 delves into the influence of design and functionality of HIV-related features on the usability of MSM social media dating apps. This chapter unveils the results of a content analysis carried out on screenshots depicting HIV-related features. The evaluation focuses on aspects such as usability, usefulness, desirability, accessibility, findability, and credibility of the presented HIV-related information.

Chapter 7 explores user perceptions of HIV-related features within apps. Between January and March 2022, 15 interviews were undertaken with MSM social media

dating app users, revealing their views and experiences regarding these features. This chapter emphasises the emerging themes from the interview data, with a special focus on users' experiences with and insights into the HIV-related features.

Chapter 8 highlights the research findings, answering three research questions and explaining the research's contribution to the body of knowledge. The research's limitations and future research recommendations are also mentioned.

1.4 Summary

This chapter has situated the current study within the broader context of health communication, elucidating its focus on HIV, MSM, and social media dating apps. It has underscored the significance of investigating HIV-related features within MSM social media dating apps, given their potential to supplement existing HIV prevention strategies, and enhance HIV awareness among app users.

The chapter has outlined a step-wise approach to this research, commencing with an identification of the types of HIV-related features available on dating apps, followed by a thorough analysis of these features. The study then delves into the MSM social media dating app users' experiences, particularly in New Zealand, providing a valuable exploration of user understanding of HIV-related features.

Crucially, this research is driven by a comprehensive understanding of HIV prevention information communicated via MSM social media dating apps. It seeks to better promote HIV prevention strategies through these platforms, which could have a profound impact on public health. This understanding is imperative, not only for the MSM community, but also for healthcare providers, app developers, and policymakers.

This research is poised to contribute to the field of health communication, particularly concerning HIV prevention among the MSM community using dating apps. The subsequent chapter will delve into a comprehensive examination of the foundational research and prior studies that have laid the groundwork for the current investigation. This thorough explanation of the research background will provide improved comprehension of the setting and principles on which the current research is established.

Chapter 2: Contextualising HIV Prevention: An Exploration of MSM, Social Media Dating Apps, and Health Communication in New Zealand

This chapter positions the research of investigating HIV-related features within MSM social media dating apps within the context of related academic areas, including literature on HIV and MSM, health communication, dating apps and HIV prevention. Composed of sections, this chapter presents the background information necessary for understanding HIV-related features within MSM social media dating apps.

The chapter commences with an examination of HIV's emergence, notably its incidence in New Zealand and prevalence among MSM, providing context for the present research. Subsequently, the chapter introduces the broader discipline of health communication. This study is anchored in the domain of health communication. In the following section, dating apps and HIV prevention are discussed. It evaluates the present but limited literature on HIV prevention on MSM social media dating apps and makes an argument for how this study may fill a research gap and contribute to the knowledge in this field.

2.1 General overview of HIV and MSM

Understanding New Zealand's HIV situation serves as the foundation for designing and implementing targeted HIV prevention and treatment strategies, particularly for the MSM community. This section provides an overview of the emergence of HIV in New Zealand and highlights its disproportionate impact on the MSM community.

Such understanding is vital for three key reasons. Firstly, it highlights the HIV epidemic as a major public health threat. Secondly, it informs the development and implementation of community-specific, effective prevention and treatment programmes. Finally, by revealing the disproportionate burden of HIV on New Zealand's MSM community, it highlights the need for targeted prevention efforts within this group.

2.1.1 Emergence of HIV

Since the 1980s, the global HIV/AIDS pandemic has resulted in an estimated 84.2 million individuals contracting the virus (WHO, 2022). The epidemic has led to approximately 40.1 million deaths globally. Specifically, in 2021, the worldwide

number of people newly diagnosed with HIV reached approximately 38.4 million. Furthermore, in that same year, around 650,000 individuals died from AIDS-related illnesses (WHO, 2022).

In 1981, the Centre for Disease Control (CDC) in the United States of America first recognised AIDS, while its cause, HIV infection, was subsequently discovered (Gallo, 2006). The human immunodeficiency virus (HIV) is a type of retrovirus that targets cells in the human immune system, particularly macrophages and CD4+ T-cells, which are vital elements of the immune system, and severely impairs their function (UNAIDS, 2019). HIV infection leads to a weakening of an individual's immune system, resulting in immunodeficiency (UNAIDS, 2019). Acquired immune deficiency syndrome (AIDS) describes the collective symptoms and infections related to the immunodeficiency developed by the individual. A person infected with HIV might not develop AIDS for many years, with some cases reporting incubation periods of 10 or more years (Chaisson et al., 1995). Due to the state of immunodeficiency, several types of infections, such as pulmonary tuberculosis, pneumonia, enteritis, encephalitis, oral mould infection, and herpes zoster, can occur. These infections are caused by specific pathogenic microorganisms. In addition, severe infections can be instigated by pathogens, such as pneumocystis and candida. Tuberculosis is the leading cause of death in individuals diagnosed with HIV (UNAIDS, 2019). The prevalence of HIV varies across the globe, with certain areas more impacted than others. The Sub-Saharan Africa region (Southern and East Africa) is the most affected by HIV, followed by Asia and the Pacific (UNAIDS, 2022).

Almost four decades ago, upon the emergence of the HIV/AIDS epidemic, most infected individuals died from an AIDS-related condition. Even today, there is no effective HIV vaccine or cure. However, effective treatments and pre-exposure preventative medicines are now available. For the global effort to end AIDS as a public health threat, access to HIV care is vital. Expanding access to earlier diagnosis and antiretroviral therapy has reversed the rates in several high-prevalence nations, including some of the most affected in the southern region of Africa (Cichocki, 2019). Despite the significant advances in HIV/AIDS treatment and prevention on a global scale, local contexts continue to shape the experiences and challenges faced by different communities. In New Zealand, a nation known for its progressive stance on LGBTQ+ rights and its vibrant gay scene, understanding

the dynamics of HIV within the MSM population becomes vital. This unique environment calls for a close examination of the HIV/AIDS landscape, with a focus on the policies, practices, and community initiatives that have shaped the response to this public health concern.

2.1.2 HIV in New Zealand

Auckland, together with San Francisco, Toronto, and London, is recognised as one of the most gay-friendly cities worldwide (Dougan, 2015). The city has a vibrant gay scene, hosting gay-friendly bars, clubs, and events. The annual Auckland Pride Festival, characterised by a parade and an array of cultural events, stands as one of the city's major events, drawing a large audience from the LGBTQ+ community.

New Zealand exhibits a notably progressive stance towards LGBTQ+ rights and equality, mirrored in its legislative provisions and policies. In 1986, New Zealand introduced the Homosexual Law Reform Act, thereby decriminalising consensual sexual activity between men and positioning itself as a pioneer in global reform (New Zealand Legislation, n.d.). In 2013, it legalised marriage for same-sex couples, becoming the 13th country to do so (New Zealand History, 2022). This legislation granted same-sex couples the legal privileges and societal benefits associated with marriage, symbolising a stride towards LGBTQ+ equality and acceptance in the country. Furthermore, New Zealand enforces anti-discrimination laws that safeguard LGBTQ+ individuals from discrimination in sectors such as employment, housing, and healthcare (Community Law, n.d.). The nation also supports an LGBTQ+ rights movement, which campaigns for continued progress and equality (Gummer, 2002; Hansen, n.d.; New Zealand History, 2022;).

The first reported case of AIDS in New Zealand occurred in 1983 (UNAIDS, 2004). UNAIDS statistics affirm that the prevalence of HIV remains low in New Zealand compared to global averages. HIV prevalence in adults between the ages of 15 and 49 stands at 0.05 per 1,000 people (UNAIDS, 2021). As of 2021, approximately 3,600 individuals in New Zealand live with HIV, with 15% of people unaware of their status (UNAIDS, 2021). Concurrently, treatment for HIV is being administered to about 3,033 individuals in Aotearoa (Burnett Foundation Aotearoa, n.d.).

In New Zealand, gay and bisexual people comprise approximately 2.5 percent of the population. Although a small portion of the population, they are the most affected

by HIV/AIDS. The risk of HIV infection among MSM is very high, being 348 times greater than that among heterosexuals (Burnett Foundation Aotearoa, n.d.).

In 2021, 112 individuals were diagnosed with HIV in New Zealand, of which 70 were MSM. Among these 70 cases, 41 were diagnosed within the country, while 29 had received their diagnoses outside of New Zealand. The following year, in 2022, the Burnett Foundation Aotearoa (n.d.) reported 135 new HIV cases, with 80 among the MSM population.

These statistics reflect a disproportionate prevalence of HIV within the MSM community. Over time, while there has been a decrease in HIV cases among MSM since a peak in 2016, the significant number of late diagnoses suggests a delay in HIV testing. This points to a need for regular testing and early diagnosis within the MSM community.

Various organisations actively contribute to HIV/AIDS prevention efforts in New Zealand, with the Burnett Foundation Aotearoa playing a significant role. As a leading non-governmental organisation, it has established strong trust within the MSM communities through sustained visibility, strategic branding, and a comprehensive range of services. Founded in 1984 by Bruce Burnett as an AIDS support network, the foundation has been instrumental in HIV prevention for nearly four decades. Its rebranding in 2022 from the New Zealand AIDS Foundation (NZAF) to the Burnett Foundation Aotearoa signifies an expansion in its mission and services (Burnett Foundation Aotearoa, 2022; Te Ara, n.d.).

The foundation provides diverse services, including HIV and STI testing, counseling, and remote support, underscoring its nationwide impact. Notable campaigns, such as "Ending HIV," launched in 2016 with the aim of eliminating new HIV transmissions by 2025, further reflect the foundation's influence (Ending HIV, 2020). Body Positive Inc. is another significant non-profit organisation in New Zealand dedicated to addressing HIV. Founded by HIV-positive individuals in 1994, Body Positive Inc. initially distinguished itself as the nation's only HIV+ peer support organisation. Its primary mission is to alleviate the prevalent feelings of isolation among people living with HIV and to foster a supportive environment (Body Positive, n.d.).

As with many organisations in this field, Body Positive Inc. places a strong emphasis on education. It conducts educational forums that equip individuals with

vital information about HIV, thereby fostering understanding and encouraging prevention. Simultaneously, it advocates for those living with HIV, ensuring their voices and concerns are acknowledged in public discussions (Body Positive, n.d.).

Furthermore, Body Positive Inc.'s range of services extends beyond educational and advocacy initiatives. It provides networking platforms, creating spaces for HIV+ individuals to connect, share experiences, and offer mutual support. Information on complementary therapies and a range of resources, such as a national directory of HIV/AIDS services, publications, and brochures, further enhance the organisation's comprehensive support for people living with HIV (Body Positive, n.d.).

There are also other organisations, such as Te Whāriki Takapou, which emphasise sexual health, encompassing HIV education and prevention for Māori communities (Te Whāriki Takapou, n.d.), and Rainbow Youth which works to increase wellbeing and health of LGBTQIA+ young people, including those who are living with HIV (Rainbow Youth, n.d.).

These organisations play an essential role in addressing the HIV/AIDS epidemic in New Zealand. They provide services to individuals living with HIV/AIDS, aim to reduce HIV transmission, and advocate for the rights of these individuals. By working together, and with government and other stakeholders, these organisations can help to mitigate the effects of HIV/AIDS in New Zealand and enhance the quality of life for those affected by the disease. Among the various populations affected by HIV/AIDS in New Zealand, the MSM community experiences a unique set of challenges and risks. This next section will explore the prevalence of HIV among MSM and the contributing factors that highlight their vulnerability to the disease.

2.1.3 The prevalence of HIV among MSM and contributing factors

MSM, a term originating in the 1980s to include adult males engaging in sexual activities with other males irrespective of their sexual orientation or gender identity, are disproportionately affected by HIV (Woodyard et al., 2000). Globally, MSM face a risk of contracting HIV that is 27 times higher than that of heterosexual men, highlighting their vulnerability to the disease (CDC, 2021; Hessou et al., 2019; UNAIDS, 2019).

Various factors contribute to the increased prevalence of HIV among this group. A

primary risk factor is unprotected anal sex, identified as a high-risk activity due to the potential presence of the HIV virus in an infected individual's blood, rectal fluids, semen, pre-ejaculatory fluid, vaginal secretions, or breast milk (CDC, 2019; UNAIDS, 2014). Risky behaviours, such as engaging with multiple sexual partners and drug usage during sexual activities, further exacerbate this risk (Beyrer et al., 2012; Ending HIV, n.d.; HIV.gov, 2017; Kiene et al., 2008; Millett et al., 2012). These behaviours are often influenced by social and cultural factors within the MSM community, including insufficient knowledge about safe sex practices and a stigma surrounding condom use (UNAIDS, 2002).

From a behavioural perspective, unprotected sex and multiple sex partners among MSM, particularly those engaging in casual sex, raise questions about the influence of digital platforms, such as MSM dating apps, on attitudes and practices surrounding condom use.

In addition to high-risk behaviours, societal factors play a substantial role in increasing the risk of HIV among MSM. Numerous social challenges negatively impact this group's well-being and quality of life, such as violence, discrimination, stigma, and limited access to high-quality healthcare (UNAIDS, 2000, 2002, 2006).

One of the societal hurdles is the stigma and discrimination faced by MSM. In many parts of the world, homosexuality is still stigmatised and considered taboo, leading to a lack of acceptance and understanding by their families, friends, and communities (Duncan, 2017; UNAIDS, 2000, 2002, 2006). This not only affects the mental health of MSM, leading to feelings of isolation and lack of support, but it also serves as an obstacle to HIV prevention and treatment efforts. Fear of discrimination often results in MSM undergoing fewer medical checks, thus increasing their risk of HIV infection, and potentially delaying early-stage treatment (Avert, 2019).

Additionally, MSM face barriers to accessing appropriate and effective healthcare services due to this same stigma and discrimination, further contributing to the high prevalence of HIV among this population (Lick et al., 2013; Mirza & Rooney, 2018).

MSM are also more likely to experience violence and harassment, including physical violence, verbal abuse, and discrimination in the workplace and other public spaces (Greenwood et al., 2002; Friedman et al., 2008; Raymond et al., 2009).

This violence and harassment can affect MSM's mental and physical well-being and their overall quality of life.

Despite the challenges faced by this community, various strategies can help prevent HIV among MSM. These include access to HIV testing and antiretroviral therapy treatment, promotion of the use of condoms and other barrier methods, access to pre-exposure prophylaxis, reduction of substance abuse, promotion of safe sexual practices, and targeted HIV prevention campaigns (CDC, 2019; CDC, 2021; Coates et al., 2008; HIV.gov, n.d.; Mayer & Venkatesh, 2010; WHO, n.d.). Additionally, addressing stigma and discrimination is important for improving public health outcomes and reducing the burden of HIV among MSM.

Lastly, the exploration of the role of digital platforms such as MSM dating apps in shaping behaviour and attitudes surrounding HIV prevention within this community is crucial. These platforms have the potential to influence behaviour and communicate health information. Therefore, understanding the HIV-related features within these apps is an integral part of strategising against HIV transmission among MSM. The discussion on the role of such digital platforms serves as a segue into the next section, which delves deeper into the evidence-based HIV prevention strategies, including Pre-Exposure Prophylaxis (PrEP), Treatment as Prevention (TasP) and Post-Exposure Prophylaxis (PEP). These strategies are designed to curb the spread of HIV and provide a safeguard for individuals, such as MSM, who have an elevated likelihood of contracting HIV.

2.1.4 HIV prevention strategy

While understanding the heightened risk and the factors contributing to the increased HIV prevalence among MSM is crucial, it's equally important to discuss potential interventions that can mitigate this risk. Central to these interventions is the utilisation of antiretroviral medications, forming the basis of three evidence-based HIV prevention strategies: TasP, PrEP, and PEP. These strategies are designed to curb the spread of HIV and provide a safeguard for people, such as MSM, who have an elevated likelihood of contracting HIV.

TasP is a strategy aimed at minimising the spread of HIV by utilising antiretroviral therapy (ART) to lower the viral load of individuals living with HIV/AIDS (PLWHA) to undetectable levels. A low HIV viral load decreases the probability of

passing on the virus to others (WHO, 2012). Adherence to TasP guidelines can reduce the transmission risk by up to 96% (Cohen et al., 2013).

TasP implements the "U=U" or "undetectable equals untransmittable" concept, indicating that an HIV-positive individual with an undetectable viral load, courtesy of ART, cannot transmit the virus to their sexual partners (Burnett Foundation Aotearoa, 2022). The consistent use of ART, leading to undetectable viral loads, enhances not only the health outcomes for individuals living with HIV, but also decreases the likelihood of viral transmission to their sexual partners. This bears significance for those at a heightened risk of HIV transmission, such as those with multiple sexual partners or engaging in unprotected sex (NIH, 2019).

Beyond individual benefits, TasP carries implications for public health. TasP aids in slowing the virus' spread and reducing the overall societal burden of HIV. This is especially vital in resource-limited environments where the availability of ART, along with other HIV prevention tools, may be constrained.

Another effective HIV prevention strategy is PrEP. This preventative medication is used by individuals at a heightened risk of contracting HIV, aiming to reduce their chances of infection. PrEP is comprised of two drugs, tenofovir and emtricitabine, taken daily in pill form (CDC, 2019; Mayer & Venkatesh, 2010).

PrEP is intended for individuals who have a significant risk of HIV infection through sexual activity or intravenous drug use. These individuals include MSM, persons who have multiple sexual partners, and individuals who share needles for drug use. It is also recommended for those who have an HIV-positive sexual partner and individuals engaging in risky sexual behaviour, such as unprotected sex or sex with partners of unknown HIV status (CDC, 2022).

For individuals at risk of acquiring HIV through sexual contact or injection drug use, these medications can prevent the virus from taking hold and spreading throughout the body, thereby averting a long-lasting infection. Studies have shown that daily PrEP usage can reduce the risk of HIV infection by approximately 99%. Moreover, consistent daily PrEP intake can decrease the likelihood of HIV infection by 74% among those who use it regularly (CDC, 2019). Oral PrEP intake has shown an impact in reducing new HIV infections when offered as an additional prevention option for gay men and other individuals engaging in sexual activities with men, sex

workers, and transgender people (UNAIDS, 2019). A study in 2014 demonstrated that taking PrEP medication at least four times a week can be up to 96% effective in preventing HIV infections (Grant, 2014). A further study conducted in 2017 on young men engaging in sexual activities with men across multiple US cities found high acceptability of PrEP, with most participants reaching the necessary drug levels for protection against HIV during their monthly check-ups (Hosek et al., 2017).

PrEP is now widely available in many countries and covered by most private insurance plans and Medicaid. In New Zealand, PrEP was established as a publicly funded medication in 2018, allowing those eligible for public healthcare to obtain a 3-month supply of PrEP for a maximum cost of \$5 (Burnett Foundation Aotearoa, n.d.).

Entities like the Centers for Disease Control and Prevention (CDC) and the World Health Organisation (WHO) recommend PrEP as a prevention strategy for people at risk of HIV. PrEP can serve as a crucial element within a holistic HIV prevention strategy and supplement endeavors aimed at promoting early ART initiation, HIV testing, and linkage to care (Liu et al., 2014). The number of HIV-related deaths has been reduced by PrEP and other HIV treatments.

PrEP and PEP are both antiretroviral medications adopted to prevent HIV transmission. The primary distinction between the two lies in the timing of initiation. PrEP is taken before potential exposure to prevent infection, while PEP is taken after potential exposure as emergency protection (Pebody, 2022).

PEP is a medicine used soon after potential HIV exposure to protect against infection. If administered within 72 hours following potential exposure, PEP is highly effective in preventing HIV (HIV.gov, 2021).

PEP is recommended for individuals who have been potentially exposed to HIV through activities such as unprotected sexual intercourse, sharing needles, or occupational exposure (e.g., healthcare workers who are accidentally exposed to HIV-positive blood). The earlier PEP is started, the more effective it is in preventing HIV infection. Although it is recommended that PEP be initiated within 72 hours of potential exposure, it may still be effective if started up to 96 hours after exposure (CDC, 2022).

Potential adverse effects of PEP include nausea, headache, and fatigue, which are

typically mild and can be managed with medication. PEP is not a replacement for other preventative measures such as regular condom use during sexual intercourse. Moreover, PEP does not guarantee the prevention of HIV infection (CDC, 2022).

In addition, there are other effective strategies for preventing the spread of HIV (CDC, 2021; Coates et al., 2008; WHO, n.d.), including consistent and correct condom use, needle and syringe programmes, HIV testing and early diagnosis, and behavioural interventions, such as risk reduction counselling and education.

It is essential to understand that relying on a single method for HIV prevention is not sufficient. To successfully reduce the likelihood of HIV transmission, it is crucial to adopt a combination approach utilising multiple prevention methods. By combining different strategies, individuals can increase their chances of remaining HIV-free and help control the spread of the virus.

The preceding section provides a summary of HIV and MSM, laying the groundwork for the study of exploring HIV-related features within MSM social media dating apps.

The next section focuses on health communication and the sub-field of eHealth, offering insight into how new technologies have been utilised to aid health interventions. It further elucidates how research in this field contributes significantly to understanding current research investigating HIV-related features within MSM social media dating apps.

2.2 Health communication

Health communication, as a research field, explores and explains the ways in which human and mediated contact affects health outcomes and seeks to promote health (Kreps et al., 1998). It is considered one of the most advanced subdisciplines of communication studies (Lie & Servaes, 2015). However, there is no standardised definition of health communication. Health communication is sometimes defined from a practice-oriented perspective. For example, the Centers for Disease Control and Prevention (CDC) in the United States defines health communication as: “The study and use of communication strategies to inform and influence individual decisions that enhance health” (CDC, 2001, n.p.). Some scholars define health communication from both scholarship and practice perspectives. For example, Bernhardt (2004) states that: "Health communication is the scientific development,

strategic dissemination, and critical evaluation of relevant, accurate, accessible, and understandable health information communicated to and from intended audiences to advance the health of the public" (p. 2051).

Health Communication focuses on the communication processes involved in promoting health and preventing disease. This field is concerned with how health information is communicated and received by different audiences, and how health messages are framed and delivered to different populations. Health Communication seeks to enhance health consequences by developing effective and culturally appropriate health communication strategies. This can include promoting health awareness, educating about health risks and benefits, making it easier to access health services, and enhancing communication between patients and healthcare providers. Health communication is a multidisciplinary field that involves collaboration between public health professionals, health educators, and communication experts (National Communication Association, n.d.; Society for Health Communication, n.d.).

The success of targeted health messaging hinges on culturally tailored communication strategies. Research has shown that health promotion programs are more effective at driving behaviour change when they incorporate cultural relevance into their design. For example, a systematic review found that lifestyle interventions tailored to manage type 2 diabetes among adults of Black African ancestry resulted in improved health outcomes. These positive results were particularly evident when the interventions were delivered by facilitators from the same community and used language and messaging that resonated with participants (Wadi et al., 2021). Similarly, Schiavo (2023) emphasises the critical role of cultural humility in both clinical and public health contexts, advocating for the avoidance of stigmatizing language and the integration of culturally relevant values and expressions. Together, these approaches not only reduce communication disparities but also foster greater trust and engagement within diverse populations.

Health communication plays a crucial role in addressing HIV prevention (Tomori et al., 2014). Implementing successful health communication tactics can increase awareness about the disease, promote testing and early diagnosis, diminish stigma and discrimination, and enhance the availability of assistance and therapy for people who are HIV-positive (Bor et al., 2021; Kudrati et al., 2021; Peinado et al., 2020;

Sunguya et al., 2016; Tomori et al., 2014). Effective HIV prevention efforts can enhance health results for people who are living with HIV, which in turn enhances the impact of health communication efforts.

Health communication strategies for HIV prevention may include mass media campaigns, community-based outreach programmes, and targeted messaging for specific populations, such as MSM (Sander et al., 2017). These strategies may involve some communication channels, including TV, radio, print media, and social media (Wellings & Macdowall, 2000). Effective HIV prevention messages are culturally and socially appropriate, evidence-based, delivered through appropriate channels, and tailored to the requirements and convictions of the intended audience. For example, health communication campaigns aimed at young people may use social media (Maher et al., 2016). In addition to education and awareness, health communication can also be used in addressing the social and structural impediments that prohibit individuals from accessing HIV testing and treatment. Health communication can be used to deliver information about HIV transmission, prevention, and testing. It can also serve to encourage changes in behaviour, such as reducing risk behaviours and encouraging adherence to antiretroviral therapy (Bago & Lompo, 2019; Craddock et al., 2019; McFarlane et al., 2015; Threats & Bond, 2021). Health communication can also play a role in reducing stigma and discrimination by promoting social and cultural understanding of the disease and increasing awareness of the experiences of HIV-positive people.

Health communication through digital technology, particularly in the field of online HIV prevention interventions, is becoming an increasingly prevalent practice in the digital age. This growing emphasis is not merely a trend but a reflection of the broader shift towards leveraging the power of the internet, social media, and mobile apps to enhance public health efforts. Online HIV prevention interventions specifically utilise these digital platforms to create innovative strategies to prevent the spread of HIV, providing avenues for engagement and education (Horvath et al., 2013).

According to recent studies, digital interventions have proven to be an effective means of increasing both HIV knowledge and testing. Researchers found that a mobile app tailored to MSM was well-received, with over half of the participants using it to obtain condoms and self-test kits (Sullivan et al., 2017). In a controlled,

randomised study, Rhodes et al., 2016, utilised social media to educate MSM on HIV testing. As a result of the 12-month intervention, participants showed a higher rate of HIV testing compared to control groups (Rhodes et al., 2016). Additionally, an educational digital storytelling intervention in Nigeria was found to effectively enhance the perception of HIV risk and increase the knowledge of adolescent participants in the group receiving treatment compared to the group not receiving treatment (Ofoegbu et al., 2020).

As technology continues to advance, the methods of health communication are also evolving. In particular, the widespread use of the internet and social media has made eHealth an essential component of health communication. In the next section, the discussion will further delve into the concept of eHealth.

2.2.1 eHealth

Digital health, often referred to as eHealth, is characterised by the deployment of contemporary information and communication technology, notably the Internet, to enhance and streamline health services, thereby promoting better health outcomes (Eng, 2001). It emerges at the intersection of medical informatics, public health, and business. Its primary objective is to facilitate the provision or improvement of healthcare services and information via the internet and associated technologies (Eysenbach, 2001). In a broader context, the World Health Organisation (WHO) delineates eHealth as:

"the cost-effective and secure use of information and communication technologies in support of health and health-related fields, including health-care services, health surveillance, health literature, and health education" (WHO, 2024, n.d.).

Recent research, such as a study by Yoeli et al. (2019), demonstrates the potential of eHealth interventions, particularly mobile phones, to improve patient adherence to tuberculosis treatment and address gaps in the current standard of care.

As the internet and other novel communication tools have developed dramatically fast in recent years, eHealth also embraces a significant evolution. It can be fulfilled in multiple routines, for instance, health information websites, health support

programmes, interactive health records, health education applications, mobile health communication programmes and care systems (Norman & Skinner, 2006). The wide range of novel eHealth applications holds promise to provide access to various information about health, enhance care quality, reduce diagnostic errors, validate collaborations among different agencies, and encourage healthy life habits (Kreps & Neuhauser, 2010).

The deployment of technology in modern health care systems has improved various healthcare services, including patient data management, health record digitisation, and privacy protection. Many health institutions have successfully digitised most of the services, enhancing efficiency and privacy – a significant concern for patients (Brooks, 2019). The use of electronic management systems for patient records and data is a notable feature in almost every hospital. Patient records transitioned from physical files to well-organised databases in computer systems, ensuring efficiency, and protected access limited to authorised personnel through information privacy policies such as passwords (Alotaibi & Federico, 2017).

Positioned within this expansive domain of eHealth, social media platforms have demonstrated potential as vehicles for health communication, inclusive of strategies focused on HIV prevention. The integration of such platforms within the realm of eHealth offers benefits, such as interactive engagement, improved accessibility to pertinent health information, enhanced social support, and a likelihood of receiving personalised information, as compared to traditional non-mediated sources (Moorhead et al., 2013).

Empirical investigations have explored the potential of eHealth, with research conducted by Bull et al. (2011). Their study targeted a diverse youth demographic, delivering an HIV prevention intervention via Facebook. This intervention, comprised of HIV risk information, blogs, online videos, and safer sex guidelines, aimed to enhance safer sex knowledge, attitudes, and behaviour. Over 1500 young adults, primarily from African American and Latino backgrounds, participated in this study. They completed a baseline assessment and two follow-up evaluations at two- and six-month intervals.

More recently, Lee et al. (2020) investigated the utilisation of social media platforms to encourage HIV testing and the adoption of pre-exposure prophylaxis (PrEP) among young Latino immigrant MSM. Their results emphasized the

significance of customizing social media content according to participants' language preferences, cultural norms, and attitudes towards HIV testing and PrEP.

Overall, these studies highlight the implications of integrating social media platforms into eHealth strategies. These platforms may contribute to the development of targeted HIV prevention interventions, particularly for specific groups. As eHealth continues to evolve with information technology advancements and changing social media dynamics, its role in enhancing health outcomes through targeted, accessible, and efficient communication channels grows. This evolution underscores the need for health researchers and professionals to leverage these developments for health promotion and disease prevention.

2.3 Dating apps and HIV prevention

The literature review has so far covered a general overview of HIV and MSM, the broad disciplines of health communication, and the health communication sub-field of eHealth. The subsequent section focuses on the role of dating apps in HIV prevention, specifically scrutinising studies concerning HIV prevention within MSM social media dating apps. These studies serve as a critical resource in understanding how digital communication and human interaction on such platforms can influence HIV prevention strategies. The insights gleaned from this research context can further inform the broader landscape of MSM social media dating apps and their efficacy in HIV prevention.

2.3.1 The rise and evolution of dating apps

Dating, as an integral part of romantic relationships (Smith, 2019), allowing individuals to form deeper connections and get to know each other, has significantly evolved over the years. Traditionally, the dating process involved families and friends playing a pivotal role in matchmaking (Rosenfeld et al., 2019). As society progressed, individuals gained more independence and took control of their dating lives.

The advent of technology catalysed a major revolution in the dating scene with the introduction of online dating platforms. The surge of these services can be attributed to the growing prevalence of the internet and mobile technology, facilitating matchmaking without the constraint of geographical boundaries, and thus, transforming the dynamics of initiating and developing romantic relationships

(Ansari & Klinenberg, 2015; Ranzini & Lutz, 2017; Sharabi & Timmermans, 2021).

The first online dating website, Match.com, emerged in 1995 (Matthews, 2022), followed by platforms like eHarmony in 2000 (Britannica, n.d.). These early platforms primarily focused on helping individuals find long-term partners and offered compatibility matching based on detailed questionnaires.

However, the advent of smartphones and social media gave rise to a new generation of dating apps like Tinder, which offer a dating experience that is easy to use, and readily available. These apps, available on ubiquitous mobile devices, allow users to swipe through potential partners and quickly connect with those they find attractive. This not only led to a surge in their popularity but also increased the number of users.

One significant advantage offered by these online platforms is the opportunity for potential partners to peruse each other's profiles at any time, learning about interests, hobbies, and perspectives before deciding to meet (Finkel et al., 2012; Rosenfeld, 2018). This level of convenience and the abundance of choice provided by these apps, contrasts starkly with the traditional offline dating scene.

Over the past few years, online dating has become more advanced and refined, with the development of new features and technologies to enhance the user experience. Some dating apps have adopted artificial intelligence (AI) to analyse large amounts of user data, thereby creating more accurate and personalised match recommendations (Klubnikin, 2022). AI can also be used to verify the authenticity of profile pictures, reducing catfishing. Image recognition algorithms can further analyse facial expressions and body language to provide more insight into the personalities of potential matches.

The rise of digital dating platforms aligns with the transformation of modern life, particularly the realm of interpersonal connections and intimate activities. Current data from 2022 affirms this, with over 57.44 million individuals in the United States and over 366 million people globally using online dating services (Dixon, 2023).

Central to young adulthood is the pursuit of stable romantic relationships (Arnett, 2000; Sumter & Vandebosch, 2019), and the role of online dating in fulfilling this goal has gained prominence over the years. Supported by a nationally representative survey of American adults conducted in 2017, it was found that about 39% of

heterosexual couples connected online, marking a notable rise from 22% in 2009 (Rosenfeld & Thomas, 2012; Rosenfeld et al., 2019).

Existing literature shows a higher propensity for same-sex partners to engage with dating apps compared to their heterosexual counterparts (Rosenfeld & Thomas, 2012). For instance, Gordon (2014) noted that gay men demonstrated a more frequent engagement with dating apps, averaging 21 uses per week with a session duration of 96 seconds. This trend was corroborated by a survey of over 4,000 Australian males, which illuminated the preference of MSM for online dating as a conduit for connecting with potential partners (Prestage et al., 2015). A report by Pew Research Center in 2020 further emphasised this pattern, suggesting that sexual minorities are approximately twice as likely to use online dating platforms compared to their heterosexual peers (Anderson et al., 2020).

Despite the apparent advantages of online dating, the platform is not devoid of challenges. A significant proportion of women reportedly experience some form of harassment on dating platforms, with those aged between 18 to 35 years facing a higher threat of physical harm compared to their male counterparts (Pew Research Center, 2020). Moreover, a 2018 Australian study illuminated that straight males disproportionately perpetrate sexist abuse and harassment against women (Thompson, 2018). For MSM users, the online dating landscape can pose distinct issues, such as an elevated risk of HIV and other sexually transmitted infections due to increased sexual partners and frequent engagement in condomless anal intercourse (Holloway et al., 2015; Jin et al., 2009).

Research indicates that underage MSM also utilise dating apps to find potential partners (Macapagal et al., 2018). Additionally, a study conducted by Rice et al. (2015) found a greater inclination among gay adolescents to actively seek partners online, leading to a higher likelihood of engaging in unprotected sexual encounters with individuals they meet through online platforms.

Nonetheless, the emergence of dating apps and the subsequent revolution of the dating scene have profound implications for adults' mental and physical well-being. As dating apps become increasingly accepted as tools for finding partners across different age groups and genders, they have proven to exert a significant influence on how relationships are formed and developed in contemporary society (Burman & Margolin, 1992).

Dating applications are commonly defined as software applications designed to generate connections between individuals seeking romance, casual sex, or friendship. They are downloaded onto mobile devices and employ algorithms that take into account factors such as age, gender, and geographical proximity to match users accordingly (Orchard, 2019). The stigma surrounding online dating has led to an increasing number of singles finding love online over the past 15 years (Finkel, 2012). Pew Research Center (2016) reported that 15% of American adults have used apps or websites for online dating. These platforms are particularly beneficial for individuals who have recently relocated and lack an established social network, identify as a sexual minority, or are burdened by work or child-rearing responsibilities, leaving them little time to attend social gatherings with other singles (Finkel, 2012).

Different dating apps offer unique features. For instance, Tinder enables users to express interest or disinterest in another user's profile by 'swiping right' or 'swiping left', respectively. In the case of a mutual 'right swipe', the users can exchange messages (Nannyange, 2021; Pleines, 2024). Bumble, another dating app, permits only female users to initiate contact in a heterosexual match (The rocky safari, 2014). eHarmony, meanwhile, boasts an advanced matching algorithm that seeks to pair uniquely compatible singles. Grindr and Her cater to homosexual and lesbian/bisexual users, respectively (Finkel, 2012). Most of these apps provide free versions with the option to upgrade to a paid version that offers additional user-friendly features enhancing the dating experience (Orchard, 2019).

The COVID-19 pandemic has further underscored the advantages of dating apps as it curtailed traditional social interactions. A study by Winking (2021) reported an increase in the use of dating apps during this period, despite the guilt associated with forming intimate connections amidst social distancing restrictions. This trend was reflected in record-breaking numbers of app interactions; Tinder, for instance, registered its highest number of daily swipes in March 2020 (Fortune, 2021).

Despite the global surge in dating app usage, acceptance and efficacy vary significantly across different regions. For example, a study by Adam et al. (2020) indicated a low acceptance of dating apps in Malaysia. By contrast, usage is high in Australia and the United States, where over half of single Australians and nearly a third of U.S. adults have used dating apps (Anderson et al., 2020; Clement, 2020a;

YouGov, 2017). These divergent trends highlight the influence of cultural attitudes on online dating and the importance of contextual understanding in studying the impacts of these platforms.

Chakraborty (2019) explored the factors influencing the use of dating apps in India, finding that playfulness was a key motivator for users, while trustworthiness was not a significant determinant of app usage. This observation underscores the varied cultural contexts in which dating apps operate and the importance of culturally sensitive research in understanding their impacts.

Thus far, this chapter has broadly explored the emergence of dating apps, the transformations they have caused in the romantic landscape, and the specific features and popularity of various platforms. The discussion has also covered various challenges and user experiences associated with these platforms in different cultural contexts. Building upon this foundation, the ensuing section will narrow the focus to concentrate specifically on dating apps for MSM.

2.3.2 Dating apps for MSM

From the rise of early MSM cruising spots to the introduction of dating apps, the gay dating landscape has undergone significant changes. In the pre-internet era, gay dating was often limited to secretive in-person meetings in bars, clubs, bathhouses, adult bookstores, and public spaces such as parks, toilets, and rest areas which were designated as cruising areas where gay individuals could meet and engage in sexual activity (Binson et al., 2001; de Wit et al., 1997). This not only limited the opportunities for gay people to find partners but also posed risks to their safety and privacy.

The emergence of the internet and the growth of online dating during the 1990s brought about a revolution in gay dating. Online dating websites, forums and chat rooms emerged as safe and discreet spaces for MSM to connect, share stories, and form relationships (Bolding et al., 2007; Crowson & Goulding, 2013). The introduction of MSM social media dating apps, such as Grindr which launched in 2009 (Grindr, n.d.), revolutionised the gay dating scene even further. They offered a means for MSM to connect with each other and sparked a significant increase in the number of relationships formed online. Internet accessibility and anonymity allowed gay people to come out of the closet and express their sexual orientation without

fear of judgment or persecution (Gudelunas, 2012; Harper et al., 2016; Torrence, 2019).

Dating apps are increasingly popular among MSM (Goedel et al., 2015; Queiroz et al., 2017). They offered a convenient and accessible way for MSM to connect with potential partners without having to leave their homes, anywhere and anytime. By using GPS technology, dating apps show users potential partners who are located nearby (Anzani et al., 2018). Users create profiles and connect with others without revealing their real names or personal information because of the anonymity of dating apps. The user-friendly interface and the ability to filter potential partners based on specific criteria further enhanced the dating experience for the MSM community.

An individual's sexual orientation significantly influences their sexual behaviour and preferences, shaping their engagement with media in the context of romantic or sexual relationships (Gobrogge et al., 2007; Rosenfeld & Thomas, 2012). These variations in behaviour tend to become apparent during young adulthood, which is the stage when most bisexuals, gays, and lesbians identify their sexual orientation (Rosenfeld, 2018). An examination of pertinent literature reveals that use rates of the internet and social media platforms are significantly higher among bisexuals, gays, and lesbians than among heterosexuals (Seidenberg et al., 2017). The reasons behind these differences are multi-faceted, including factors such as societal acceptance, need for privacy, and the ability to connect with others who share a similar sexual orientation.

A wealth of research provides evidence of the pronounced use of dating applications by MSM. A 2010 survey by Harris Interactive reported that 55% of MSM individuals accessed a social networking site daily, a higher percentage compared to the 41% of heterosexuals (Harris Interactive, 2010). This data highlights the significant role of social media platforms such as Grindr, Adam4Adam, and Scruff in promoting interaction and connectivity within the MSM community (Farnden et al., 2015).

Follow-up studies have echoed these observations. For instance, Gordon (2014) found that gay men used dating apps more frequently than heterosexual men, averaging 21 uses per week and 96 seconds per use. Additionally, research conducted among over 4,000 Australian males revealed a preference for online

dating amongst the MSM community for seeking romantic partners (Prestage et al., 2015).

The Pew Research Centre's 2020 report indicated that sexual minorities were about twice as likely to use online dating platforms compared to their heterosexual counterparts, underscoring the critical role of these platforms for these communities. In parallel, research in the U.S. found that gay men were three times more likely to meet online than heterosexual couples, further supporting the important role of online platforms in facilitating connections amongst gay men (Rosenfeld & Thomas, 2012).

In line with these findings, Sumter and Vandenbosch (2019) affirmed that gay men are more likely to create an online dating profile and initiate online romantic relationships compared to heterosexuals. This is underscored by a study by Lehmillier and Ioerger (2014), which showed that more than half (54.5%) of MSM surveyed maintained more than one account on social media dating applications.

Similarly, the study by Chow et al. (2019) showed a significant growth in the proportion of MSM in Melbourne and Sydney, Australia, who have been finding sex partners via social media dating apps, with an increase from 23% in 2011 to 52% in 2018. This body of research demonstrates the engagement of the MSM community with online dating platforms and their essential role in promoting social and romantic connectivity within this community.

Findings from various studies indicate that gay individuals spend more time on dating and social media applications compared to heterosexual individuals. Goedel and Duncan (2015) discovered that men access these apps 8.38 times per day and use them for 1.31 hours in general. Grindr's (2022) investor presentation revealed that the average daily app usage time was 61 minutes in December 2021. A survey carried out in Spain further supports this trend, with gay dating app users spending an average of 30 minutes on these services when they log in, which is three times greater than the 10 minutes typically spent by heterosexual users (Growth from Knowledge, 2019).

This illustrates the potential for connecting with the MSM community through dating apps. By utilising the popularity and accessibility of dating apps among the MSM community, these platforms can be powerful tools to target and engage with

this group, showcasing the potential for promoting HIV prevention and sexual health. The following section delves into how this potential is realised, particularly within the MSM community, a demographic that has demonstrated extensive access to and utilisation of mobile technology.

2.3.3 HIV prevention on MSM social media dating apps

In comparison to heterosexual populations, MSM have been demonstrated to have more extensive access to and utilisation of mobile phone technologies (LGBT Market Research and Development Lab, 2012). This increased engagement with mobile technologies enhances the opportunities for reaching this specific audience with highly engaging preventive messaging, especially for those who aren't reached through traditional in-person or group interventions (Elford et al., 2004). Within the online sphere, individuals in the MSM community can disclose their HIV status, leading to increased transparency and slowing the transmission of HIV and other STIs (Brooks, 2011).

In recent years, some MSM social media dating apps have actively participated in HIV prevention efforts, offering a range of features aimed at reducing the transmission of the virus and promoting healthy sexual behaviour. Dating apps have emerged as a new channel for HIV prevention and education. With features such as HIV testing resources, status disclosure, educational content, and safe sex promotion (Adam4Adam, n.d.; Grindr, n.d.; Hornet, n.d.), these apps can help reduce new HIV infections and promote healthier behaviour.

One of the popular HIV-related features introduced in many MSM social media dating apps is the option to disclose one's HIV status (Davids, 2016). This feature is significant as many people living with HIV face significant discrimination and shame. Having a platform where they can openly disclose their status can help reduce these negative experiences. Additionally, this feature can help people make better choices regarding their sexual health by being more informed, as they can see their potential partner's status before engaging in sexual activity (Hecht et al., 2022).

Other HIV-related features adopted by some MSM social media dating apps include information about where to get tested (Bellis, 2018), with the ability to locate HIV testing resources (Grindr, n.d.). These apps provide users with information about local testing facilities, making it simpler for people to get tested and learn about

their status. This is important because knowing one's HIV status is vital in regards preventing new infections (Pan American Health Organisation, 2018).

Dating apps have also begun to incorporate educational content related to HIV and sexual health, including knowledge about HIV transmission, prevention methods, and the importance of regular testing (Grindr, n.d.; Scruff, 2023).

A lot of MSM social media dating apps have demonstrated efforts towards HIV prevention. Blued, launched in 2012, initiated an ongoing HIV testing programme in Beijing in 2015, resulting in a dramatic rise in HIV testing at six HIV testing centres operated by Blued in Beijing. The overall number of HIV tests increased dramatically from 425 in 2014, to 7315 in 2017 (Wang et al., 2019).

Other social media dating apps also have HIV prevention intervention features. Grindr issues an alert to users to undergo an HIV test every 3-6 months and hosts a sexual health resource page (McNeil, 2018). Hornet, founded in 2011, has over 25 million users globally (Armand, 2017). It provides features for finding testing locations, obtaining more information about PrEP, and includes a profile for AIDS.gov in the Favorites section to help users find nearby testing locations (Hornet, 2016).

These concerted efforts by various apps are contributing to new opportunities for education and prevention. Providing users with educational content can help increase knowledge and understanding of HIV, reducing the spread of misinformation and promoting healthy behaviour.

Different dating apps offer different options for users to specify their sexual health profiles. These choices generally include revealing one's HIV status, utilising PrEP (pre-exposure prophylaxis), maintaining an undetectable viral load, being willing to use condoms, and specifying the date of the most recent HIV and/or STI test (Hecht et al., 2022).

Such features can inform and facilitate risk, sorting among males desiring to approach partners based on their sexual activities. While many users may benefit from these features as an explicit way to exchange sexual health information, it's vital to acknowledge that these features are optional. Providing an option to disclose or withhold sexual health information safeguards users who may face stigma and persecution.

Separately, Hecht et al. (2022) demonstrate that 77% of survey participants reported awareness of HIV prevention features present in MSM dating apps, and 61% of this group utilised one or more of these features. Similarly, Fields et al. (2021) discovered that Black MSM commonly used dating apps to learn about PrEP, leading to the conclusion that these platforms may serve as facilitators for the disclosure of PrEP and consequently assist in preventing the spread of HIV.

Interest in engaging with HIV prevention measures through app-based programmes is reflected across various demographics and locations. Holloway et al. (2014) found an over 80% interest among young men who have sex with men (YMSM) in taking part in online research. Ventuneac et al. (2018) found a 91% interest in sexual health features on apps among participants in the U.S., while Goedel et al. (2017) reported that 63.9% of London-based MSM were willing to use HIV testing reminders. Similar enthusiasm was shown by 70% of YMSM in Southern California (Holloway et al., 2014), and a 63.8% desire among MSM in the US to obtain sexual health knowledge through an app (Sun et al., 2015).

This growing trend is complemented by findings from Hoenigl et al. (2020), who revealed a positive association between app usage and the increased use of sexual health resources, particularly PrEP. The collective insights from these studies emphasise the significant potential for connecting with the MSM community through dating apps. By leveraging the popularity and accessibility of these platforms, they can be transformed into powerful tools to target and engage with this group, showcasing the potential for promoting HIV prevention and sexual health.

Despite these promising insights, the specific role of MSM social media dating apps as a channel for HIV prevention needs to be further evaluated. Although studies have suggested that these apps can be promising (Badal et al., 2017; Bineau et al., 2021; Contesse et al., 2020; Eleuteri et al., 2018; Goedel & Duncan, 2015; Goldenberg et al., 2014; Hecht et al., 2022; Hirshfield et al., 2012; Hoenigl et al., 2019; Holloway et al., 2014; Kesten et al., 2019; Mitchell et al., 2016; Muessig et al., 2013; Newcomb et al., 2016; Rosser et al., 2010; Sun et al., 2014; Su et al., 2015; Ventuneac et al., 2018), research evaluating these apps among MSM for providing HIV-related prevention features and information remains limited. A review of the proceeding noted studies reveals a substantial gap in scholarly knowledge. There appears to be a lack of a comprehensive understanding of HIV-related online dating

app features, including the interactions of those features and how app users perceive them. This gap is further accentuated by the fact that most research has been conducted in regions like Australia, the United States, or Asia (Anzani et al., 2018). While there are some studies in New Zealand, the overall research in this context is limited in comparison. The geographical discrepancy raises concerns about the generalisability of findings to New Zealand due to variations in policy, environment, and practice, emphasising the unique cultural and societal context that may significantly differ from other regions.

Therefore, to bridge the gap in the existing literature, there is a pressing need for a thorough investigation of HIV-related features on MSM social media dating apps as they exist and are used now. A special emphasis should be placed on the perspectives and experiences of users, considering the potential impact of regional variations on the efficacy and perception of these features.

2.4 Summary

This chapter has provided an overview of HIV and MSM, the field of health communication, and the role of dating apps in HIV prevention. The analysis of these interconnected areas highlights the urgency of addressing HIV among MSM, emphasizing both the challenges and opportunities presented by the evolving landscape of dating apps. This context is crucial for understanding the potential of digital health communication strategies to engage MSM in HIV prevention, showcasing the significance of this research within the broader field of public health.

The subsequent chapter introduces and dissects the political economy of communication and uses and gratifications theory. These theories have been selected to form the theoretical framework of this research due to their potential to provide insights into the motivations and economic structures underpinning social media dating app usage among MSM. Understanding the intersections between user motivations and the wider societal and economic contexts can offer a more holistic perspective on the utilisation and impact of these platforms.

Chapter 3: Dating apps in social context: Theoretical framework

In the field of communication studies, the Political Economy of Communication (PEC) and the Uses and Gratifications Theory (UGT) serve as crucial theoretical frameworks that illuminate the intricate relationship between media and society. On one hand, the PEC approach offers a macro-level view, asserting that media systems are in a constant state of evolution, driven by changes in the socio-economic and political landscape. On the other hand, UGT provides a micro-level perspective, focusing on the individual motivations behind media usage, thereby mirroring wider societal norms.

This chapter applies these two frameworks to delve deeper into the investigation of HIV-related features within MSM social media dating apps. The discussion begins with an overview of the PEC, touching on its origins, key concepts, central figures, and relevant studies. Subsequently, attention shifts towards an exploration of the UGT, providing insights into its fundamental principles and its application within the realm of media research.

The final part of the chapter emphasises how the combined application of PEC and UGT can offer a nuanced understanding of HIV-related features within MSM social media dating apps. While PEC captures the broader systemic influences on these features through its macroscopic lens, UGT examines the micro-level user interactions. Collectively, they underscore the intricate interplay between media, society, and communication practices.

3.1 Political economy of communication

The political economy approach has held a significant role in shaping communication research, influencing scholars across the globe since the 1940s and continuing to expand on a global scale today (Cao & Zhao, 2007; McChesney, 2007). As this study endeavours to analyse the integration of HIV-related features within MSM social media dating apps through the lens of the Political Economy of Communication (PEC), it is essential to first establish a robust understanding of the foundational principles of PE. This comprehensive knowledge of PE's underpinnings is critical to accurately apply the PEC framework to the research context.

3.1.1 Political economy

Political Economy, an academic discipline centred around the intricate relationship between political structures, economic systems, and societal impacts, has etymological roots in the Greek words 'oikos' and 'nomos,' which translate to 'house' and 'law,' respectively, signifying its foundational understanding of household management. The term 'political,' derived from the Greek 'polos,' references the city-state, the primary political organising unit of the classical period. Initially, 'political economy' was linked to the socio-cultural norms and practices that governed household management. Over time, however, the term evolved to include broader community management concerns and gradually developed into an academic field of study examining the interplay between political and economic systems (Mosco, 2009).

This rich historical backdrop is vital as it laid the groundwork for the development of the Political Economy of Communication (PEC). The PEC framework offers a comprehensive lens through which to view media systems dynamics, including the integration of HIV-related features within MSM social media dating apps, the central focus of this research. The following sections discuss the evolution of political economy and the contributions of significant figures, for example, Adam Smith and John Stuart Mill have subsequently defined the modern understanding of political economy.

3.1.2 The evolution of political economy over time and key figures

Political economy is a discipline within the social sciences that examines the relationships between individuals and production processes. It seeks to identify the economic laws governing production, exchange, distribution, and consumption, and aims to comprehend how these laws are moulded by historical and societal conditions (Kenton, 2023; Marx, 1977; Yaylagül, 2020).

The term 'political economy' is widely credited to the French economist Antoine de Montchrestien, who authored the book 'Traité de l'économie politique' in 1615 (Kenton, 2023). During the 18th century, scholars began to probe the allocation and stewardship of wealth among individuals. This period heralded the emergence of pivotal figures such as Adam Smith and John Stuart Mill, whose contributions significantly shaped the field of political economy. Their works aimed to explain and critique the advent of capitalism and industrial tumult in

Western Europe and the United States. These scholars analysed the relationships between the governments and economic systems of industrialised nations, and the impact of the guiding policies and practices on various societal groups, notably labourers and business owners (Weiss, 2018).

Adam Smith's influential publication, 'An Inquiry into the Nature and Causes of the Wealth of Nations', remains a fundamental pillar of classical economic theory, deeply shaping both the realms of economics and political economy. This treatise covers pivotal themes such as free markets, division of labour, capital accumulation, economic growth, and international trade. It offers insights into core economic principles including the 'invisible hand,' self-interest, price mechanisms, and marginal utility (Hayes, 2024). Smith's ideological focus lies on laissez-faire capitalism, which champions a market system with limited governmental intervention. His proposition that the pursuit of self-interest yields optimal resource allocation and economic growth underpins classical economic theory, which held sway over economic thought until the late 19th century (Nolen, 2023; Young, 2022).

John Stuart Mill, another towering figure in political economy, asserted the inherent interconnectedness of economics and philosophy, promoting their conjoint study. Central to Mill's philosophy is utilitarianism, which emphasises the maximisation of benefits or well-being for the greatest number of individuals. His work 'Principles of Political Economy' advocates for free trade, competition, and underlines the importance of labour division in fostering economic growth. Moreover, Mill underscored the crucial role of education, labour unions, and government regulation in safeguarding workers' rights and thwarting monopolistic practices (Capaldi, 2004).

In a narrower sense, political economy refers to “the study of social relations, particularly the power relations that mutually constitute the production, distribution, and consumption of resources, including communication resources” (Mosco, 2009, p.32). This view emphasises the critical role of understanding the complex interplay of power dynamics, economics, and consumer behaviour in shaping the communications industry. Mosco further describes political economy as “the study of control and survival in social life” (2009, p.33), linking control and survival to political and economic processes that govern social and economic

life.

Mosco's interpretation of control refers to the degree to which a society organises, manages, and adapts to inevitable changes, while survival addresses how individuals generate what is necessary to sustain their community. Processes of control are inherently political, integrating a society's network of social organisation. By contrast, survival processes are fundamentally economic, considering what community members require to reproduce themselves. This expansive definition allows political economy to encompass all human activities and societal transformations.

Significantly, this interpretation of political economy highlights the necessity of considering power relations and socio-economic contexts when analysing the role of communication resources in society. For the current study investigating HIV-related features on MSM social media dating apps, this perspective is vital. The distribution and consumption of HIV-related information on these platforms is inherently influenced by existing power relations and socio-economic contexts. Therefore, to fully comprehend users' interactions with these features, it is crucial to consider the broader political and economic systems that shape their production and usage.

3.1.3 Four central characteristics of political economy

The four characteristics of political economy that provide insight into its definition include: social praxis, moral philosophy, history, and social totality (Mosco, 2009). Specifically, the political economy approach involves understanding the historical context and evolution of a specific subject matter to grasp the structural transformations that led to its current state. This understanding necessitates an exploration of broader societal changes, including the influences of political, economic, and social factors on these transformations. Additionally, this analysis is grounded in a moral philosophy based on democratic principles such as social justice and equality. As such, the political economy approach assesses the changes and systems of the subject matter in relation to these values. Moreover, this approach intertwines research and action, applying the insights derived from the analysis to instigate positive societal changes.

The first characteristic of political economy is its historical perspective. From the 1700s to the 1800s, major figures in political economy, such as John Stuart Mill, David Ricardo, and Adam Smith, sought to explicate the substantial societal changes ushered in by capitalism. This transformation evolved societies from primarily agricultural labour towards commerce, production, and eventually industrialisation. Karl Marx and other political economists took a different approach, focusing on the mechanisms of capitalism and its interplay with other political economic systems, aiming to comprehend the social changes that could give rise to socialism (Mosco, 2009). Contemporary political economists, particularly those specialising in communication, are striving to understand fundamental shifts in social structures and processes, with a focus on four significant historical trends: media proliferation, increased corporate influence, the commercialisation of goods and services, and evolving state and government involvement (Golding & Murdock, 2005).

The second characteristic of political economy is social totality. Political economy, from its inception, has emphasised the importance of thoroughly understanding the broader social whole when analysing a subject matter. Comprehending social totality involves recognising the interrelations among social, political, economic, and cultural dimensions (Mosco, 2009). Political economists seek to understand the interactions between power, wealth, and broader societal and cultural factors. This approach has its roots in the works of thinkers such as Adam Smith and Karl Marx and is still prevalent in different branches of political economy theory today. It underscores the necessity to study the intersections of mass media, information, and entertainment systems with these broader social and economic dynamics.

The third characteristic of political economy is moral philosophy. It focuses on the values shaping social behaviour and guiding efforts to change it (Mosco, 2009). Often, moral values are overlooked in economic and political analyses, so this specific analysis aims to uncover and elucidate the moral underpinnings of these perspectives. This approach offers robust protection for democracy, fairness, and the communal domain when faced with dominant individual interests (Artz et al., 2006). Modern political economic studies incorporate various moral perspectives but generally advocate for expanding democracy to include all societal facets. This expansion suggests that democracy should permeate beyond

the political sphere to include economic, social, and cultural domains, promoting equitable income distribution, increased accessibility to education, full public engagement in cultural creation, and ensuring communication freedom (Mosco, 2009).

Social praxis represents the fourth attribute of political economy, an ideology deeply embedded in philosophical history. Mosco (2009) defines social praxis as the inseparable unity between thought and action. The term 'praxis' originated in ancient Greece, where it denoted the business and political activities of free men. Understanding philosophy's significance, greatly emphasised during the Middle Ages and early modern era, hinged significantly on praxis. This principle was also central to the philosophical works of Hegel, Kant, and Marx. Although integral to the substantive and epistemological constructs of political economy, praxis contests the idea that truth arises solely from contemplation. Political economists propose integrating intellectual work and social intervention, viewing the latter as a means of advancing knowledge. This underscores the necessity to not only embrace ideas but also to actualise them to foster societal change.

In conclusion, political economy, as a method for studying media, concentrates on the social relationships, power dynamics, and economic structures entwined in media creation, dissemination, and consumption. It accentuates the interconnectedness of politics and economics, asserting the impossibility of studying these spheres in isolation. Through a political economy lens, researchers can delve deeper into understanding power's operation in society, economic forces shaping media production and consumption, and how economic dynamics facilitate or obstruct various cultural forms. This approach differs from other media analysis methods focusing on discourses, meanings, or texts, as political economists perceive meaning as a product of power relations rather than an abstract entity. They adopt a comprehensive, historical approach to spotlight significant concerns related to audience goods, corporate influence, societal structures, the propaganda model, and communal spaces. Ultimately, political economy aims to expose the mechanisms of power and survival in society while acknowledging factors, such as time, space, and cultural capacity that may limit the freedom of consumption.

3.1.4 The political economy of communication

The political economy of communication, an interdisciplinary field, emerges from the confluence of communication research and political economy. It incorporates various disciplines, such as history, economics, sociology, and political science (Mosco, 2009). Serving as an analytical framework, the political economy of communication provides a critical lens for understanding the intricate confluence of political, economic, and communicative systems and their influence on social and cultural phenomena, notably media content.

This methodology scrutinises the relationships between political, economic, and communicative systems from historical, holistic, and systematic perspectives. It also considers the role of institutions and organisations within these systems (Golding & Murdock, 2005). Of particular importance, it examines how media industries utilise culturally and symbolically bound resources to craft and disseminate messages that meet the tastes and needs of a specific audience.

The primary focus of this approach is to understand the effects of economic, social, and political elements, such as profit, power, and influence on media messages. It endeavours to untangle the complex ties between media industries and other economic, social, and political systems and the impacts of these relationships on the creation, dissemination, and utilisation of media messages. This approach extends beyond a simple analysis of media ownership or control, recognising that media industries are enmeshed within larger societal structures, asserting that media messages are not neutral but shaped by a complex mix of influential factors.

The political economy of communication in Aotearoa New Zealand has been significantly influenced by neoliberal reforms since the 1980s. These reforms reshaped the media landscape, leading to the deregulation and commercialization of broadcasting in 1989, allowing transnational corporations to establish cross-media ownership (Hope, 2017). By late 2023, the media ownership landscape in New Zealand remained dominated by shareholder and private-equity owned corporations, smaller privately owned companies, and public broadcasters controlled by the government (Hope et al., 2023).

The impact of these neoliberal policies extended beyond the media sector,

profoundly affecting the healthcare system as well. Large-scale health system transformations driven by market-oriented approaches have often resulted in fragmented services and persistent inequities, particularly affecting high-priority populations such as Māori (Sharma et al., 2024). As Conner (1995) warned decades ago, the restructuring of New Zealand's healthcare system was largely motivated by commercial interests, resulting in inequitable access to health communication resources. This market-driven context shapes the digital landscape as well, influencing the design and implementation of public health communication, including HIV prevention efforts on MSM social media dating apps.

While the political economy of communication in Aotearoa New Zealand demonstrates the influence of neoliberal policies, it is crucial to consider how foundational theorists like Dallas W. Smythe and Herbert Schiller have contributed to understanding the broader principles and global applications of this field.

Dallas W. Smythe and Herbert Schiller stand out as significant figures within the North American sphere of the political economy of communication. Smythe distinguished himself through the singular integration of academic rigour and practical experience, enabling him to deliver sharp insights into the shaping of social and political structures through communication (Dervin, 1993). During the early 1940s, as the first economist appointed to the Federal Communications Commission (FCC), Smythe played an influential role in labour relations and rate hearings. This provided him with direct insights into the strategies of commercial interests employed to preserve private control over radio and television (Lent, 1995). This experience profoundly impacted Smythe's subsequent academic endeavours. After concluding his tenure at the FCC, Smythe joined the University of Illinois in 1948 and there established a pioneering course on the political economy of communication (Lent, 1995).

Smythe's substantial contribution to the field includes the development of the audience commodity theory (Smythe, 1977). This theory posits audiences as valuable commodities — not merely passive consumers — that media owners buy and sell. This innovative perspective challenged the then-dominant understanding of audiences and instigated 'The Blindspot Debate' in 1977. In this

discourse, Smythe put forth the argument that the audience serves as the primary product of the media, procured by advertisers to promote their products and services.

Smythe argued that advertisers "purchase the services of audiences with predictable specifications who will pay attention in predictable numbers and at particular times to specific means of communication. As collectivities, these audiences are commodities. As commodities, they are traded in markets by producers and buyers" (Smythe, 1977, p. 4). Thus, he postulated that the audience commodity is "a non-durable producer's good, purchased and employed in the marketing of the advertiser's product" (Smythe, 1977, p. 6).

Media proprietors, being the primary architects of the audience commodity, heavily rely on their audiences and readership. Correspondingly, advertisers depend on market research data, which quantifies the audience's numbers and characteristics, to procure these audience services. The audience, therefore, assumes a pivotal role in generating demand for the products advertised. Smythe (1977) asserted that commercial media's principal product is not the content itself, but the means by which audiences are drawn to advertisements, thereby stimulating consumer demand. As private, advertiser-supported media proliferate, an increasing number of communication theorists and political economists have embraced the concept of the audience commodity (Wasko, 2005).

The audience commodity theory argues that media industries transform their audiences into marketable assets, which they then trade to prospective advertisers (Arvidsson & Bonini, 2015). These corporations primarily aim to maximise profits by selling advertising slots, where audiences serve a crucial role. To achieve this, they endeavour to gather a substantial number of viewers, listeners, or readers – potential consumers of the advertised products or services. Demonstrating the purchasing potential of their audience to entice advertisers becomes vital. This strategy leads to the commodification of audiences. In response, media corporations adopt tactics such as content creation and brand promotion to attract and retain these audiences. Ultimately, the goal is to turn audiences into a sellable commodity, generating revenue for the corporation (Arvidsson & Bonini, 2015).

Herbert Schiller, akin to Dallas Smythe, played a pivotal role in advancing the

political economy of communication, emphasising the integration of communication studies into a wider spectrum of political and economic dimensions (Mosco, 2001). In 1969, he authored a book, 'Mass Communications and American Empire,' critically analysing the prevalent commercial media system. His work delved into the escalating privatisation of media in America and the unilateral flow of American cultural products into countries like Canada (Schiller, 1969).

In this book, Schiller first introduced the theory of cultural imperialism. He defined 'cultural imperialism' as the incorporation of a society into the global system where the dominant strata of that society are coerced or influenced into aligning their social institutions with the values and structures of the system's center of power (Schiller, 1976, pp. 9-10). In essence, cultural imperialism involves actions aimed at merging a developing society into the contemporary global order. The governing elites of such societies are incentivised, pressured, or manipulated to adapt their values and structures to favour the leading centres of power in the global system. This often results in transformations within these societies in line with the dominant power centres' interests (Schiller, 1976).

Schiller's idea of cultural imperialism underscores the intricate methods by which the world's most powerful nations assert control over weaker countries. This is not just through economic and political measures, but also through media and cultural industries. By exporting their cultural products, like films, music, and TV shows, these powerful nations can shape the cultural framework of the weaker nations. This promotes their values and lifestyles, consolidating their position of power (Schiller, 1976).

During the latter part of the 20th century, Schiller further refined the concept of 'cultural imperialism.' He shifted his critique towards the producers of media products as multinational media corporations evolved into global cultural entities. Capital globalisation has empowered transnational corporations to operate independently from political control, surpassing the authority of nation-states and governments. A handful of these transnational corporations are gaining increasing control over modern technology and information dissemination. These corporations, accountable not to the working class of their home countries, have become the primary force in global political and economic information operation

(Schiller, 1989). Schiller also highlighted the control exerted by the U.S. over internet information flow through language and the management of digital databases (Schiller, 1984). Schiller's concept of cultural imperialism has significantly impacted media and communication research, helping to elucidate various phenomena, such as the growth and influence of multinational media corporations and the global spread of American popular culture (Morley, 2006).

Murdock and Golding defined political economy of communications, stating that "the mass media are first and foremost industrial and commercial organisations which produce and distribute commodities." (Murdock & Golding, 1973, p.205).

Mosco identifies three fundamental processes that are integral to a political economy of communication: commodification, spatialisation, and structuration. Commodification refers to "the process of transforming things valued for their use into marketable products that are valued for what they can bring in exchange" (Mosco, 2009, p.127). In other words, it involves the transformation of a good or service from being something with intrinsic value or purpose to something that is valued primarily for its ability to be traded and sold in the market. Spatialisation is "the process of overcoming the constraints of geographical space with, among other things, mass media and communication technologies" (Mosco, 2009, p.128). As technologies advance, barriers of distance become less significant, facilitating greater access to information and resources globally. In the context of this study, spatialisation is central to understanding how MSM social media dating apps operate, linking individuals across different geographical boundaries. Finally, structuration refers to "the process of creating social relations, mainly those organised around social class, gender, and race" (Mosco, 2009, p.128). This process illuminates how social relations, influenced by economic, political structures, cultural norms, as well as individual agency, shape communication and media practices. Structuration is pertinent to this study, as it addresses how social structures can impact the usage and perceptions of MSM social media dating apps.

This field of political economy of communication study looks at a broad range of issues that affect society, including capitalism, the role of media ownership, the effects of media concentration on democracy and cultural diversity.

A lot of political economy communications research has focused on capitalism,

as this reflects a significant aspect of modern economies. The capitalist economy has two major aspects: "Production for profit, and wage labour" (Stanford, 2012, p.34). The concept of production for profit pertains to most goods and services produced by privately owned businesses, which create and vend their products with the objective of earning profits in a market-based economy. Wage labour refers to where a person offers services to organisations or companies and is compensated via wages or salary in exchange for their labour. They do not own the output they produce or the means of production they use to produce it.

At the heart of the capitalist system, which prevails as the primary economic model in numerous countries globally, lies the interrelation between profit production and wage labour. The foremost objective of a business within this framework is to generate profit (Duska, 1997), serving to benefit the company, its shareholders, and owners. Businesses endeavor to enhance value and maintain growth by reducing costs, including labour costs, and providing stakeholders with a return on their investment. Concurrently, labourers aim to secure a living wage and elevate their quality of life.

Political economists delve into the analysis of capitalism's impact on the production and allocation of goods and resources. They uncover the deep-rooted power dynamics inherent in society (Stanford, 2012). By contrast, the political economy of communication offers criticism of the problems emanating from capitalism. One of the key goals of multinational corporations has been to endorse the establishment of commercial media platforms that foster consumerism via advertising and programming. This concentration on consumerism has led to adverse environmental and cultural effects (Mosco, 2009).

McChesney (2015) analysed primary developments in the U.S. media at the turn of the 21st century, which included "corporate concentration, conglomeration, and hypercommercialism" (p.15). Hypercommercialism refers to the increasing dominance of commercial interests and values in the media and communication industries. It is characterised by an emphasis on profit and market share, the promotion of consumerism, and the prioritisation of advertising and sponsorship revenue over other forms of content. The trend of concentration and conglomeration has led to an acceleration of hypercommercialism, not only within the media industry but also across the whole of society.

Hypercommercialism is often driven by the consolidation and concentration of media ownership, as large corporations acquire and control multiple media outlets and platforms. This can lead to a homogenisation of content, as media companies focus on producing content that appeals to the broadest possible audience and generates the most advertising revenue. Furthermore, McChesney critiques the hypercommercialism present in the media industry, stating that its primary goal is profit generation, rather than promoting a diverse and creative media environment. It can stifle the plurality of voices in the media, as independent and alternative perspectives struggle to compete with dominant commercial players and may lead to the erosion of public service values and the privatisation of public communication spaces and resources. He argues hypercommercialism also negatively impacts both the democratic process and the quality and diversity of media content, as the commercial imperatives of media companies result in a homogenisation of content, a focus on sensationalism and entertainment rather than serious journalism or public service, and a bias towards established power and interests (McChesney, 2015).

The trend of media ownership concentration has become an ubiquitous phenomenon, with a limited number of companies owning and controlling most of the media outlets. Many countries exhibit a pattern of concentrated ownership within their media industries (Doyle, 2015). Ownership consolidation in the media industry is largely driven by economic factors, including the advent of new technologies, high merger rates, and the interlocking interests of companies (Wen, 2021). In today's heavily digitised world, media organisations vie for funding from advertising agencies, viewed as the primary revenue stream. This intense competition results in the consolidation of the mass communications industry into a few dominant media conglomerates that prioritise profitability (Herman & Chomsky, 1994).

The process of digitalisation has further strengthened the dominant power of established media conglomerates. Digitalisation has had a considerable influence on the media industry, particularly in terms of the way media content is produced and distributed. The cost of producing additional copies has been significantly lowered due to the capacity to generate and share content online without the need for physical interaction. This means that media companies can now reach a larger audience without incurring significant additional costs. Media magnates who

possess a significant following are prone to gain advantages from these scale-related savings as they can distribute the initial production expenses among a greater number of people (Goodwin, 1998). This allows them to produce and distribute content at a lower cost, while maintaining or increasing their profits. On the other hand, new entrants to the market do not have the same advantage of economies of scale and may find it difficult to compete with larger media companies that can offer content at a lower price (Wen, 2021). In addition, media giants with abundant financial resources have the potential to outcompete emerging players by enticing funding from advertising corporations. This can be achieved through substantial investments in production and distribution to enhance the allure of their content. The appeal of media content plays a crucial role in attracting investments from advertising agencies, which serve as the main revenue source for media platforms. As a result, they significantly influence the outlook of media corporations (Herman & Chomsky, 1994). The more attractive the media content, the more likely it is to receive investment from advertising agencies. As a result, media companies have the incentive to consolidate in order to create larger, more attractive media outlets that can attract greater investments from advertising agencies.

While consolidation may bring certain efficiencies and economies of scale, it also has significant implications for the diversity of voices and perspectives in the media landscape (Iosifidis, 2014). According to Brogi et al. (2015), the increase in consolidation within the media market heightens the probability of diminishing the diversity of political, cultural, and social perspectives. When media ownership is concentrated in the hands of a single decision-maker, there is a potential for that individual to wield disproportionate, unfair, and undemocratic influence. This situation can result in partial reporting, self-imposed restrictions on free expression, and a dearth of varied perspectives (Baker, 2007). Moreover, media concentration deters the important aspect of media diversity. This phenomenon curtails both political and cultural diversity, thereby compromising the ability of people to access and distribute information and ideas required for informed decision-making about public affairs (Freedman, 2014). A few large media companies controlling most of the media market can result in a narrow range of viewpoints dominating the media landscape. They have significant power to shape public opinion and discourse. This can lead to a situation in

which certain voices and perspectives are marginalised, while others are elevated, which can have a significant impact on democracy, as citizens may not have access to the diverse range of viewpoints necessary for making informed decisions. Moreover, the concentration of media ownership can intensify the commercialisation of cultural sectors, converting them into instruments for amassing capital that exploit the creative labour of professionals, rather than serving as platforms for meaningful symbolic exchange (Freedman, 2014). This trend can lead to a homogenisation of media content, with a focus on profit rather than providing diverse and informative content to the public.

This chapter has so far discussed the political economy of communication approach and its relevance to the analysis of communication resources and power dynamics. In the context of this research, the political economy approach provides a crucial framework for investigating the complex dynamics of how HIV-related features are integrated within MSM social media dating apps. It allows for an exploration of the power relations and economic processes that shape the distribution and consumption of HIV-related information on these platforms, and how these factors can influence user interactions. This theoretical understanding will serve as a guiding foundation for the subsequent analysis presented in the research chapters.

Now, the chapter will turn to another theoretical framework essential for this research – the Uses and Gratifications Theory. The following section presents a fundamental overview of the uses and gratifications theory, covering its evolution over time, fundamental tenets, crucial concepts, and merits and drawbacks, as well as its implementation in MSM social media dating apps.

3.2 Uses and Gratifications Theory

One of the most prominent perspectives in understanding media choice is the uses and gratifications theory. Inspired by Maslow's hierarchy of needs, this theory seeks to "explain the reasons that people choose a specific medium over alternative communication media and to elucidate the psychological needs that motivate people to use a particular medium" (Cheung et al., 2011, p.1338). The uses and gratifications theory views audiences differently from other mass communication theories. Instead of seeing them as passive recipients of information, this theory regards them as active users of media. Traditional media

theories concentrate on the impact of media on individuals, while the uses and gratifications theory emphasises the ways in which individuals utilise media (Katz, 1959). This theory assumes that media users are motivated, goal-oriented, and actively involved in the media environment. Essentially, it suggests that media consumers take an active role in their media consumption. The idea is based on the premise that "individuals seek out media that fulfill their needs and lead to ultimate gratification" (Whiting & Williams, 2013, p. 362).

The inception of the uses and gratifications theory can be identified as originating from the 1940s, when scholars began to investigate the efficacy of the medium of radio. Herzog's (1944) study on the motivations of radio listeners was one of the first to employ the theory. The theory was later refined by Blumler, Katz, Guarevitch, and some other theorists in the 1970s. According to Katz et al (1973):

"(1) the audience is conceived of as active; (2) in the mass communication process much initiative in linking need gratification and media choice lies with the audience member; (3) the media compete with other sources of need satisfaction; (4) many of the goals of mass media use can be derived from data supplied by individual audience members themselves; and (5) value judgements about the cultural significance of mass communication should be suspended while audience orientations are explored on their own terms" (p. 510-511).

When it comes to researching active media users and media content, the uses and gratifications theory is important since it takes into account users' socio-psychological requirements, which could help explain why people choose to use certain media and how they choose to use it (Xu et al., 2012). It explains not just whatever social or psychological demands drive people to choose certain media channels and material, but also the resulting attitudes and behaviour (Ruggiero, 2000).

The uses and gratifications theory has been extensively adapted to different media to measure the motivations of individuals for using media. Early on in its development, the method concentrated on conventional media, such as TV (Ruggiero, 2000), newspapers (Elliott & Rosenberg, 1987). The internet age gave the idea fresh impetus and importance (Raacke & Bonds-Raacke, 2008). It is

currently commonly employed in social media research (Gerlich et al., 2015), education-related apps (Gallego et al., 2016), diet and fitness applications (Lee & Cho, 2017), social networking sites (Raacke & Bonds-Raacke, 2008; Urista et al., 2009). Moreover, U&G has increasingly been used to investigate the MSM social media dating apps.

Gallego et al. (2016) used the uses and gratifications theory to examine the association between gratifications connected with a second life and use intentions in online scientific education. Similarly, Lee and Cho (2017) examined how gratification-related factors are associated with intentions to use diet and fitness apps in their research. Furthermore, Urista et al. (2009) undertook a study to explore the motivations behind young adults' usage of social networking sites. The findings revealed that people employ social media platforms for: "experience selective, efficient, and immediate connection with other[s] for their (mediated) interpersonal communication satisfaction and as an ongoing way to seek the approval and support of other people" (p. 216).

Uses and gratifications theory suggests that individuals are proactive in choosing and utilising media to satisfy their personal needs (Katz et al., 1973). Therefore, individuals who use dating apps are not passive consumers but rather, active agents, who use dating apps to fulfill specific needs and desires. Understanding the motivations and gratifications that drive MSM social media dating app usage is essential to understand the effective HIV-related features in dating apps. For instance, users may use dating apps to fulfill their sexual desires or to seek romantic relationships. If individuals use dating apps mainly to engage in sexual activities, HIV features that promote safe sexual behaviour should be easily accessible and prominent.

The research by Van De Wiele and Tong (2014) enumerated six gratifications including: socialising, sexual encounters, entertainment, seeking romantic connections, gaining social acceptance, and fostering a sense of community. Socialising was reported as the most frequently sought-after gratification, followed by sex. Miller's survey (2015) revealed that dating app users seek: ease of use, accessibility, safety, control, connectivity, and versatility as gratifications. Similarly, Rice and colleagues (2012) discovered that among gay men, the primary motivation for using Grindr is to pass time, with other motivations

including making friends, connecting with the gay community, seeking sexual encounters, and finding dates. Research conducted by Xie (2019) found MSM social media dating apps significantly impact and influence the social and sexual aspects of gay Asian migrants in New Zealand, as they enable them to navigate their new environments and find acceptance within their new communities. Together, these studies demonstrate that gay men use dating apps for various reasons, ranging from socialising to sexual and romantic goals, and to connect with others in the community.

In recent research, Chen and Ding's online survey (2020) of 406 Blued users found six uses and gratifications including: passing time, fulfilling romantic and sexual aspirations, engaging in social networking and being part of a community, gaining social acceptance, seeking health information, and indulging in interactive and visual fantasies. Searching for health information is one of the uses and gratifications, which suggests that individuals are actively seeking out information and resources to protect their sexual health via MSM social media dating apps, highlighting the potential need for targeted HIV prevention efforts that leverage the reach and accessibility of these platforms.

Previous research has identified various motivations for MSM users on social media dating apps, including socialising, sexual and romantic aspirations, and seeking health information. However, what is not clearly understood is how these platforms leverage their communication capacity for public health purposes, particularly HIV prevention. While studies have recognised the presence of HIV-related features on these apps and their potential for targeted prevention efforts (Chen & Ding, 2020), the communication dynamics surrounding these features are largely unknown. This includes how they are presented, how users understand and perceive them, and their actual impact on user behaviour. This gap in knowledge underlines the significance of this study, as it aims to elucidate these dynamics, thereby providing valuable insights that can enhance the communicative power of these platforms in promoting HIV prevention.

Similarly, while the uses and gratifications theory is broadly applicable, there is little research focusing specifically on the motivations of New Zealand MSM users for using social media dating apps. This lack of cultural or geographic specificity, along with the under-explored role and influence of HIV-related

features within these apps, poses significant gaps in the literature. The importance of addressing these gaps lies not only in contributing to a deeper understanding of MSM users' behavioural patterns and needs, but also in providing invaluable insights for public health initiatives and the design of these apps. This study is poised to fill these gaps, thus emphasising its value and necessity.

3.3 Summary

The chapter introduced main theoretical frameworks used in this research: the political economy of communication (PEC) and the uses and gratifications theory (UGT). The application of PEC provided insights into the broader societal, economic, and political forces shaping the design of these platforms, particularly with respect to HIV-related features, and UGT helped understand the motivations behind user engagement with these platforms. The next chapter will describe the research methodology and techniques applied in this study, preparing for an analysis of the role and impact of HIV-related features in MSM social media dating apps.

Chapter 4: Methodology and Methods

This study aimed to investigate the communications capacity of MSM social media dating apps in relation to HIV prevention. It sought to identify, document, and analyse HIV-related features within these apps, and assessed the users' perceptions of these features. This study aims to provide insights into how existing features work as health communication tools, with a view to providing suggestions for future improvement. These suggestions are broader than direct “intervention research”, which usually involves implementing new functions or changing application design to encourage behaviour changes or modifying user behaviour through specific strategies (Uribe et al., 2023)..

Three research questions were designed to achieve those goals.

RQ1: What HIV-related features are present on MSM social media dating apps?

Firstly, it is necessary to know what HIV-related features are present on MSM social media dating apps. This involves identifying MSM social media dating apps from the most popular dating apps in the country, the New Zealand version of Apple's App Store and Google Play Store. Globally, the Apple App Store had approximately 2.22 million iOS apps available, while the Google Play Store had about 3.48 million Android apps (Ceci, 2021). The latter is the first-largest app store in the world, while the Apple App Store comes second. The Apples' iOS and Google's Android retained 99.18% of mobile operating systems market share worldwide in June 2021 (Statista, 2022), at the time when the app selection was performed. If an app is widely popular and available on main platforms, it is likely to have a wider reach and impact on society according to the distribution and reach of an app. Those two represent a significant share of the market of mobile phone applications, thus, their selection in this study. iOS is the Apple Inc proprietary operational system that is featured on the company's smartphone product line, i.e., iPhone. The apps to the iOS are distributed exclusively, at least in June 2021, via Apple's App Store; they are the Android mobile operational property of Google LLC. Android is developed by Google LLC and the Open Handset Alliance. Unlike iOS, Android is open to other smartphone manufacturers. Android apps are available on Google's Play Store (originally the Android Market), Amazon Appstore App for Android (Amazon Appstore, 2022), and some smartphone manufacturers, such as Samsung Galaxy Store. Android

apps can also be sideloaded. This research only focuses on the Google Play Store for Android apps as it contained more apps than the Apple App Store and because it was the largest and the official store for Android applications.

Once identifying the MSM social media dating apps, the next step involves inspecting them for the presence of HIV-related features. This procedure entails downloading, installing, creating an account, and inspecting every feature on the app. Features that provide information related to HIV are captured, documented, and classified for deeper investigation. The outcomes form a categorisation of HIV-related features present on MSM social media dating apps, with screenshots serving as analysis materials for the second research question.

RQ2: How do the design and functionality of HIV-related features in MSM social media dating apps impact user interaction?

This question builds on the outcome of the first by analysing the screenshots captured from the smartphone display of HIV-related features present on MSM social media dating apps used in New Zealand. The goal is to grasp the significance and impact of the identified features on the app users considering HIV prevention and awareness. To accomplish this, a user experience design framework was developed and used in conjunction with content analysis to analyse the screenshots of HIV-related features previously identified. The outcome is a content analysis of HIV-related features on MSM social media dating apps.

RQ3: How do app users perceive HIV-related features within MSM social media dating apps?

To address the third research question, MSM social media dating app users were requested to participate in semi-structured interviews to voice their perceptions of HIV-related features within MSM social media dating apps.

This chapter starts by reporting the rationale behind the methodological approach to accomplish the research objectives. Next, the research design is presented where the research philosophy outlines and justifies the ontological and epistemological underpinnings utilised in this investigation. The following discusses the methods applied in this research, and also elaborates on the ethical considerations.

4.1 Research philosophy

Research philosophy "refers to a system of beliefs and assumptions about the development of knowledge" (Saunders et al., 2015, p.124). Understanding philosophical issues facilitates the clarification of study designs (Saunders et al., 2015). Ontological and epistemological assumptions underpinning this research will be discussed in the following section.

4.1.1 Ontological positioning: Constructionism

According to Crotty (2003), ontology is the examination of existence or "the study of being" (p.10). The ontological focal point is to answer if a subject ought to be seen as a subjective or an objective entity (Wilson, 2010). Ontological assumptions are used to answer, "What is there that can be known?" or "What is the nature of reality?" (Guba & Lincoln, 1989, p. 83). Similarly, Bakker (2010) described ontology as "the study of the true nature of existence" (p.235). Ontological assumptions and beliefs in philosophy shape the questions researchers may ask about how the world functions or how humans interact or act.

Constructionism is the ontological stance of this study. Ontological constructionism asserts that the knower makes their world. Bryman (2001) considered constructionism an ontological assumption where social events and their meanings are constantly being revised and changed through social interactions. Generally speaking, "the researcher always presents a specific version of social reality, rather than one that can be regarded as definitive" (p. 33). Through interactions, experiences, behaviours, and perceptions, constructionism aids individuals in understanding how the social and natural worlds are constructed (Grix, 2002; Potter, 1996).

This research employs ontological constructionism. The MSM social media dating apps are the 'being' or 'world' to be observed. The users interact and communicate with HIV-related features from this 'world,' and as a result of these interactions come a set of experiences, behaviours, and perceptions. Furthermore, those outcomes joined with the experiences, behaviours, and perceptions from social and/or other interactions will evolve and mutate into demands and requirements that will modify the 'world' that was once observed.

In this context, human-machine interaction can enrich understanding and

highlight the complexities associated with the research problem. This interaction is instrumental in elucidating how users engage with the interface and functionalities of the app, and how these engagements shape their behaviours, experiences, and perceptions of HIV-related features.

Key considerations may include the user-friendliness of the features, the effectiveness of the app in fostering communication of HIV-related information, and the overall user experience. Specific elements such as the visibility and accessibility of HIV-related features within the app interface, the impact of prompts or push notifications on shaping user behaviour and engagement, and the influence of the overall app design on users' willingness to share or seek HIV-related information, all play crucial roles in this interaction dynamic.

Following the discussion on the ontological assumption through a constructionist lens, the paper will clarify the epistemological positioning.

4.1.2 Epistemological positioning: Interpretivism

Epistemology is a knowledge theory concerned with beliefs about "how phenomena [can] come to be known" (Giacomini, 2010, p. 131); in other words, how reliable knowledge is generated (Hiller, 2016). Pascale (2011) explains that epistemology focuses more on "the nature, sources, and limits of knowledge"(p.4). Generally, it offers a justification for the scientific generation of knowledge. In other words, epistemology is concerned with "how we come to know that which we believe we know" (Hiller, 2016, p.100). An epistemology relies on its own theoretical beliefs, assumptions, and thus the relationship between subject and researcher (Hiller, 2016).

Interpretivism, the epistemological stance of this research, has its roots "in the philosophical traditions of hermeneutics and phenomenology" (Chowdhury, 2014, p.443). This method places emphasis on the importance of human personalities and their participation in cultural and social life (Elster, 2007; Walsham, 1995). It highlights the research methods which adopt the stance that various human actors socially construct human knowledge of reality. Therefore, it rules out natural science methods (Eliaeson, 2002; McIntosh, 1997). Tekin and Kotaman (2013) described interpretivism as a school of thought that focuses on the meaning of social relationships and interactions. Interpretivism asserts that social reality

differs from natural reality since the social reality subjects are humans and their relationships with one another. Therefore, interpretivist research focuses on understanding what social realities mean for those experiencing them (Noblit & Eaker, 1987). Interpretivism argues that individuals construct knowledge by interpreting their experiences within the world, while objectivism believes that knowledge is obtained by searching for and collecting information (Constantino, 2008; Pascale, 2011). Interpretivism holds that personal experiences form the basis of all knowledge. It is constrained by the intrinsic circumstances in which humans spend their lives (Alvesson & Sköldbberg, 2009; Denzin & Lincoln, 2005; Greene, 2010). Interpretivism is subjective and relies more on qualitative data (Tekin & Kotaman, 2013), which is in line with Woods and Trexler (2001), whose qualitative methods are well-suited to interpretivism. In simpler terms, interpretivism involves examining how individuals interpret their experiences in response to particular circumstances. Therefore, in this research related to explore users' perception of HIV-related features, the researcher gathered data from qualitative semi-structured, face-to-face interviews with informants.

In the context of MSM social media dating apps, there is a dynamic human-machine interaction at play. The apps interface with the users, and conversely, the users' inputs influence the functionality of the apps. This mutual influence fosters an ongoing cycle of changes and adaptations in both user behaviour and app functionality.

Despite the effect of the users' interactions with the 'world,' that is to say: MSM social media dating apps, the 'world' is not built by the users. But the 'world' is the fruit of the app developers' conceptualisation of the user's intent. As such, the developers that might or might not share the same users' perceptions and opinions, interpret what they believe is the users' goal and, using their technical knowledge, into the implementation of what will be a new feature or features.

The introduction of new features should once again shape user experiences, behaviours, and perceptions, thereby initiating a fresh cycle of interactions. This two-way feedback system, wherein the perceptions of both users and the platform inform one another, fuels the ongoing evolution and cyclical interplay between the parties.

The interaction and evolution of the parties are unfeasible to portray in this

research. That would require a set of studies and historical analyses. Thus, this historical analysis is out of the scope of this research. Nonetheless, this research aims to provide a temporal portrait of that interaction and explore what constitutes the HIV-related features 'world' of MSM social media dating apps and HIV related features. That brings the first research question: What HIV-related features are present on MSM social media dating apps? How the HIV-related features of the 'world' were designed and how user-app and app-user communicate and interact; that is the aim of the second research question: How do HIV-related features relate to users' ability to interact with the app? Finally, how the users of the features perceive those relying on different perceptions, knowledge, experiences, and criteria of those who create the features. That is the aim of the third research question: How do app users perceive HIV-related features within the apps?

4.2 Research design

This study was designed in three phases. Phase I sought to canvas and document HIV-related features in MSM social media dating apps. Phase II evaluated how the HIV-related features were presented. Phase III aimed to learn users' perceptions on HIV-related features.

Phase I aims to identify the objects. In the scope of this research, there are primary and secondary objects. Primary objects are the MSM social media dating apps that contain HIV-related features. Secondary objects are the app HIV-related features situated within the primary objects. The secondary objects can be seen as a product of the reality of the developers of each MSM social media dating app. However, this is out of the scope of this research.

Phase II seeks to assign a meaningful interpretation to the second research question in an objective manner. The specific configuration of HIV-related features is not pertinent to this phase. However, the presentation of these features is of paramount importance. The underlying assumption is that the structure of these secondary objectives significantly impacts their meaning in terms of relevance and user perception, thereby shaping the overall subject experience. Consequently, the objective approach strives to minimise the impact of developers during the creation of app features and researchers during their evaluation. Simultaneously, it endeavors to assess the resultant influence on

feature quality. This assessment constitutes the primary objective of Phase II. Nevertheless, it is crucial to acknowledge that nothing is created in isolation from the subjects involved.

Phase III aims to harness the subjective experience, perceptions, values, and the knowledge about HIV-related features that shape another reality from the perspectives of the MSM social media dating app users.

4.2.1 Phase I: App selection and HIV-related features identification

With an aim of providing an overview of HIV-related features, this study first needed to identify MSM social media dating apps that are used in New Zealand. The search strategy employed various iterations of keywords. Standard terms used to describe social media dating apps for MSM were chosen initially. Search terms included: 'gay,' 'gay dating,' 'gay social media dating,' 'men who have sex with men,' 'MSM,' 'LGBT,' 'homosexual,' and 'bisexual.' Following the trial, it was found that some of the search keywords were too broad and mainly returned non-MSM social media dating apps. The final search phases used were refined and are as follows: 'gay,' 'LGBT,' 'homosexual,' and 'bisexual.' Each keyword was searched in the Apple App Store and Google Play store from May 25 to May 26, 2021, and then filtered using the following inclusion and exclusion criteria.

APP inclusion and exclusion criteria

The MSM social media dating apps identified in the preceding phase were filtered using the following criteria:

- (1) The app had to be present on both Apple Store and Google play store. To be considered, the app had to have a version for iOS and android systems. The goal was to exclude a possible system bias potentially arising from apps only being available on one platform. This criterion ensured the apps included in this study were available on both Android and iOS, thus eliminating any potential bias arising from any differences in the smartphone platform or user base.
- (2) The language must be English. In New Zealand, English is the predominant official language (Stats, 2020).
- (3) Only free apps were selected. Free apps means no financial transaction

was required to download, install, and utilise the app. Similar to criterion one, the aim is to normalise the objects (apps). Often, paid apps are expanded versions of the free offerings that contain more features. These paid features are only available to users that choose the paid versions by purchasing the app through the app store or through in app purchases. However, the features available on the free version are available for all app users regardless of whether they are using a paid version or not. Additionally, trial versions were also excluded. Given the focus of this study on the general perceptions of MSM app users, it was deemed appropriate to select the versions of the apps that are most commonly used. Accordingly, the free versions of these apps were chosen for this study.

(4) Apps were excluded if their target population was not the MSM community. Dating apps that do not actively target MSM users (subjects) were out of the scope of this study. For example, FEM Dating app can be found from Google Play store, it is a free lesbian dating and chatting app which was excluded.

(5) Apps were excluded if they could not be opened or logged in. (A researcher account was created for the purpose of observing the HIV-related features use only).

(6) Duplicate results were excluded. The search terms used to find potential MSM dating apps had the potential to return the same results. For instance, Grindr appeared in the search results for the keywords 'gay' and 'homosexual.' Regardless of how many times Grindr showed up as a result, it was only counted once.

(7) Versions that are alike (e.g., 'lite' or 'pro' versions) were not included. Instead, only the free version was counted. For instance, Grindr and Grindr Premium appeared as two separate results, but only Grindr was selected for use in this study.

(8) Apps were excluded if their target population was not New Zealand app users. One example that was excluded was the Telugu gay chat app as this app was specifically developed for Telugu speaking gay people.

(9) In the Apple app store, apps under lifestyle and social networking categories were included. Apps under Games, Entertainment, Education, Utilities, Magazine, News, Health & Fitness, Medical, Travel, Photo & Video, Music,

Reference, Book and Stickers categories were excluded, because these categories did not contain dating apps.

(10) In the Google play store, apps under Social, Dating, Lifestyle and Communication categories were included. Apps under those categories on the Google play store include dating apps. Apps under Puzzle, Travel & Local, Books & Reference, Sports, Music & Audio, News & Magazines, Adventure, Arcade, Photography, Art & Design, Business, Role Playing, Education, Events, Health & Fitness, Maps & Navigation, Personalisation, Trivia, Productivity, Simulation, Tools, Video, Shopping, Entertainment, Casual and Players & Editors categories were excluded.

Using the search criteria and selection criteria, a list of MSM social media dating apps was produced. These apps were then installed from the Google Play Store to an Android smartphone. According to Statcounter (2021), Android has a significant global market share advantage over iOS and therefore likely represents the most used iteration of a MSM dating network various apps. Once installed, each app was manually checked for HIV-related features, from May 27th to May 31st, 2021.

On June 1st, 2021, screenshots were taken of the HIV-related features on various apps. Given that apps can undergo frequent updates, the screenshots were captured at a single point in time to prevent the inclusion of outdated features. This process yielded 46 screenshots, all cropped to focus solely on HIV-related information and exclude the operating system interface and any non-HIV-related data.

Any features that were linked to external, self-contained websites were not included in the screenshots. The reasoning for this is twofold: the content from third-party websites was outside of the app's control and therefore unrelated to the specific content analysis of the app itself. The resulting dataset was then utilised in the subsequent phase of content analysis, which examined the usage and effectiveness of these HIV-related features within the apps. The HIV-related features dataset was documented and can be found published as a dataset at: <https://doi.org/10.7910/DVN/ALTNZL>, Harvard Dataverse, V1

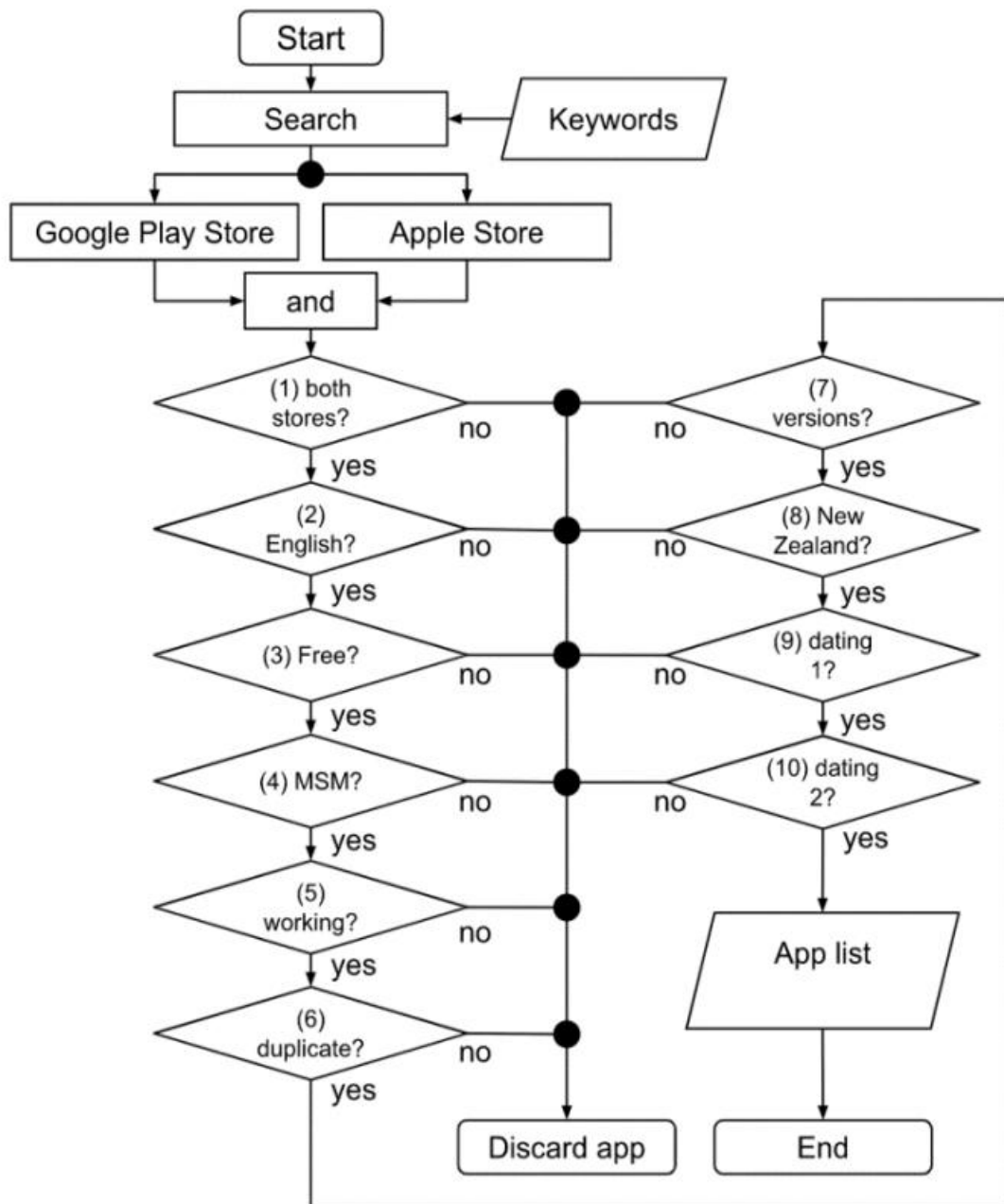


Figure 1: App selection flowchart

4.2.2 Phase II: Content analysis

The second phase of this research involved a focused content analysis of screenshots to understand the usability of the HIV-related features present in MSM social media dating apps. Rather than exploring how these features integrate into the broader app environment, this phase concentrates on their standalone usability. This analysis evaluates how these HIV-related features might influence user interaction, notwithstanding the broader context of the complete app.

During the 1940s, content analysis became a well-established approach of systematic analysis (Stan, 2010). Content analysis might be one of the most prominent approaches in social science (Krippendorff, 1989). Content analysis has been frequently referenced as a type of evidence in Media Studies for many decades (Bell, 2011). As described by Downe-Wamboldt (1992), "Content analysis is a research method that provides a systematic and objective means to make valid inferences from verbal, visual, or written data in order to describe and quantify specific phenomena" (p.314). Similarly, Bell (2001) stated, "Content analysis is an empirical (observational) and objective procedure for quantifying recorded 'audio-visual' (including verbal) representation using reliable, explicitly defined categories ('values' on independent 'variables')" (p.5).

Content analysis has been adopted to examine visual images (Baek & Mayer, 2010; Heuer et al. 2011; King, 2015). Analysing the pictures utilised, Baek and Mayer (2010) employed content analysis to investigate the evolution of sexual imagery in cigarette advertisements by analysing the images used. Heuer et al. (2011) performed a content analysis to assess the imagery that accompanies internet news reports on obesity and how overweight individuals are depicted in news photographs. King (2015) employed content analysis to examine the popularity and usage of images and illustrations in printed materials of health information. Thus, content analysis is a suitable approach to answer the second research question on exploring screenshots of HIV-related features, because the units of analysis in this study were screenshots.

Any meaningful visual/linguistic information can be used as the material of content analysis, such as visual, linguistic, graphic, and oral. Analysis is a method of dissecting things into their component parts. As an observational and systematic approach, content analysis is effective in describing how and what visual material means. It quantifies content samples, which are grouped into precise collections. It allows for the delineation of various domains of visual representation by offering descriptions of image constituents, types and periods of images, and other defined areas of representation instead of analysing a single image or text (Bell, 2001).

In order to do a visual content analysis, the quantity and scale of the visual material must be specified in detail. This takes place before the observation

begins. The process involves deciding the 'sample size' or the corpus of representation that needs to be studied. Typically, framed pictures or representational sequences are often extracted during visual content analysis. Nonetheless, to create a meaningful analysis, all texts are categorised based on certain dimensions ('variable') using content analysis that is important in describing the totality. Interpretation of each text separately is not its main focus (Bell, 2001).

Only with the support of accurate assumptions and exactly defined concepts, content analysis is an effective programme. To provide meaningful evidence pertinent to a hypothesis, it is necessary to establish visual content categories in a clear and precise manner and apply them consistently. It is crucial to define variables and values. In a specific study endeavour, each variable is logically distinct from the others. Additionally, the values that are specified for each variable must be exclusive to one another and comprehensive (Bell, 2001).

A user experience design framework was developed and used in conjunction with content analysis to answer the second research question. The aim of this framework was to refine the assessment scope and establish an objective methodology for evaluating image content.

Several alternative frameworks were considered in the development of this research. One such framework was Jakob Nielsen's 10 Usability Heuristics (Nielsen, 1995), which is widely recognized and utilized by UI designers to guide usability improvements (Staats, n.d.). Nielsen's heuristics provide foundational principles for enhancing interface usability, including "visibility of system status", "user control and freedom", and "error prevention". These principles are particularly relevant for evaluating interface design and identifying usability issues that could negatively impact the user experience (Nielsen, 1994, n.d.).

Heuristic evaluations are most effective when conducted in the early stages of the design process, before and during user testing, allowing designers to identify and resolve usability issues at an early phase (Staats, n.d.). However, Nielsen's heuristics primarily focus on technical usability and system-level interactions, which limits their applicability when it comes to assessing broader aspects of user experience, such as credibility and desirability. These factors are crucial in the context of evaluating HIV-related features in MSM social media dating apps.

Garrett's Elements of User Experience model (Garrett, 2011) was also considered. This framework divides user experience into five planes: strategy, scope, structure, skeleton, and surface, which progress from abstract concepts to more tangible elements. Garrett's model is highly valuable for guiding the design process, from identifying user needs to creating a visually coherent and functional product. While it effectively addresses the alignment of user needs with business objectives through the strategy plane, Garrett's model is primarily focused on the design and development of user interfaces. It does not explicitly emphasize broader user experience elements like credibility and desirability, which are essential for assessing the effectiveness of health-related features in social media platforms aimed at MSM users.

Ultimately, Morville's User Experience Honeycomb was selected as the most appropriate framework for this research, as it offers a comprehensive structure for evaluating the usability of HIV-related features within MSM social media dating apps. Its focus on dimensions such as usefulness, credibility, and accessibility aligns with the research objectives of examining how the design and functionality of HIV-related features in MSM social media dating apps impact user interaction.

In this context, the assessment focused on images within the realm of software user interaction and experience, as opposed to being evaluated as general images. Consequently, the analysis concentrated on the perceptual elements of the feature presentation (thus, the images) rather than delving into the technical aspects of software development.

User experience design framework

The field of user interaction and experience (UI/UX) design is one means to describe how an application and user interact. Thus, analysing elements of UI/UX will help to understand how the applications and users interact. "User experience encompasses all aspects of the end user's interaction with the company, its services, and its products" (Norman & Nielsen, n.d.). Peter Morville created the honeycomb in 2004s. The honeycomb describes goals that a well-designed application should contain in terms of the user interface. It is presumed that the developers follow guides and principles common in the industry and it is widely adopted in the development of mobile applications (Kim, 2020; Richardson et al., 2021; You et al., 2019). The honeycomb describes six goals (Usability.gov., n.d.)

that a well-designed application should contain in terms of user experience.

Those goals are:

- Useful: the application/feature must serve some purpose or fulfill a need.
- Usable: the application/feature must be convenient for use or easy to use.
- Desirable: the application/feature elements must be pleasing to the user.
- Findable: content must be easy to locate and negative.
- Accessible: content must be easy to reach.
- Credible: information must be trustable and believable.

In this thesis, 'Usable' refers to something that can be effectively utilised or put into practical action. It implies that an object, system, or resource is in a suitable condition or state to fulfil its intended purpose or function. When something is described as usable, it suggests that it is capable of being operated, accessed, or interacted with in a convenient, efficient, and functional manner. 'Desirable' refers to something that is highly sought after, attractive, or appealing. It signifies that an object, quality, or characteristic possesses qualities or attributes that make it desirable or worth having. When something is described as desirable, it suggests that it is considered valuable, advantageous, or pleasurable to possess or experience. Desirable means the visual aesthetics of design should be appealing and easy to understand. 'Accessible' refers to something that is easily approachable, reachable, or available for use or interaction. It conveys the quality of being easily accessible or within reach, particularly concerning physical, digital, or conceptual access. When an object or concept is described as accessible, it means that it can be conveniently reached, entered, obtained, or understood. It implies that barriers, restrictions, or obstacles to entry or use are minimised, rendering it easy for individuals to engage with or utilise without difficulty or undue effort. 'Findable' refers to the quality of being easily locatable or discoverable. It describes something that can be readily found or identified, typically with the help of search, navigation, or organisational systems. When something is described as findable, it suggests that it is effectively structured, labelled, or indexed in a way that facilitates its retrieval or location. It implies that appropriate mechanisms or methods are in place to guide users or individuals

to the desired item, information, or resource. In the context of HIV relevant information, findability is critical and should be easily locatable. 'Credible' refers to something or someone that is considered trustworthy, reliable, and believable. It signifies the quality of being worthy of confidence, acceptance, or belief based on the perceived reliability, expertise, or integrity of the source or information. In the context of providing accurate HIV-related information through apps, the credibility of the information is paramount for educating and raising awareness on HIV prevention and safety practices.

Peter Morville's User Experience Honeycomb (Morville, 2004) serves as background information for the research to create variables and values for the usability checklists.

To facilitate effective analysis, the researcher began by defining all relevant macros, variables, and values. A macro is a collection of variables used to describe a single item on the usability checklist. In this study, the macros employed to describe usability are based on Peter Morville's User Experience Honeycomb (2004), which outlines six facets of the user experience: usability, usefulness, desirability, accessibility, findability, and credibility.

Variables, as defined by Bell (2001, p.7), are "the set of options which are of the same class or type as defined for the purposes of the research project." In this study, variables are conceptualised based on several factors, such as interaction, interaction effort, link to a third-party website, education, mode, dynamics, colour, font, searchability, reliability, errors, and source. Bell (2001, p.7) also defined values as "elements which are of the same logical kind. That is, elements can be substituted for each other because they belong to the same class: these constitute the values on a particular variable". Hence, in this context, values represent the potential outcomes or states that the defined variables can take. Coding refers to classification or categorisation of the data based on these defined variables and values, using a specific set of criteria.

Each variable is logically distinct from the others. Additionally, the values that are specified for each variable be exclusive to one another and comprehensive. When analysing a screenshot, the coders responsible for attributing values to the variables are likely to point out different elements as well as describe them in different ways. The variables and values provide a structured pathway for the

analysis. The variables supply the coder with what to observe in the screenshots following these research analysis elements of interest. The values limit the ways the coders explain each element (Bell, 2001). Table 1 showed the variables according to the Honeycomb macros.

Table 1: User experience variables based on the honeycomb framework

Usable	Useful	Desirable	Accessible	Findable	Credible
Interaction	Educate	Mode	Font	Searchable	Reliability
Interaction effort		Dynamic			Errors
Link to a third-party website		Colour			Source

In the following section, detailed meaning of macros, variables and values which were defined by the researcher were explained.

Usable

The term usable indicated how easy to use the feature was. There were three variables to assess how usable the feature was: interaction, interaction effort, and link to a third-party page.

Variable 1: Interaction.

The variable interaction was designed to evaluate if the user can interact with the features. When observing the screenshots, the researcher should look for areas that appear to have functionality, such as, selecting an option, opening a web link, and fulfilling an input field. The variable can be divided into two values:

- Yes – users can interact with the page.
- No – users cannot interact with the feature.

Variable 2: Interaction effort.

For this variable, it was expected to know what effort is available after the interaction. This variable had three values.

- Not applicable – no need to submit a request.
- Provide standard information – the information was provided by the app, such as the option selection, and information centre. The processing was done without human interaction.
- Interpersonal interaction – a custom or open information request was sent to a person who would personally reply to the user.

Variable 3: Link to a third-party website.

The researcher should search for hyperlinks or content that point to an outside institution. This variable contained two values.

- Yes – there was a hyperlink for a third-party page.
- No – there was not a hyperlink for a third-party page.

Useful

The meaning of the term 'useful' in this research determined if the HIV-related information raises some sort of awareness. That was the need the feature should fulfil. The goal would be features that inform, explain, and invite the users to obtain more knowledge about HIV.

Variable 4: Educate.

The term educate in this research meant the supply of knowledge was offered, namely all screenshots contained some kind of HIV-related information. The researcher looked for the extension of HIV information according to the following values:

- Not applicable – there was not much information provided in the screenshot. The researcher could not judge from the screenshots.
- Basic information – the message contained basic information. This was provided in the screenshot without further explanation. These were mostly loose terms, such as HIV status, tribes, and safety practice options.
- Explanatory information – the information was not only provided but also accompanied with description/explanation of one or more terms. It complemented the basic information with at least one descriptive sentence of what the term meant. It helped to inform the topic.
- Invite users to more knowledge – it showed extra information besides basic and explanatory. It can also show as an option where the user can access more information about a topic, even if there was only basic information. For instance, it offered users an option to ask for help from public health professionals or health ambassadors for further explanation.

Desirable

The researcher intended to assess the aesthetics of the feature looking for its attractiveness and visual pleasantness. To determine if it is, exploration of the multimedia resources used by the developers to catch the users' attention on HIV-related features is needed.

Variable 5: Mode.

From the variable mode, the researcher would identify what kind of media the developers use to present the information. Mode meant the way that information was presented. It had four different values.

- Text – text was provided to present the information.
- Image – only image was provided to present the information.
- Text and image – both text and image were presented.
- Video – video was provided to present the information.

Variable 6: Dynamic.

Dynamic meant technical effects that cause movement, such as animation. The researcher should identify if there was likely dynamic content on the image. There were two values under this variable.

- Still – the message had no moving effects.
- Animated – the message was delivered using animation techniques.

Variable 7: Colour.

The usability of applications is greatly influenced by colour (Jonson, n.d.). There were three values under this variable.

- One colour.
- Two colours.
- Three, and above three colours.

Accessible

Variables in this research aimed to evaluate how text and characters were presented in the screenshots. An accessible text should display text in a comfortable font typeset, size and readability.

Variable 8: Font.

Font meant a set of types of one particular font, face, and size. Different fonts have different sizes; developers can also use different scales, such as px (pixel), pt (point), or sp (scalable pixel) (developers, n.d.). It is impossible to determine what was used on the app because the size may also vary depending on the phone screen and later with the size of the screenshot. A relative perception of the size of the text suffices once the goal was to ascertain how accessible the information was to read. The researcher should identify the relative size of the font typeset used on the image. There were three values under this variable.

- Small – the font was presented in very small text. The font was too small for users to read.
- Normal – the font was presented in an appropriate size. The information

was easy to read.

- Big – the font was presented in very big text which gave users an uncomfortable feeling. The font was too big for users to read. An excessively large font size can have a detrimental effect on the readability experience, making the text overwhelming and causing the page to appear cluttered (Mehta, 2023).

Findable

The information should be easily found in the screenshots. That might occur as all the information was fully displayed in the screenshot. That meant that all content was shown. Conversely, the information might run outside the screenshot's boundaries implying that the content was not fully shown. The latter might also be the case if multiple topics were enclosed on a feature screen, often requesting the user to scroll or to use an app search tool.

Variable 9: Searchable.

From this variable, the researcher wanted to know how findable the feature is. How easy is it to find the information? Searchable meant there was a search tool that existed that could be used to locate the information of interest. Sometimes, if there was too much information provided, it would be easier and save time for users to find the information they are looking for. It was divided into two values.

- Yes – there was a search tool. Users can use the search tool to find information.
- No – there was no search tool.

Credible

The information must be worthy of confidence. That is especially crucial when the information is related to healthcare. While the correct information might help to support healthcare, misinformation might cause, for instance, stigmatisation of HIV (Krishna & Thompson, 2021). Thus, the information provided should be correct as to the current scientific understanding and not disputable. That meant the apps should provide reliable and relevant information to users (Edith Cowan University, 2021). Misspelled words and typos often degrade the message's ability to deliver the information, consequently diminishing the message's

integrity and trustworthiness to the users' perception. Furthermore, accredited sources are perceived as providing more believable information. Although accredited sources are preferred, they are not required or influential when the information is basic or common knowledge.

Variable 10: Reliability.

Reliability meant how trustful the information was. From variables reliability, error and source, the researcher wanted to know how credible the feature was. How reliable was the information? The researcher should agree or disagree if the information was provided. The following values were provided:

- Not applicable – there was not much information provided on the screenshot. The researcher could not judge from the picture.
- Incorrect information – the provided information was checked by researchers and knowing to be wrong from common knowledge. Or it was misinformation.
- Correct information – the provided information was correct.

Variable 11: Error.

The variable error meant the accuracy of word writing. Errors and incorrect spelling can create confusion, loss of clarity or change of meaning. Additionally, errors can discredit the information. The researcher should investigate the screenshots in search for errors and attribute one of the four values:

- Misspelled – the text was misspelled.
- Incorrect abbreviation – a lot of abbreviations have a common agreement in spelling. For those who do not follow the right way, we considered it an incorrect abbreviation.
- Ambiguous abbreviation – the abbreviation had more than one interpretation, and users might have doubt about it. For example, BB has multiple meanings, "Baby," "Bareback," "Big Brother," or "Body Builder."
- Incorrect word splitting – sometimes, a word was split or broken into two rows. If such a thing happened, hyphenation for multi-syllable words applies. If

the hyphenation was incorrect, it was considered an incorrect word-splitting error.

- No errors – all the spelling was accurate. No errors existed.

Variable 12: Source.

Some HIV-related information is widespread knowledge not requiring further certification. Further or new information might require accredited sources to establish credibility. Source here was defined as where the information came from. Three values were under this variable.

- Not available – there was no source mentioned for the information.
- Common knowledge – all the information was well known. It was easy for users to understand the information. Abbreviations were known without the need for clarification.
- Accredited source – the information came from, or cites, trustful sources such as health government institutions, health organisations, scientific peer-reviewed paper or similar.

Intercoder reliability

The degree of agreement between different researchers who independently evaluate the same aspect of a message or artefact is known as intercoder reliability (Lombard et al., 2002). Intercoder reliability measures the coding agreement between two researchers while assessing the same content using the same variables and values. Agreement means that the researchers indicate the same value to a variable on independent appraisals. A high intercoder reliability score implies that the researchers often attribute the same value to a variable. It is important to point out variables and values that are clearly defined and are interpreted in the same way by the researchers, thus reducing bias and subjectivity. Furthermore, clear variables ensure that the assessment can be reproduced accurately. In content analysis, intercoder reliability is paramount. As Singletary (1993) said, it is "near the heart of content analysis; if the coding is not reliable, the analysis cannot be trusted" (p. 294).

Without excellent reliability, content analysis measures are ineffective (Neuendorf, 2002). Cohen's Kappa (Cohen, 1960, 1968) is a reliable statistic that

may be used for interrater reliability assessment. It evaluates the level of agreement between two coders (McHugh, 2012). Cohen's Kappa measures are extensively employed to account for possible agreement. While no clear cut off point for acceptable Kappa values have been set, Banerjee et al. (1999) argue the following:

"Values greater than 0.75 or so may be taken to represent excellent agreement beyond chance, values below 0.40 or so may be taken to represent poor agreement beyond chance, and values between 0.40 and 0.75 may be taken to represent fair to good agreement beyond chance" (p. 6).

This research included 46 screenshots that were coded by a first researcher (coder). A student at the University of Auckland was asked to serve as a second researcher (coder). He received information on the research design and the meaning of variables. Then he coded all the images a second time. The coding results were then "scored," comparing the second researcher's results with the results of the primary researcher. The first researcher rated the variables on October 25, 2021, and the other researcher on October 28, 2021. The coding results for the first and second researcher are shown in Appendix E.

Cohen's Kappa (Cohen, 1960, 1968) was used to determine intercoder reliability. The values of Cohen's Kappa showed two opposite situations of this calculation, when it works and when its use is limited. The overall Kappa value, calculated using all values, was 85.68%. In this case, the Kappa value shows a general agreement among the researchers. A consensus that is deemed satisfactory typically involves values surpassing 80%. The calculation included all variables to minimise unbalance. The unbalance in one value does not weigh on the calculation of the agreement by chance.

For instance, the variable 'dynamic' has 100% agreement on a single value 'still.' It only represents 0.69% or 3.83 cases when calculating the agreement by chance, including all variables. Conversely, when restricted to the variable 'dynamic,' the agreement by chance represents 100%. Statistically, the possibility of a random agreement for one coding for the variable 'dynamic,' which has two options, is 0.25 ($\frac{1}{2} \times \frac{1}{2}$) for one screenshot, 0.0625% ($\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$) for two screenshots, and for all 46 screenshots is 2.02×10^{-28} ($\frac{1}{2} \times 46 \times 2$).

Consequently, if all agreements are by chance, Kappa cannot be calculated. The latter is extreme when Kappa is not applicable or represents distorted information. That case is the same on the variable 'Fonts' and similar, to a lesser degree, to variables that showed polarised agreement on one value. Therefore, a relative agreement was used to design and evaluate the variables. Moreover, Kappa was used to show the overall agreement between the two researchers.

The relative agreement among the researchers was 86.59% (478/552). A full coding agreement was reached on four out of the twelve variables: 'mode,' 'dynamic,' 'fonts,' and 'searchable.' The researchers' agreement was above 90% on two variables: 'interaction' and 'link to a third-party website.' Five variables, 'interaction effort,' 'educate,' 'reliability,' 'errors,' and 'source,' had an agreement above 70%. And lastly, 'colour' had the lowest agreement score with a value slightly above 65%. The variables with the lowest degree of agreement among the two researchers require clarification. The variables are 'colour,' 'source,' and 'interaction effort' in ascending order. The coding agreement on these variables was below 75%.

'Colour,' with the lowest agreement of 65%, has the following values: 'one colour,' 'two colours,' and 'equal or above three colours.' The disagreement nearly fully lies on options 2 and 3. Researcher 1 concentrated 98% of answers on option three, while researcher 2 had 65% answers on option three and 33% on option two. That was due to the consideration of the background colour of the screenshot by researcher 1, while researcher 2 did not include that. The variable was not considered problematic because the issue was identified by the researchers. And the variable results did not impact the outcome of the 'Desirable' macro (variables 'mode' and 'dynamic' were 100% in agreement).

'Source' agreement of 71.74%, was similarly situated in two options: 'not available' and 'common knowledge.' The divergence of the agreement is on the interpretation of what information would be common knowledge. Common knowledge does not require a source. Conversely, a term or information that was not considered to be common knowledge would require a source. Considering that most HIV information identified contained correct information and no errors and was simplistic (enough to be considered common knowledge), the variable 'source' was not redefined.

Lastly, 'Interaction effort' (74%) considered what would happen in terms of interaction when the user utilised the feature. Because the analysis was performed on screenshots resulting from screenshots of the apps' features, the outcome of any interaction was not executed. Once again, the variable 'Interaction effort' did not influence the result of the 'Usable' macro. By contrast, the other variables, 'interaction' and 'link to a third party page' showed agreement rates of over 90%. Furthermore, the coding results were not spread on the options available, with 82% of answers being provided standard information.

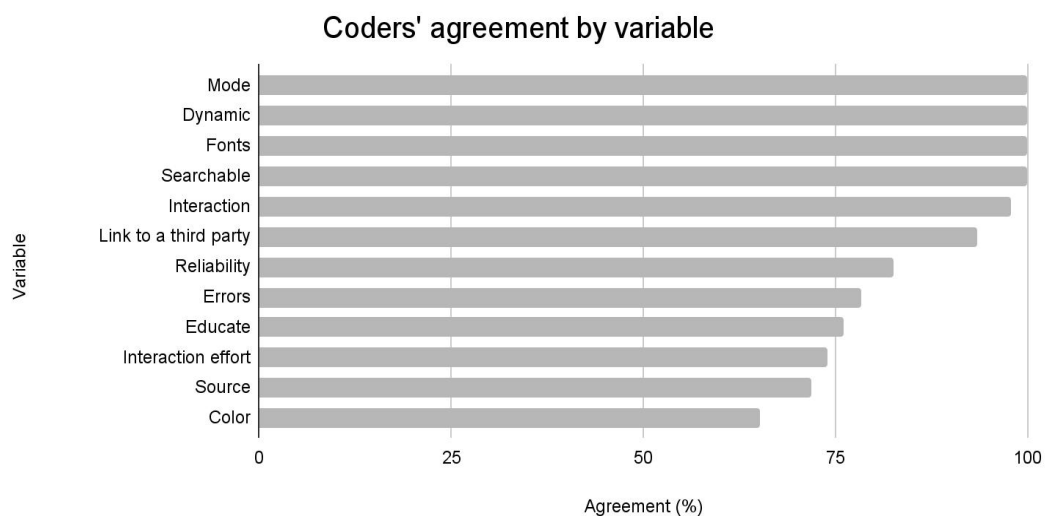


Figure 2: Researchers' agreement by variable

4.2.3 Phase III: Semi-structured interviews

The third phase of this research aimed to explore MSM social media dating app users' perceptions of HIV-related features within the app.

In qualitative research, Marshall and Rossman (1999) proposed four data collection methods: immersing oneself in the setting, observing directly, conducting in-depth interviews, and analysing documents. For the purpose of this research, a one-on-one semi-structured interview approach was taken as the qualitative data collection method for the third phase (Barriball & While 1994), which was to investigate the experiences, thoughts and feelings of those who participated in it.

Other interview approaches, such as structured interviews or unstructured interviews are also applied in qualitative research (Fontana & Frey, 2005;

Liamputtong & Ezzy, 2005; Taylor, 2007). However, structured interviews may be excessively strict and can resemble a quantitative style of investigation. Unstructured interviews can risk gathering generic data with no precise direction. In a qualitative study, it is hard to have a completely unstructured interview because the researchers usually have an idea of the themes they want to assess (Arthur & Nazroo, 2003). Therefore, both structured and unstructured interviews are unsuitable for this study.

The semi-structured interview is among the most commonly utilised qualitative methodologies (Kitchin & Tate, 2000). Semi-structured interviews are useful for investigating diverse attitudes, thoughts, feelings, and impacts, and/or gathering a variety of experiences (Longhurst, 2003). The interviewer endeavours to procure comprehensive information by presenting a curated set of inquiries to the interviewee within the framework of an oral exchange in a semi-structured interview. The interviewer normally has a set of predefined queries, but in this case, the interview unfolds in a conversational approach. It allows the interviewer to discover essential information that is required (Longhurst, 2003). The researcher has the latitude and flexibility to explore replies, explain thinking, and seek to confirm the meaning of the respondents' answers (Treece & Treece, 1986). Also, to get a better knowledge of the interviewee, the interviewer may ask follow-up questions, which shares the advantages of both structured and unstructured interviews (Fylan, 2005; Galletta, 2013). In semi-structured interviews, participants have the freedom to share their experiences, while researchers can guide the conversation around particular themes, resulting in a flexible and dynamic dialogue. It allows the interviewer to be conversational and creates two-way communication. The interviewee gets the freedom to express their view in a relaxed mode (Barriball & While, 1994). In this way, further investigation into the matter is possible (Legard et al., 2003). They enable delicate matters to be discussed, as well as time and space for clarification of replies and/or probing for further information (Barriball & While, 1994).

Additionally, it enables the interview to be tailored in accordance with each participant's responses (Taylor, 2007). This is not only about talking but also listening and paying attention. The researcher should be open to hearing what people have said as well as building a comfortable atmosphere for participants to share. The researcher should be careful and systematic about the content that

people talk about (Krueger & Casey, 2000). It is the investigator's responsibility to be an attentive listener who pondered on what was said and utilised prior research expertise in order to elicit as much information as possible (Gill et al., 2008).

Recognising the sensitivity of the research topic and the unique dynamics between the researcher and MSM participants, rapport-building went beyond the standard practice of creating a supportive interview atmosphere. The researcher's prior engagement with the MSM community, such as volunteer activities at the Burnett Foundation Aotearoa, provided cultural insights that were invaluable during interviews. This familiarity enabled the researcher to establish trust more effectively, encouraging open dialogue on sensitive HIV-related features within MSM social media dating apps.

During the interviews, additional strategies were employed to ensure participants felt genuinely heard and respected. This included adapting the interview flow based on participants' comfort levels, using culturally sensitive language, and offering reassurance about the anonymity and confidentiality of their responses. These rapport-building efforts led to more candid conversations, enabling the researcher to gather nuanced insights that were crucial for understanding MSM users' perceptions of HIV-related features.

Research instruments

For conducting semi-structured interviews, information sheet, consent form and koha were instruments applied in this study.

Information Sheet: All study participants received an information sheet, which was designed for MSM social media dating app users (see Appendix A). Using a question-and-answer format and plain language, the information sheet provided a concise overview of the research project and its objectives, along with a comprehensive description of the entire research procedure. In addition, it specified what participation in practice means, including its duration, location, and requirements. How their privacy was being protected, outlined their rights to withdraw from participation, to decline to respond to any question, and to have any queries concerning the study satisfactorily addressed. It ensured that each participant understood precisely what participation entailed from an information

sheet. The contact details (telephone and email) of the researcher were also given on the information page to ensure that participants may contact them if they wanted.

Consent Form: All research participants were given consent forms that clearly stated what they were giving their consent for (see Appendix B). It specified in detail that the conversation would be recorded, as well as their right to withdraw at any moment without being disadvantaged in any way.

Koha: Each participant was compensated with a koha for their time and contribution to the research through their participation in an interview. The koha consisted of a supermarket voucher to the value of \$30. Some participants chose to attend the semi-structured interview online, the researcher used NZ Post to courier the voucher to their given address. Some participants chose to attend the semi-structured interview in person, where they were given the voucher immediately after the interview was finished.

Procedure

Ethics approval from AUTEK was obtained prior to conducting the research (see Appendix C). All potential participants were recruited by advertisement, flyers, etc. The researcher used her already existing Facebook account and explained clearly what the project was about and what the purpose of the call was, then posted the advertisement on the relevant Facebook groups, for example: Rainbow Auckland networking group, Rainbow Educators of Wellington, etc. Also, printed advertisements were displayed at different universities (including the Auckland University of Technology, the University of Auckland) at different locations (including the notice board in different departments, student learning centres, etc.). They were placed in various medical centres and other locations, such as the Gisborne sexual health clinic.

The following inclusion criteria should be met by participants to be considered for this study: (a) self-identified as MSM; (b) have at least one MSM social media dating app account; (c) use at least one MSM social media dating app; (d) use an MSM social media dating app for more than 3 months; (e) be above 18 years old; (f) currently live in New Zealand. There were no restrictions based on social position, race, religion, or educational attainment.

Interested participants contacted the researcher via social media, Messenger, email or phone, and the researcher sent them a duplicate of the participant information sheet (PIS) by email (see Appendix A), which included and explained the research goal and process, and consent form (see Appendix B). These materials were sent before participants' involvement to allow them time to look through what would occur during the research and to ask any research-related questions in advance. If they wanted to participate, they would send the researcher a signed consent form. The private interviews were scheduled at a time that was convenient for them. They could choose to participate in person or via online conference tools (Teams/Zoom). The interview was conducted after obtaining written consent permission.

The researcher conducted all of the interviews. At the onset of the interview, the researcher explained the interview would pose questions relevant to the study and answered any research-related questions raised by participants. During the interview, audio recordings of each one was made. It can help to avoid inaccuracies and data loss (Clemente, 2008). A total of 15 interviews were conducted for this research. Seidman (2013) recommends researchers should allow for "enough openness for participants to tell their stories" (p. 23), followed by their guidance, the researcher had no expectations or restrictions in advance of the interview length. Consequently, interview time was different between each participant, which lasted between 31 and 70 mins. Totally, 12 hours and 8 minutes of interviews were transcribed.

Demographic information of interview participants

The researcher conducted 15 interviews from February to April 2022. Most interviews were conducted online using online conferencing tools such as Zoom and Teams due to considerations of COVID restrictions during the period.

There was a wide range of ages, ethnicities, educational backgrounds, and employment statuses among the participants. Most of the participants were aged 20-35, with the average age being 31.8 years old. The oldest research participant's age was 58 while the youngest was 21 years old. The age standard deviation was 8.5, and the median was 31. Thus, most of the participants are young adults that are aged approximately between their 20s and 30s.

All the participants lived in Auckland, New Zealand, with the exception of one person who was in Christchurch, New Zealand. The participants were asked about their current employment situation. Most interviewees said they were employed, while four answered to be currently unemployed, and one said to be a student. According to their answers, the highest degree completed by the participants were: four completed master's degrees, seven bachelor's degrees, one diploma certificate, three high schools.

Six responded to be European, three Māori, one mixed, five Asians, two Chinese, one Vietnamese, one Filipino, and one Indian. The socio-demographic data suggest that the participants have a wide range of ethnicity, who were largely highly educated and employed, likely have a strong knowledge of HIV transmission and prevention methods.

Table 2: Demographic information of interview participants

Pseudonym	Age	Ethnicity	Education	Employment Status	Location
Ryan	31	Asian (Philippine)	Bachelor	fulltime	Auckland
Brandon	29	Mixed	Bachelor	fulltime	Auckland
Tyler	28	Asian (Chinese)	Master	fulltime	Auckland
Eric	33	European	Bachelor	fulltime	Christchurch
Kevin	21	European	High school	part time	Auckland
Jason	33	Asian (Chinese)	Master	fulltime	Auckland
Justin	31	Maori	Bachelor	fulltime	Auckland
Andrew	27	European	Bachelor	fulltime	Auckland
Christopher	43	Maori	diploma	part time	Auckland
Brian	58	Maori	High school	unemployed	Auckland
Jonathan	24	European	High school	fulltime	Auckland
Michael	29	European	Bachelor	unemployed	Auckland
Nicholas	32	Asian (India)	Master	fulltime	Auckland
Benjamin	32	European	Bachelor	fulltime	Auckland
Samuel	26	Asian (Vietnamese)	Master	unemployed	Auckland

Data transcription and verification

The interviews were audio recorded for transcription purposes. The researcher transcribed the conversation after the interview finished. The semi-structured interviews were initially recorded and then transcribed using a combination of verbatim transcription and key message transcription. Conversations that were not relevant to the interview questions were excluded. Additionally, contextual, emotional, and situational cues were noted. The interviews lasted approximately 50 minutes on average, and the transcriptions took between 8-10 hours on average.

Following the completion of all transcriptions, the researcher reviewed the transcriptions while simultaneously listening to the recordings. The main objectives of this process were: (1) to identify and rectify any errors and include any omissions; (2) to clarify and annotate certain language (e.g., to explain Te Reo Māori words that refer to gay, such as takatāpui); and (3) to anonymise information related to identification, such as their name. Transcriptions were made available to participants for accuracy checks and to allow them to withdraw information they may have supplied but did not want to be included in the study. The 15 interviews took place between February and April 2022, meaning that the perspectives expressed by interview participants are relevant only to that particular period. The final stages of the study were communicated to the participants as well, which included sending them a finding summary if they want to have it.

Thematic analysis

Thematic analysis was employed in the study to analyse the data gathered from semi-structured interviews. It is "a method for identifying, analysing and reporting patterns (themes) within data" (Braun & Clarke, 2006, p.79). Thematic analysis is widely regarded as one of the most suitable methods for analysing data in qualitative research (Alhojailan, 2012). "Through its theoretical freedom, thematic analysis provides a flexible and useful research tool, which can potentially provide a rich and detailed, yet complex, account of the data" (Braun & Clarke, 2006, p. 78). It has been used broadly in social sciences, gaining more attention after 2006 (Braun & Clarke, 2006) with the proposal of a more systematic approach than the open approach until then (Aronson, 1994; Boyatzis, 1998; Joffe, 2011). Thematic analysis is mainly used on textual datasets, including interview transcripts, social media posts, and survey feedback. Thematic analysis is an analytic tool that does

not determine theoretical conjectures, research questions or dictating methods of data collection (Clarke & Braun, 2014). It "can be used to identify patterns within and across data in relation to participants' lived experience, views and perspectives, and behaviour and practices; 'experiential' research which seeks to understand what participants ' think, feel, and do" (Clarke & Braun, 2017, p.297). This method has proven to be an appropriate approach in past studies of exploring people's experiences (McArdle et al., 2012), views and perspectives (Hall et al., 2012), influencing factors and processes (Robertson et al., 2013), and practices/behaviours (Slater et al., 2015).

The objective of the study was to obtain a thorough comprehension of the users' experience and perceptions of HIV-related features, and a thematic analysis suited to the research purpose.

The analysis process was followed by Clarke & Braun's (2006) six phases of guidance. The first step of thematic analysis is to familiarise oneself with the data while possibly identifying interesting passages in the text (transcription). That means that at the end of the familiarisation process, the researcher had a complete understanding of the media, subjects mentioned, topics mentioned, and a preliminary idea of what codes should fit particular chunks of data. The data familiarisation process started early in this research. First, the data set was the result of semi-structured interviews designed to answer the research question, "How does the design and functionality of HIV-related features in MSM social media dating apps influence their usability for the users?" The researcher had previously analysed the apps, which created a preliminary notion of possible answers. Furthermore, the researcher interviewed the participants and transcribed and reviewed the audio files. As such, it can be said that the researcher was familiar with the data.

Next, in the coding phase, the researcher created preliminary codes from the transcripts using the software NVivo Release 1.6.2. These preliminary codes were in a descriptive form that served as an organisation method to identify parts of interest in the text. The initial coding work benefits from the semi-structured nature of the transcripts. Due to the transcripts following a similar sequence, some 'in vivo' codes ('in vivo' codes are derived from the data itself, i.e., quotes) can also be used. The 'in vivo' were applied to the passages of particular interest that could

be potentially used in matching analysis and data or used as assumptions supporting the semantic content. The initial coding and collated session were done by partially coding sections of each transcript. The clustering of codes began once all coding has been completed. The researcher analysed the codes and assigned them to potential themes. Organising involved pinpointing themes that indicated patterns that could possibly direct in understanding MSM social media dating app users' perceptions of HIV-related features.

It has been said that data saturation occurs when the collection of additional data yields little or no new information or insights, resulting in no significant changes to the codebook. At this stage, no new themes emerge, nor do existing themes require further refinement. This is often referred to as "thematic exhaustion," signaling that the key patterns and categories within the data have been comprehensively captured (Guest et al., 2006, p. 65). Throughout the analysis, the researcher systematically compared and contrasted participants' responses to assess the frequency and representativeness of emerging themes. By the 15th interview, no significant new information or themes emerged, indicating that data saturation had been achieved.

The researcher interpreted the themes, codes, and dataset in the analysis stage, attributing meaning and significance to the themes previously identified. The process required referring back to the dataset, and inspecting the codes and passages that support the themes. The complete analysis of the themes and supportive data were utilised to answer the research question, and limitations found were also described if identified. Chapter 7 presents the results of the thematic analysis and their discussion.

4.3 Ethical considerations in this research

Identifying ethical considerations has been described as a crucial aspect of doing research (Business Research Methodology, n.d.). According to Simons (1995), ethics is "the search for rules of conduct that enable us to operate defensibly in the political contexts in which we have to conduct educational research" (p. 436).

This research received approval from the Ethics Committee at Auckland University of Technology on June 21, 2021. Ethics approval was acquired under reference #21/69. On 1st February 2022, the researcher submitted an updated

application to AUTECH for a decision to broaden the research location and age range (view sample of participants).

Knowing that results could not be considered reliable if the study was not carried out appropriately and ethically (Bettinger, 2010), throughout the study process, the researcher kept ethical considerations in mind (Creswell, 2013). Before ethics application, they sought professional advice from a group of people. There is no potential conflict of interest. There is no commercial advantage to the researchers as a consequence of the research, and there are no cultural, employment, financial or similar pressures levelled at participants as a consequence of their involvement in this research.

To maintain participant anonymity and respect their right to privacy, participants were given a pseudonym to ensure no information can be directly traced. This study targeted individuals' perspectives of HIV-related features in MSM social media dating apps, as a result, there was no need to get authorisation or information from external parties such as employers or professional organisations. This study did not gather any personal identifying information, such as address or date of birth. All data pertaining to participants was kept confidential. In the final thesis and any related publication, it was made clear that names have been changed, so no individuals would be identified when reporting their views and statements of them.

The researcher was aware that asking people to comment on a sensitive issue may cause discomfort. The subject of the semi-structured interview is HIV-related features in MSM social media dating app. It asked for participants' experiences and perspectives. Some of the topics MSM social media dating app users, the participants in the study, have the potential to be emotive, personal and conflicting, as they tell and relive their experiences. If the substance of the question brings back memories that are painful for them, answering some of the questions may cause emotional or psychological anguish. Prior to interviews, participants have been informed that they have the option to skip any specific questions if any make them feel uncomfortable, to minimise risk to them. The interviews were recorded, and they were able to request to turn off the recording. To alleviate any possible negative feelings and discomfort during the interview, the researcher's role is made clear, along with a commitment to understanding the participant's situation fully,

accurately and without judgement. If at any point, participants were upset or uncomfortable, they would be reminded that they can discontinue the interview/recording without any negative consequence. When the researcher noticed a participant getting uneasy, they offered to pause the recording and confer with them before asking whether they wanted to continue. If a participant needed any further assistance as a result of something occurring during the interview process, information on relevant support services would be provided.

4.4 Researcher reflexivity

In this research, which explores users' perceptions of HIV-related features in MSM social media dating apps, it was crucial for the researcher to be aware of how their position as a heterosexual female might influence interactions with participants, as well as the data collection, analysis, and interpretation. Reflexivity plays an essential role for qualitative researchers in conducting studies. According to Patnaik (2013), reflexivity is "the constant awareness, assessment, and reassessment by the researcher of the researcher's own contribution/influence/shaping of inter-subjective research and the consequent research findings" (p.100).

The researcher's reflection after each interview involved examining personal attitudes and behaviours to ensure neutrality, maintaining clarity and openness in questions, assessing interviewee comfort and responsiveness, and identifying any potential biases or assumptions introduced. Feedback from supervisors and peers played a pivotal role in the reflexive process. Regular discussions during supervision meetings, as well as informal dialogues with peers, helped refine the interview questions and methods, prompting critical reflection on potential biases.

To further enhance reflexivity, the researcher maintained reflexive notes throughout the research process, documenting emerged thoughts and understanding of complex issues. This practice helped maintain awareness of the researcher's positionality and its potential influence on data collection and interpretation. By actively engaging in reflexivity throughout the research process, the researcher was able to foster a transparent and nuanced understanding of users' perceptions, ultimately enhancing the depth and reliability of the study's findings.

4.5 Summary

This chapter outlined the methodology and methods used in this study, based on constructivism as an ontological principle and interpretivism as an epistemological approach. These research strategies guided the three stages of the study: app screening to identify HIV-related features, content analysis, and semi-structured interviews. The initial app screening examined the presence of HIV-related features in MSM social media dating apps. The content analysis assessed the usability of these features, while the semi-structured interviews explored user experiences and perceptions. This approach provides an understanding of the role of these features in MSM dating apps and their potential contribution to HIV prevention, addressing gaps in health communication. The next chapter will present the findings from the first stage, focusing on the presence of HIV-related features in the sampled apps and evaluating their potential effectiveness as public health tools.

Chapter 5: Unveiling HIV-related features: An Analysis of MSM Social Media Dating Apps

Previous studies explored specific HIV-related features in dating apps (see Chapter 2) but none of them systematically categorised what HIV-related features were available and present in MSM social media dating apps. This chapter offers an overview of the existing HIV-related features of MSM social media dating apps in the market. It aims to contribute to understanding of the dating apps' ability to raise awareness about HIV/AIDS. The findings respond to the first research question, "What HIV-related features are present on MSM social media dating apps?" The chapter starts with identifying dating apps currently used by the MSM social group. Next, it analyses the apps by categorising the features that contain HIV-related information. Additionally, it discusses how this study's results compare to similar research conducted to show the changes in the inclusion of HIV-related information.

5.1 Findings

This section provides an overview of the various dimensions explored during the research, including the availability of MSM social media dating apps across the Apple App Store and Google Play Store, the various HIV-related features present in these apps, and their distribution among different platforms. The findings from each of these areas not only inform the understanding of the current landscape of MSM social media dating apps but also help elucidate potential avenues for HIV prevention efforts.

5.1.1 The availability of app on both stores

A total of 1,296 app results were found collectively from both stores. A total of 296 app results were present on the Apple App Store search using the keywords: gay, LGBT, bisexual, and homosexual. Of those, 119 apps results under the searching keyword of "gay," 104 apps results under the searching keyword of "LGBT," 56 apps results under the searching keyword of "bisexual," and 17 apps results under the searching keyword of "homosexual." The search result is always 250 apps on the Google Play store, regardless of the keyword used, resulting in 1000 app results considering four keywords. This demonstrated that each search term had a large number of results accessible. In general, more apps are available through Google Play than the Apple App Store. In Apple's App Store, the search term "gay" yielded the most results.

Table 3: Apple App Store and Google Play Store keyword search results

Source / Keywords	Gay	Homosexual	Bisexual	LGBT	Total
App Store	119	56	17	104	296
Google Play	250	250	250	250	1000
Total	369	306	267	354	1296

Since the results generated by the keywords could contain repetitions, it was necessary to apply the inclusion criteria to refine the final list. At this point, the 1,296 combined results from the keywords, not the number of apps. The difference lies in the fact that one app might and did appear on different keyword queries. For instance, an app that showed on all queries would increase the results by four; however, it is a single app.

The final Apple App Store list contains 112 apps. Here was the whole screening process. A total of 296 results were found on the Apple App store. After removing the duplicated results there were 233 apps left. One app was not available at the time of checking for detailed information, additions to the app stores are frequent, and removal of apps was common. Apps may be withdrawn for many reasons, including actions made by the developer, failure to renew a developer account, and removal by the owner of the app store (Larsen et al., 2016). Hence, 232 apps remained. A total of 85 apps were under various categories (they were used to filter out apps that are not dating apps), which were excluded, as shown in Figure 3. There were 147 apps under lifestyle and social networking in the Apple App Store. One paid app, four non-social media dating apps, one app that was not targeted for New Zealand users, and 29 apps that were not targeted for MSM. Those apps were excluded from the list.

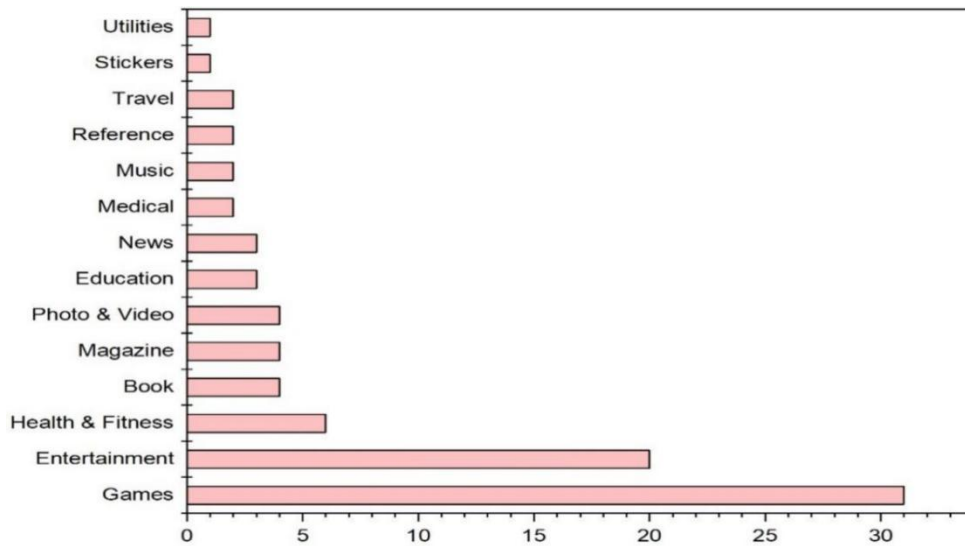


Figure 3: Excluded iOS apps under various categories

The list from Google play Store ended with 253 apps. There were 1000 app results found in the Google Play Store. Two hundred fifty app results for each of the four keywords. Again, after removing the duplicated results, there were 571 app results. One app was not available when checking for detailed information; consequently, it was excluded. There were 570 apps remaining. Of the 570 apps, 211 apps were under other categories, for instance, Puzzle or News and Magazine, other than the categories of dating social, dating, lifestyle, and communication. The apps from the non-related categories were excluded. Figure 4 showed the number of apps and the non-related categories that were excluded.

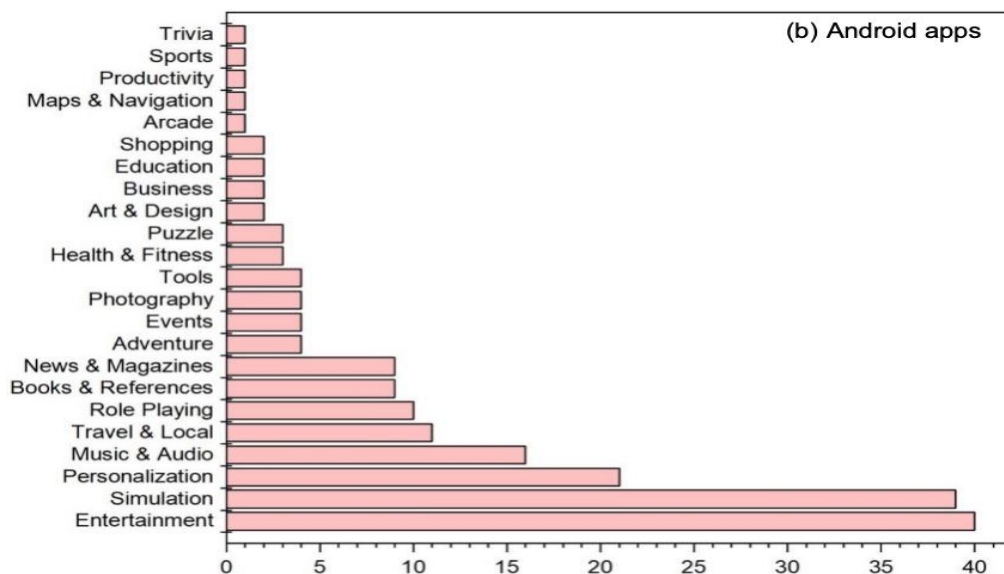


Figure 4: Excluded Android apps under various categories

There were 359 app results under the category of social, dating, lifestyle, and communication in the Google Play Store. Then four paid apps were removed, 25 apps that were in a language other than English, 35 non-social media dating apps, two apps that were non-target for New Zealand users, and 40 non-targets for MSM apps.

Once the lists of apps from both app stores were obtained, it was necessary to combine them. The final list contained 44 MSM social media dating apps. The reason for combining both stores attempted to eliminate mobile operational bias. Apps from the Google Play Store cannot be installed on Apple's iPhones. Also, apps from Apple App Store were not compatible with Google's Android phones. Hence, an application exclusive to a single platform would not meet the criteria for widespread popularity. Keeping this in consideration, apps that were confined to a single platform were consequently excluded. In the end, both lists were combined into one that only includes the apps that featured both lists.

Among those 44 MSM social media dating apps, it was not possible to create an account on five MSM social media dating apps. Either these apps have not been updated for a long time or were abandoned. Finally, 39 MSM social media dating apps were left for analysis. Then, the identification process started to check if the app contained any HIV-related features. Every available section of the app was explored. Screenshots were taken once any HIV-related features were found.

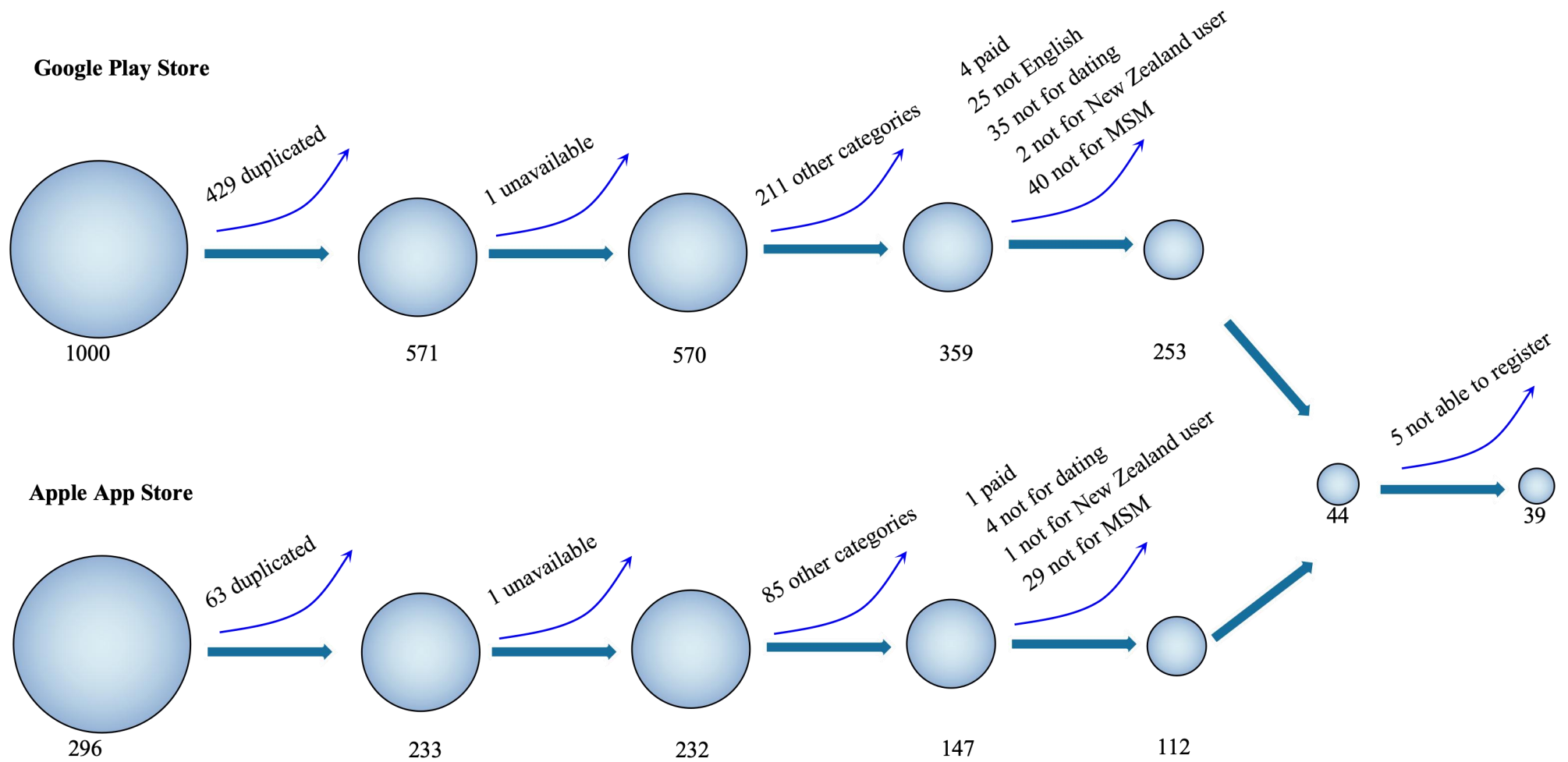


Figure 5: Flowchart for the app screening process. The data represent the number of apps remaining after each screening step

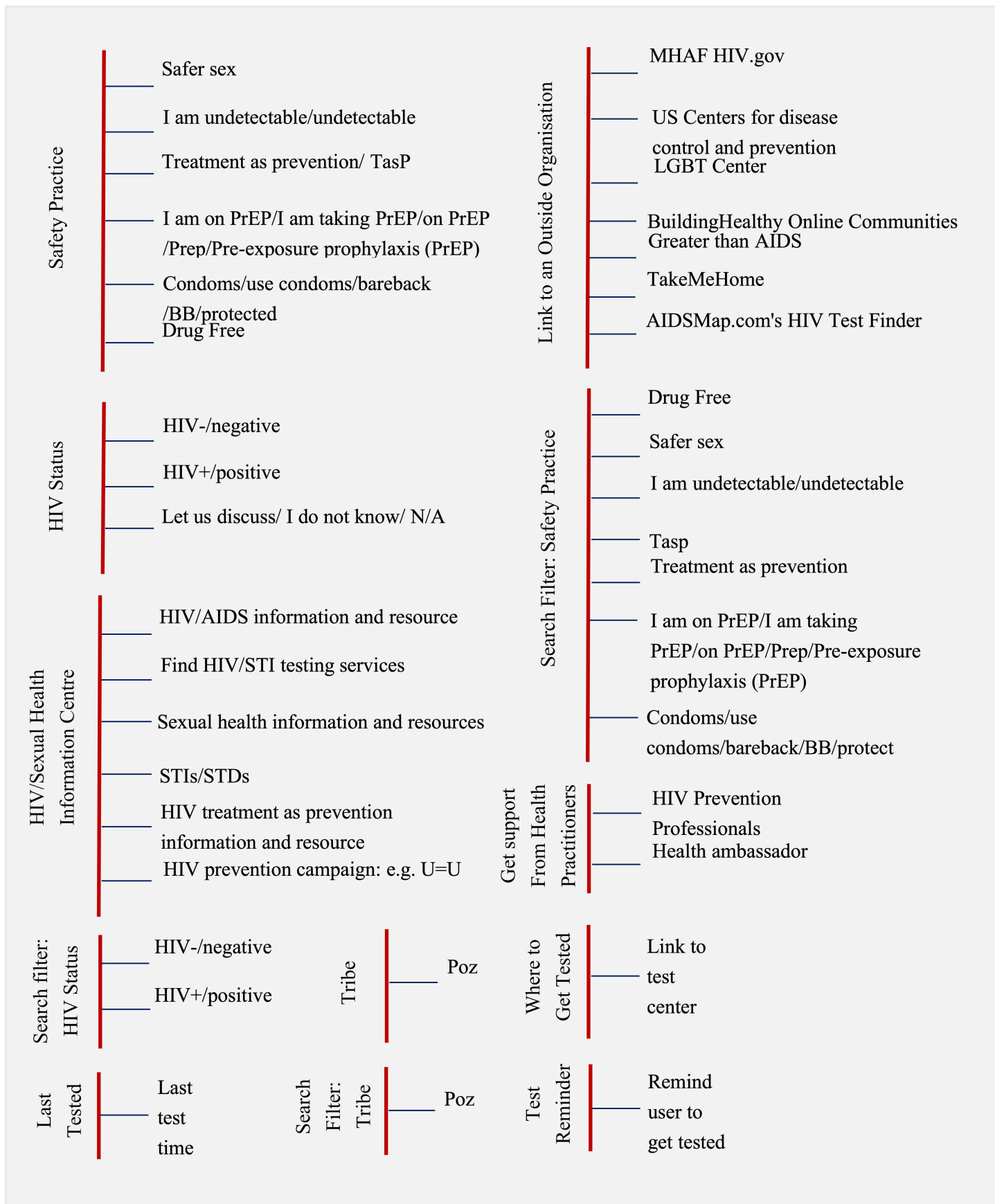


Figure 6: Categorisations of features in the apps

5.1.2 HIV-related features

Throughout this research, any mention of HIV prevention, service, testing, information on any level of complexity, and the HIV disclosure option was identified as an HIV-related feature. The HIV-related features identification was applied to each of 39 MSM social media dating apps. The HIV-related features within MSM social media dating apps were focused on safety practices, HIV status, HIV/sexual health information centre, link to an outside organisation, where to get tested, last tested, get support from health practitioners, tribe Poz (HIV positive), search filter of HIV status/safety practice /tribe of Poz. Each HIV-related feature is explained in this section while the following section notes which apps contained specific HIV-related features.

Safety practice feature

Safety practice feature appeared in Adam4Adam, Gayroyal, Grindr, GROWLr, Hornet, Jack'd, Manhunt, MUSL, RealMen, ROMEO and Scruff. For example, this occurred on Adam4Adam as a drop list option of 'select your practice': 'Protected,' 'BB,' 'I am on PrEP,' and 'Depends' are the four options that users can select. On Gayroyal, it is also a drop list option of safer sex: 'no comment,' 'always,' 'never,' and 'needs discussion.'

Safety practice means a practice that prevents people from being at risk. Safe sex practices with correct condom usage, no drug intake while engaging in sexual activity, restricting oneself to only engage in low-risk sexual activities, selecting individuals who have the same HIV status as their sexual partners, using medications to prevent or treat HIV and avoiding sexual activities are all efficient methods in reducing the likelihood of getting or spreading HIV (CDC, 2022; Nih.gov, 2021). Safety practice information usually exists as a drop-down menu option or as a separate option in users' profiles. There are mainly two kinds of information.

First, looking at safe sex-related information on condom usage preference. 'BB/Bareback' means no condom usage, 'Protected' means use condom, and 'Need discussion' means open to discussion. The consistent and proper use of latex condoms reduces the chances of contracting sexually transmitted infections and HIV transmission. Studies have shown that HIV-negative MSM who have intercourse with HIV-positive males may lower their chance of contracting the virus by using

condoms consistently (Johnson et al., 2018; Smith et al., 2015). Safe sex-related information on drug usage was provided as well. It was shown as 'drug free' information. Research showed that using drugs while having sex increases the likelihood of engaging in sexual behaviours that might transmit STIs and HIV (Calsyn et al., 2010).

Second, looking at HIV prevention method information, such as PrEP and TasP. PrEP is the use of an HIV medicine taken daily to lower the chance of contracting HIV via intercourse or drug injection for persons who do not yet have HIV but are at risk of acquiring it (Nih.gov, 2021). Research has demonstrated that PrEP is efficacious in preventing HIV transmission (Anderson et al., 2012; Donnell et al., 2014; Grant et al., 2010; Storholm et al., 2017; Volk et al., 2015). TasP refers to the consumption of HIV medicine to stop the transmission of HIV through sexual activities, which is regarded as one of the most effective means to control HIV transmission (HIV.gov, 2022). It was shown in various expressions, such as 'I am on PrEP,' 'I am taking PrEP,' 'on PrEP,' 'Pre-exposure prophylaxis (PrEP),' 'Treatment as Prevention,' or 'TasP.'

HIV status feature

HIV status feature was found in Adam4Adam, Grindr, GROWLr, Hornet, Jack'd, Manhunt, RealMen and Scruff. For instance, this happened on Scruff as five options under the 'HIV status' drop list: 'Unset,' 'Positive,' 'Positive, Undetectable,' 'Negative,' and 'Let's discuss.'

HIV Status indicates if a person is infected with HIV. There are various benefits to knowing ones HIV status. It serves as a crucial gateway to HIV care, prevention, treatment, and support services (UNAIDS, 2018). HIV status is mainly an optional section on a drop-list box on the user profile. Usually shown as 'HIV positive/HIV+,' 'HIV negative/HIV-,' or 'HIV positive, undetectable.' For those users who do not want to disclose such information or do not know their HIV status, there are some options for them, such as 'No response,' 'I do not know,' or 'Let us discuss.'

HIV positive denotes a positive HIV test result; HIV negative indicates a negative HIV test result. Undetectable refers to HIV-positive individuals who take their recommended treatment and have a low level of HIV in their blood that is not detectable by standard tests. A person who has a viral load that is not detectable has

no danger of spreading HIV to sexual partners (Body Positive, n.d.).

Disclosure is considered to be one of the critical objectives of public health. It could reduce HIV transmission by impelling sexual partners to get tested and alter their behaviour. Additionally, it may lead to other behaviours that could enhance the management of HIV, such as HIV preventive behaviours or the willingness to use condoms (WHO, 2004).

In addition to the benefits of HIV status disclosure to public health, as discussed before, there are also potential advantages to a person who decides to be transparent about their HIV status with sexual partners, such as: higher chances of receiving required medical support, and an increased probability to talk about and carry through ways to minimise HIV risk with partners (WHO, 2004). However, one must overcome common barriers that discourage them from the disclosure of HIV status, which include fear of desertion, rejection, violence, discrimination, dropping of financial support, and physical and emotional abuse (WHO, 2004).

Tribe of Poz feature

Grindr and Jack'd contained the tribe Poz feature. On Jack'd, for instance, this feature was presented under the dropdown multiple options of, 'I am into.' Poz is one of the options together with other tribes such as 'Twinks.' Similarly, it is also one of the multiple choices lists under 'Tribes' on Grindr.

A tribe is a social grouping of homosexual males formed entirely on the basis of their body type, key physical attributes, or specific interests (Mahale, 2019). Poz refer to an individual who has tested positive for HIV (Hennie, 2014). HIV-positive users can utilise this option to connect and find community with other HIV-positive males, but regardless of status, if the user is 'Poz friendly' or open to dating or having sex with anyone with HIV, they can also use this option (Jack'd, 2023).

HIV/Sexual health information centre feature

Adam4Adam, Blued, Grindr, Hornet, Jack'd, and Scruff all included a page or screen that presented information on HIV and sexual health. For example, this occurred as a Questions and Answers page in the HIV resource centre on Blued.

This is a screen occurring within the app where users can get various types of

information regarding HIV or other sexual health information. The common information found on apps HIV/Sexual health information screens, included but were not limited to what PrEP is and what HIV symptoms are.

It was proven that having sound knowledge and understanding of HIV can help to aid in the improvement of health behaviours (Cohen, 1988; Frierson & Lippmann, 1987). However, low health literacy among adults (e.g., have less HIV/AIDS knowledge) makes them less likely to undertake preventative health behaviours and may give rise to HIV-related stigma through prolonging misconceptions of the way by which HIV gets transmitted (Haile et al., 2007; Herek et al., 2005; Kickbusch, 2001; White et al., 2008).

People living with HIV/AIDS will undoubtedly benefit from having a well-rounded knowledge of HIV, being aware of advances in HIV/AIDS therapeutic alternatives, and proactive involvement in healthcare. As such, giving access to health information opens pathways for people with chronic illnesses to enthusiastically participate in health-promoting behaviours and enhance their health (Kalichman et al., 2002). Based on a study conducted by Silver and Huang (2019), individuals commonly use their phones to search for health-related information. Indeed, the Internet is a vast repository of health information related to HIV, which can assist individuals living with HIV in staying abreast of the latest developments and knowledge in the field.

Link to an outside organisation feature

This feature can be found in Adam4Adam, Grindr, Hornet, Jack'd, ROMEO, and Scruff. It appeared as a hyperlink to the HIV.gov website on Adam4Adam; HIV.gov is a website that provides information and resources pertaining to HIV/AIDS from the U.S. Department of Health and Human Services (HIV.gov, 2022). Users can click 'HIV.gov' and go to the official website.

The apps provide a link to a third-party website that contains information on HIV prevention, sexual health information, HIV testing and MSM-related services, such as US CDC, TakeMeHome (this is a website headquartered in the United States where consumers may order a free HIV test kit and instructions in a discreet box), and the Building healthy online communities (BHOC) website. It is usually a hyperlink added to a paragraph of text. Clicking on the text in the app will jump to a third-party website.

Where to get tested

Adam4Adam, Grindr, Hornet, Jack'd, and Scruff included a 'where to get tested' feature. On Grindr, for instance, there was an 'HIV testing' page under the community resources; it provided a hyperlink to the HIV test resource page.

This feature offers users information about where they can do HIV tests. Users can find nearby HIV test centres based on their location. It was either presented under the user profile shown as 'where can I get tested,' or it was found on the information centre under the 'HIV testing' or 'where can I get tested' tile, providing a hyperlink to 'testing resources,' 'HIV testing services locator,' or 'Greater Than AIDS' website.

HIV testing has long been a fundamental prevention approach since the earliest development of HIV tests, as it provides a clear and definite path to HIV prevention (Ard et al., 2014; Cherutich et al., 2013). Accurate HIV testing is essential for HIV diagnosis and subsequent opportunities to intervene in behavioural changes, including condom distribution, risk-reduction counselling, and connecting HIV-positive people to care and treatment facilities (Cherutich et al., 2013). However, AIDS stigma has been demonstrated in studies to negatively impact the likelihood of seeking HIV tests, getting healthcare, sharing HIV status, and seeking and receiving social support (Heyward et al., 1993).

Last tested

The last tested feature was found in Grindr, Jack'd, RealMen and Scruff. On Grindr, it occurred as a dropdown list option under 'Last tested.' Users can choose when they did their last HIV test. Other than the time, there was also an option called 'no response.'

Last tested is a feature that users can input when they last tested for HIV in their profiles. It presented a single choice in the dropdown list option or calendar display during scrolling. Users can put the information of year and month only in some apps, while users can put the exact HIV test date in other apps.

Test reminder

Grindr, Jack'd, and Scruff offered the test reminder feature. For example, on Jack'd, users can choose the time under 'Testing reminders.'

Test reminder is a feature that users can set up a reminder to remind them to do an HIV test. Users can set a test reminder every month, every three months, or every six months, or they can choose to unset it.

Considering the heightened risk of HIV transmission among MSM, regular screening is paramount in prevention efforts (Spensley et al., 2022). Having said that, the CDC has endorsed that MSM who are sexually active with negative or unknown HIV status undergo HIV screening at least once per year in their HIV testing guidelines released in 2006. In 2017, a revised recommendation on HIV testing for MSM was released by the CDC. The updated guidelines retained the initial recommendation from the 2006 edition, advising that all sexually active MSM who show no symptoms should undergo HIV screening at least once annually (DiNenno et al., 2017). HIV screening with higher frequency (e.g., every 3-6 months) is advised for MSM opting to engage in high-risk sexual behaviours (CDC, 2022; Workowski & Bolan, 2015).

Get support from health practitioners feature

The Get support from health practitioners feature was officially provided by Adam4radam, Beuronline and Hornet. For example, on Adam4Adam, it is a direct chat with a health specialist. Health ambassador is a function found on Hornet.

It is a feature that users can get support from verified health practitioners via MSM social media dating app. It is presented in two ways. One is a direct chat with a health practitioner within the app; another is sending emails. If users have questions about their health, sexuality, or HIV, they can ask for help from professionals specialised in HIV prevention via email within the app. The app states that such service is free, confidential, and sponsored by authorities. Users will receive a personalised answer within 48 hours by sending their questions within the app. Direct chat with a health ambassador is another way to facilitate engagement with users around issues of sexual health. A health ambassador is an individual who is open to having dialogues about sexual and mental health and sharing their personal experiences. When a user visits a profile of a Health Ambassador, they will be able to identify them by the badge and engage them in conversation about a wide range of health-related issues. However, health ambassadors are volunteers who share their personal stories from the frontlines of healthcare rather than professionals who give medical advice (Hornet, n.d.). Recently, it has become increasingly evident that online peer-based interventions have the potential to strengthen HIV/STI prevention implementations

and behaviours among the MSM community. Peer health interventions have been shown to be efficient in altering sexual health practices and HIV risk behaviours (Shangani et al., 2017).

However, the costs connected with conducting HIV interventions by health practitioners are still quite notable. A paradigm for lowering the otherwise expensive expenditures of medical professionals is provided by the recruitment of lay health professionals and volunteers. Additionally, it also helps to get the community involved in providing affordable assistance, especially for persons living with HIV. Numerous successful interventions offer education, treatment monitoring, counselling, psychological support, and other pragmatic aids. Supporters of community treatment relieve the strain on overburdened medical care professionals, involve a broader portion of the community, and provide people living with HIV with a more sustainable support system (Tomori et al., 2014).

Search filter feature: Safety Practice/HIV status/tribe Poz

The 'search filter' feature is a different functionality within the application, separate from the previously discussed features. The search filter feature in a mobile app serves as a tool that empowers users to tailor and narrow down their search results based on specific criteria. This functionality allows users to customise their search by applying filters, such as safety practices, HIV status, and tribe of Poz.

Users can search for others by inputting certain filters; it is usually a dropdown option. By utilising these filters, users can more efficiently locate information relevant to their specific needs within the expansive pool of data.

Search filter of Safety Practice or HIV status or tribe Poz feature was found in Adam4Adam, Grindr, GROWLr, Jack'd, RealMen and Scruff. On Grindr, for instance, users can look for Poz under 'basic filters of tribe.'

5.1.3 Apps that contained various HIV-related features

The previous section showed what kind of HIV-related features were found in apps. Of the 39 examined apps, only 13 apps contained HIV-related features. The versions of the apps were listed explicitly as follows. Again, apps were frequently updated by the developers; thus, this research was limited to specific versions.

Table 4: App version

App name	Developer	Version
Adam4Adam	A4A Network Inc	4.6.2.6
Blued	Blue City Holdings Co., Ltd.	3.7.2
Beuronline	Studio Presse	5.12.328
GayRoyal	42pixels B.V.	1.2.3
Grindr	Grindr LLC	7.10.0
GROWLr	Initech	16.3.2
Hornet	Hornet Networks Ltd	7.3.0
Jack'd	Perry Street Software	6.4303
Manhunt	MHNext LLC	2.7.3
MUSL	MUSL	2
RealMen	RM Media GmbH	1.0.9
ROMEO	ROMEO B.V.	3.12.0
Scruff	Perry Street Software	6.4303

5.2 MSM social media dating apps profiles

In order to have a general understanding of these apps, a description of each one has been provided.

Adam4Adam – It was established in 2003 by Convergent Ideas, LLC and currently managed by A4A Network Inc., stands as one of the longest-running dating platforms for gay, bisexual, and curious men, boasting a user base of over 10 million, primarily in the U.S. Available on both iOS and Android, the app offers a variety of features that extend beyond dating, such as news, entertainment, and travel planning, aimed at fostering a sense of community among users (Adam4Adam, n.d.).

Users can create comprehensive profiles and engage with potential matches through multiple communication tools. Additionally, Adam4Adam includes a dedicated News and Entertainment section featuring articles, videos, and podcasts, as well as a travel feature designed to assist users in planning trips and discovering new destinations (Adam4Adam, n.d.).

From a health perspective, Adam4Adam offers resources related to HIV testing, safe sex practices, and mental health, along with a directory of clinics and support groups. Its health-related content is curated by public health experts, ensuring accurate and reliable guidance on sexual health matters (Adam4Adam, n.d.; Eric, 2021). This integration of health resources aligns with this study's focus on leveraging MSM social media dating apps as effective tools for HIV prevention.

Blued – It was founded in 2012 by Chinese entrepreneur Geng Le, has become one of the world's largest gay dating platforms, with a user base exceeding 40 million across 200 countries. Approximately 70% of its users are based in China, and the app has over three million daily active users, securing its prominent position within the MSM community (Cao, 2018; Hernández, 2016; Lee, 2019).

The app provides a diverse range of features, including profile creation, messaging, real-time location sharing, and live streaming, facilitating user engagement and identity expression. Blued's strategic design adjustments cater to both Chinese and international users, demonstrating a culturally sensitive, user-centric approach. This aligns with the argument of this study, which suggests that localised design enhances user engagement and improves the effectiveness of HIV communication within MSM social media apps (Blued, n.d.; Miao & Chan, 2020).

In addition to social networking, Blued offers a variety of health and wellness resources, including information on HIV and STIs, mental health support, and counselling services. The ‘He Health’ service, exclusive to the Chinese version, focuses on HIV prevention, highlighting a targeted effort to address urgent health issues among MSM users. This further supports the study’s premise that MSM dating apps can serve as vital platforms for digital health interventions (Bluecity, 2020).

Beuronline – Beuronline, a popular app catering specifically to the needs of gay and bisexual Arab men, was launched in 2016. With over 50 thousand downloads, it provides a dating and social platform for this community, offering opportunities to connect, make friends, and seek romantic partners (Beuronline, n.d.). Having amassed a user base of over 700 thousand members worldwide, Beuronline holds a unique position in addressing the specific requirements and preferences of the Arab LGBTQ+ community. The app's emphasis on safety, cultural inclusivity, and matchmaking features contributes to creating a secure and inclusive space for Arab LGBTQ+ individuals to express themselves.

The app includes features such as profile creation, photo and video uploads, instant messaging, and live video chat. Users can refine their searches based on location, interests, age, and shared preferences, enabling a more personalized and targeted approach to matchmaking. Privacy features, like private chat and selective photo sharing, enhance user security (Beuronline, n.d.).

GayRoyal – The GayRoyal app is affiliated with the long-standing gay dating website, GayRoyal.com, which was established in 2000. Specifically catering to individuals who identify as gay or bisexual men, its primary objective is to facilitate connections and foster potential romantic relationships (GayRoyal, n.d.). It offers various features to facilitate interaction among users. This includes a Group-Talk function that enables group chat sessions and private and webcam chat options ("gayroyal.com," 2023).

The app enables users to search within specific groups like Twinks, Bears, and Musclemen, making it easier for users to find like-minded individuals based on shared interests (GayRoyal, n.d.). GayRoyal also emphasizes user security, implementing HTTPS encryption, secure location features, and options to block or report users, thereby ensuring a safe and comfortable user experience (GayRoyal, n.d.).

Grindr – Grindr, a dating application launched by Joel Simkhai in the United States in March 2009, has rapidly expanded to serve over 27 million users, with 3.3 million accessing the platform daily (Romano, 2015). The app primarily caters to individuals identifying as homosexual, bisexual, transgender, and queer (Pleines, 2024). As one of the pioneering platforms to integrate geolocation technology with dating and sexual preferences, Grindr laid the groundwork for subsequent dating apps like Tinder and Bumble (Fitzsimons, 2019).

To enhance sexual health awareness, Grindr introduced a feature in March 2018 prompting users to undertake regular HIV testing every 3-6 months (McNeil, 2018). The platform's website further provides sexual health resources, including HIV-related information and links for booking tests in select countries. For users in the United States, the app also assists in locating nearby HIV testing centers. The "Sexual Health" section enables users to voluntarily disclose their HIV status and previous testing history, while also offering options to set reminders for future tests. Although the basic version of Grindr is free but ad-supported, premium features such as 'Xtra' and 'Unlimited' are available for a fee (Grindr Review, 2021).

Grindr has been acknowledged as an effective tool for engaging individuals at heightened risk of HIV and other sexually transmitted infections, aligning with the objectives of this research (Hoenigl et al., 2020).

GROWLr – Entrepreneur Coley Cummiskey introduced the app in 2010, pioneering the creation of a social networking platform tailored specifically for the gay bear community. With over 10 million users worldwide and 200 thousand daily users (GROWLr, n.d; Hudson, 2020), GROWLr currently ranks third in the U.S. market, following Grindr and Scruff (Hudson, 2020).

Within gay culture, the term 'bear' denotes a distinct subculture characterized by a rugged, traditionally masculine appearance and demeanor. Individuals within this group may exhibit traits such as hairiness, muscularity, or a heavier build; however, the core of the subculture emphasizes authenticity and self-confidence (Taimi, 2022). GROWLr uniquely caters to this community by fostering a safe and inclusive platform where users can connect with others who share similar identities and values. The app offers advanced search and filtering functions, facilitating users' ability to find individuals with aligned interests and preferences. This strategy demonstrates how dating apps customize user experiences to address the diverse identities and

preferences within the broader MSM community.

Hornet – This app, founded in 2011 (Armand, 2017), serves as a platform for queer individuals within the LGBTQ+ community to connect and interact with one another. Hornet aims to create a global network that fosters support, community, and a sense of belonging among its 35 million users (Hornet Networks, 2019).

Furthermore, Hornet provides resources for finding testing locations, accessing information about PrEP, and engaging with other users on the topic of HIV status. The Favorites section includes a profile for AIDS.gov, assisting users in locating nearby HIV testing centres (Hornet, 2016). The Know Your Status (KYS) feature helps users find HIV testing locations and offers the option to disclose their own HIV status and set reminders for testing (Hornet, n.d.). It shows apps can serve not only as social platforms but also as tools for health communication and intervention, which aligns with the focus of this research.

Jack'd - Launched in 2010, Jack'd is a dating app that serves the LGBTQ+ community with a focus on promoting inclusion and diversity (Weise, 2016). It currently has over 5 million users spanning 2,000 cities in 180 countries (Jack' d, n.d.).

Initially developed by Online Buddies, a social networking company founded in 2001 by Jonathan Crutchley and Larry Basile, Jack'd shares its origins with Manhunt, another prominent gay dating platform (Weise, 2016). In 2019, the app was acquired by Scruff, a privately owned dating platform targeting homosexual and bisexual individuals, for an undisclosed amount (Montgomery, 2019). This consolidation reflects broader market dynamics where economic power and control are concentrated among large entities.

Manhunt – In 2001, Online-Buddies Inc. introduced Manhunt, one of the pioneer services in gay dating applications. As a platform designed to facilitate connections among gay, bisexual, transgender, and queer men, Manhunt has secured a significant place in the landscape of digital social spaces for these communities. According to available data, Manhunt boasts a user base of 6 million worldwide, with a substantial portion, approximately a quarter, originating from the United States (Whittaker, 2021).

MUSL – Introduced in 2020, MUSL is a gay dating app that offers users a distinctive experience by enabling them to create up to three separate profiles, tailored for socializing, dating, or meeting playmates. This feature allows users to manage their interactions effectively, as they can block other profiles once a connection is established, providing greater control over their engagement and visibility. For users in open relationships or those seeking third partners, joint profiles can also be created (MUSL, n.d.).

MUSL prioritizes user safety and privacy with features such as automatic location adjustments and a broad search function to facilitate wider connections. It supports global networking, efficient messaging, and includes a built-in usage timer. Additionally, users can report inappropriate profiles, contributing to a safer and more secure environment for the community (MUSL, n.d.).

RealMen – This app was introduced in 2018 and serves as an intelligent web platform for gay male dating. It has been developed by a specialised team with substantial industry expertise. RealMen offers a user-friendly experience across various devices. The platform is available free of charge and provides a wide range of features that are typically offered at a cost on other dating apps. Users can utilise the app to connect with friends and potential dates, engage in conversations, and share media content (RealMen, n.d.).

ROMEO – ROMEO, also known as Planetromeo or Gayromeo, was founded by Planetromeo GmbH in Berlin, Germany, in 2002. It functions as a social networking site for individuals identifying as homosexual, bisexual, or transgender, with a global user base exceeding 2 million. The platform facilitates various activities such as chatting, meeting new people, and engaging in dating. In Germany, it is commonly referred to as the 'Gay Registry Office' or 'The Blue Pages' reflecting its popularity among registered users. The team primarily consists of homosexual men (ROMEO, n.d.). ROMEO is accessible through both iOS and Android platforms, catering to users aged 18 and above. Additionally, a website version with identical features is available. The company's ethos centres around inclusivity and support for the global LGBT+ community, ensuring a safe and welcoming environment for all its members (ROMEO, n.d.).

SCRUFF – SCRUFF, founded in 2010 by Johnny Skandros and Eric Silverberg, is an independent dating and social networking app catering specifically to gay, bisexual, trans, and queer individuals. The platform boasts a global user base exceeding 20 million (Strudwick, 2016; Scruff, n.d.). Owned and operated by the LGBTQ+ community, SCRUFF prioritises user privacy and security while offering a range of features.

The app includes a video chat functionality, enabling users to interact virtually before meeting in person. Additionally, SCRUFF Explore offers information on LGBTQ+ events and travel, such as local upcoming events and noteworthy parties, pride celebrations, and festivals worldwide (SCRUFF, n.d.). Notably, SCRUFF launched a "Poz" community in 2013, specifically catering to HIV-positive users. Moreover, SCRUFF was one of the pioneering applications to provide specific choices for military personnel and transgender individuals (Queerty, 2013). By presenting these features and initiatives, SCRUFF aims to provide a safe and inclusive environment for its users, prioritising privacy and facilitating meaningful connections within the LGBTQ+ community (SCRUFF, n.d.; Queerty, 2013). Having outlined the specifics of the 13 chosen MSM social media dating apps, it is important to delve deeper into the intricacies of their functionalities, particularly concerning their capacity to deliver HIV-related features. It's notable that the integration of such features within these platforms varies significantly, with some apps offering a broader range than others.

Various MSM social media dating apps contain different HIV-related features. The number of app HIV-related features ranges from 1-9. Evaluating each MSM social media app in the sample, Adam4Adam, Grindr and Jack'd contained the greatest total number of features (n=9). The next highest was the Scruff app, which contained 8 HIV-related features. Table 5 showed a summary of what features were found on which app. A 'yes' (one) represented that the particular type of feature was found on the app, not how many times it was found. The last column showed the sum of types of features present on which app. The last row showed the sum of the types of features which appeared each time.

Table 5: Apps that contain HIV-related features

App	Features												
	Safety Practice	HIV status	Tribe Poz	Where to get tested	Last tested	Test reminder	HIV/Sexual health information centre	Link to outside organisation	Get support from health practitioners	Search filter: Safety Practice	Search filter: HIV status	Search filter: Tribe Poz	Number of types of features
Adam4Adam ^a	yes	yes		yes			yes	yes	yes	yes	yes	yes	9
Blued ^b							yes						1
Beuronline ^c									yes				1
Gayroyal ^d	yes												1
Grindr ^e	yes	yes	yes	yes	yes	yes	yes	yes				yes	9
GROWLr ^f	yes	yes								yes	yes		4
Hornet ^g	yes	yes		yes			yes	yes	yes				6
Jack'd ^h	yes	yes	yes	yes	yes	yes	yes	yes				yes	9
Manhunt ⁱ	yes	yes											2
MUSL ^j	yes												1
RealMen ^k	yes	yes			yes					yes	yes		5
ROMEO ^l	yes							yes					2
Scruff ^m	yes	yes		yes	yes	yes	yes	yes				yes	8
Number of appeared features	11	8	2	5	4	3	6	6	3	3	3	4	

MSM social media dating apps were found to vary in the number of HIV-related features. All 13 chosen MSM social media dating apps contained at least one HIV-related feature. Nearly half of those apps (six out of 13) have only one or two HIV-related features. The percentage of apps that contained safety practice features was (n = 11, 84.6%). Eight apps included HIV status feature (n = 8, 61.5%), six apps had an HIV/sexual health information centre (n=6, 46.2%), six apps included links to a third-party website (n=6, 46.2%), five apps included a where to get tested feature, four apps including last tested date (n=5, 38.5%), four apps included a search filter of tribe (n=4, 30.8%), three apps included a get support from health practitioners (n=3, 23.1%), three apps included search filter of safety practice (n=3, 23.1%), and three apps included a search filter of HIV status (n=3, 23.1%).

It was found that the most common functionality of HIV-related features within MSM social media dating apps was 'safety practice,' followed by 'HIV status.' Several apps mixed safety practice and HIV status information together, under HIV status options for users, such as HIV negative and on PrEP. A likely reason for this could be due to the fact that safety practices and HIV status are just selection information displayed on the profile. It can be considered relatively easy to deploy in apps. Nevertheless, these two HIV-related features are profile status information.

5.3 Discussion

MSM social media dating apps incorporate a variety of HIV-related features to enhance awareness and promote sexual health. These features include options for users to disclose their HIV status (e.g., HIV positive, negative, undetectable), details about safer sex practices (e.g., use of PrEP, condoms), and information on where to get tested. Some apps provide reminders for HIV testing, access to HIV/sexual health information centers, and links to external resources like HIV prevention organisations. Features like “Tribe Poz” allow users to connect with HIV-positive individuals. These features collectively support safer practices, education, and transparency.

The findings suggest that HIV-related features are infrequently integrated into MSM social media dating apps. However, when compared with data from earlier studies (Muessig et al., 2013), there appears to be a growing trend towards the inclusion of these features. This may indicate an increasing awareness or motivation to address HIV-related issues in this domain. It is important to acknowledge that digital platforms, including social media and dating apps, are dynamic systems that

continually evolve in response to societal, economic, and political changes (Mosco, 2009).

In the current study, approximately 30% of the apps (13 out of 44 downloaded and analysed) included some form of HIV-related content. This marks a significant increase compared to a decade ago when researchers found that only 17% of apps offered any HIV or STD-related information (Muessig et al., 2013). That earlier study identified 14 out of 84 apps available on both the Apple iTunes and Android Google Play stores as containing HIV/STD-related content. More recently, research evaluating the dissemination of health information to MSM in China found that 23% (10 out of 43) of apps provided HIV/STD information (Yang et al., 2019). The rise to 30% in this study not only reflects a notable increase in the inclusion of HIV-related information over the last ten years but also points to a positive trend of broader dissemination of such information through MSM social media dating apps.

This study identified that the most frequently integrated HIV-related features in MSM social media dating apps are 'safety practice' and 'HIV status.' A key factor contributing to the prevalence of these features could be the relative ease with which they can be incorporated into user profiles. As selectable information, these features are straightforward to implement and maintain, which likely explains their widespread adoption. Despite their simplicity, these features have significant implications for user interaction and the communication of health-related information within the app environment. By enabling users to display and view 'safety practice' and 'HIV status,' these features facilitate informed decision-making and foster a culture of responsibility and transparency. The prevalence of these features may also contribute to the normalisation of discussions around HIV status and safe practices, potentially helping to reduce the stigma surrounding these topics within MSM communities. Furthermore, the popularity of these features could indicate a strong user demand, with users recognising their value in promoting safer practices and raising HIV awareness. Consequently, the widespread inclusion of 'safety practice' and 'HIV status' may reflect both their ease of implementation and their perceived importance to the user community.

The widespread presence of 'safety practice' and 'HIV status' features in MSM social media dating apps can also be examined through the lens of the political economy of communication. The incorporation of these features reflects the power dynamics and

economic interests that shape the digital landscape. From an economic standpoint, the ease with which these features can be integrated into user profiles, combined with their minimal impact on app development and maintenance, suggests that they are a cost-effective solution. The widespread adoption of these features aligns with the economic interests of app developers and the broader digital platform industry. In a competitive market, such features may serve as key differentiators, attracting users and advertisers alike. The ease of implementing these features, without significant costs to app development and maintenance, makes them a profitable choice for developers. Thus, their prevalence may be driven by market considerations and profit-oriented strategies. Health initiatives aimed at reducing HIV stigma and promoting health awareness have further contributed to the normalisation of discussions around HIV status and safe practices. By integrating these features, apps create platforms that enable responsible communication and information exchange, consistent with broader public health goals.

Additionally, the adoption of these features can be seen through the framework of the uses and gratifications theory in the digital age. Users actively engage with media to fulfil specific needs and objectives. The inclusion of these features in user profiles reflects the proactive use of media tools to achieve goals such as promoting safer sexual practices and raising HIV awareness within the MSM community. This highlights the intersection of economic factors, user demand, and public health objectives in shaping the development of MSM social media dating apps.

Researchers have highlighted the importance of app features that provide local health resources, such as information on nearby clinics based on a user's postal code (Aliabadi et al., 2015). Despite this, many global MSM social media dating apps, particularly in New Zealand, lack such features. In this region, users are often directed to international websites instead of receiving local health resources. This lack of localised public health interventions contrasts sharply with the apps' capacity to precisely locate users through GPS technology.

Analysed through the political economy framework, this disparity reflects the tension between commercial objectives and public health potential. As commercial entities, these apps are primarily designed to maximise user engagement and economic viability. However, this profit-driven focus may limit the extent of public health support they provide. This tension is evident in the study's finding that two-thirds of

the apps examined do not include HIV-related features. The absence of these features could result from several factors, including technical limitations, lack of awareness or understanding of public health implications among developers, and economic considerations. It is essential to avoid concluding that this absence indicates a disregard for public health concerns by app developers. Instead, it may reflect business decisions driven by the goal of optimising profitability. These findings underscore the value of examining the dynamics of app development through a political economy lens, revealing the complex interplay between commercial goals and public health needs.

In a prior study, Sun et al. (2015) explored the viability and acceptability of using geosocial and sexual networking apps to disseminate information about HIV/STD testing to the MSM community. Their findings showed that 64% of participants considered these apps valuable sources of sexual health information. Furthermore, they demonstrated the role of these apps in connecting individuals with health services, with 26% of conversations with health educators leading to referrals for local HIV/STD testing. This research highlighted the potential for these apps to expand their role beyond social networking, transforming into tools for promoting sexual health.

Building on these findings, a pilot study by Kakalou et al. (2021) found that nearly 80% of users were inclined to take further action when encountering a web or mobile app designed for combined HIV prevention. This proactive response, including actions such as seeking additional advice or testing, underscores the importance of incorporating prevention information into these apps. This is consistent with the uses and gratifications theory, which emphasises the active and goal-oriented nature of media consumption, especially in the context of HIV prevention.

The value of app features is further demonstrated by research conducted by Yan et al. (2020), which examined the impact of partner notification features. Although only 37% of users utilised this feature, it significantly raised prevention awareness. This illustrates the potential of such features to not only contribute to HIV prevention but also to enhance sexual health awareness and encourage proactive behaviours. Collectively, these studies highlight the evolving role of users and the meaningful contributions that tailored app features can make in promoting health awareness and fostering proactive engagement.

5.4 Summary

The study reveals that MSM social media dating apps incorporate a variety of HIV-related features aimed at enhancing user health awareness and encouraging safer practices. These features, while variable across platforms, include core components such as HIV status disclosure, safety practice options, links to sexual health information, and testing reminders. The most observed features were HIV status disclosure and safety practice options, likely due to the ease of implementing these as simple profile selections. Apps such as Grindr and Jack'd also offer filters for finding users by safety practices or HIV status, adding functionality that supports informed decision-making and user transparency.

Additional features in some apps, like test reminders and “last tested” dates, aim to normalize regular HIV testing within the MSM community, addressing CDC-recommended testing frequencies for high-risk groups. Other resources, such as in-app links to HIV or sexual health information centers, provide educational support and empower users with knowledge on prevention and treatment options. However, while these features support public health objectives, only a fraction of MSM apps (about 30%) currently offer such options, indicating room for broader implementation to maximize impact on HIV awareness and prevention. The next chapter focuses on how usable, useful, desirable, accessible, findable, and credible the HIV-related features are. It applies the content analysis of HIV-related feature screenshots.

Chapter 6: Basic and Tedious but Accessible: Content Analysis of HIV-Related Features

In the previous chapter, nine HIV-related features within social media dating apps was presented and discussed. The study moves now to assessing the HIV-related features regarding how these MSM social media dating apps interact with users when it comes to HIV-related information. This chapter addresses the second research question: "How does the design and functionality of HIV-related features in MSM social media dating apps influence their usability for the users?" To answer this question, it was needed to operationalise the definitions of interactivity in a measurable way. To achieve this, the study utilised content analysis in conjunction with a user experience design framework (Morville, 2004) to investigate further the presentation of HIV-related features within the social media dating apps found in Chapter 5. The content captured presented as screenshots. The user experience design framework was a tool for understanding the data providing means to classify and measure the information of how the MSM social media dating apps' design and functionality impact user engagement and interaction.

6.1 Results: Instrumentation, operationalisation, and quantification of content analysis

The results presented in this chapter involve the instrumentation and operationalisation of the information extracted through content analysis, as well as the quantification of that information. The instrumentation is facilitated by the macros and variables integrated into the experience design framework. The major characteristics (macros) to be assessed are Usable, Useful, Desirable, Accessible, Findable, and Credible. The operationalisation is achieved through coding, while quantification is accomplished by computing the process of coding. Accordingly, the quantification of each variable is depicted as a graph illustrating what is found, which indicating areas of convergence and divergence in their answers, ultimately representing a comprehensive perception.

Usable

'Usable' pertains to the effective utilisation of an object, system, or resource for its intended purpose. It implies suitability and functionality, suggesting that the item can be conveniently operated or interacted with. To assess usability, three key variables

are considered: 'interaction' evaluates user engagement, 'interaction effort' measures the effort required post-interaction, and 'link to a third-party website' assesses the presence of hyperlinks to external institutions. These variables provide a nuanced perspective on usability, directly connected to the practical functionalities and interactive capacities of the system.

Regarding the 'interaction' variable of the coded screenshots, almost all had some sort of interactive function, while only a tiny fraction did not offer any visible interaction. Selecting 'visible interaction' was a conspicuous indication that an event would occur if that area were interacted. The variable 'interaction effort' had the most distributed answers in this macro. However, it was still heavily weighted on a single value.

Under the 'interaction effort' variable, the highest value 'provide standard information' scored around 78% on the screenshot coding. That implied that approximately four out of five parts of interactions were on selecting basic HIV-related information as status or search parameters, such as negative, positive, positive undetectable. The second higher score was the value 'not applicable', with around 15%. Thus, there was no action following the information and consequently no further effort. In last place, the value of 'interpersonal interaction' with a score of around 6%. Thus, the ability to contact in person, specifically, the feature identified as 'get support from health practitioners' in Chapter 5, seemed a rare functionality.

Regarding the variable 'link to a third-party website', most screenshots showed self-contained HIV-related information (around 89%). Moreover, around one in ten offered a uniform resource locator (URL) to a third-party page. Those third-party websites mainly focus on HIV/AIDS education, prevention, and support, such as Greater than AIDS, or TakeMeHome.

In summary, although most HIV-related features represented by the screenshots offered some interaction, the interaction was elementary. These interactions consisted of basic HIV-related information on user profiles or search parameters. Only a quarter (4 out of 13) apps provided a link to a third-party website. The ability to interact in person and obtain further or personalised information was seldom included. Direct contact with a public health specialist or health practitioner where personal questions could be sent, was only available on three apps.

The answer to how usable the MSM social media dating apps were, was mixed. Most

features were interactive, however, they only dealt with standard or basic information while falling short of connecting users to more specialised health-related resource centres and personal interactions. In general, and in the MSM social media dating apps' assessed versions, the apps were not usable as a medium to deliver HIV awareness information. However, they were usable when the information was limited to fundamental terms.

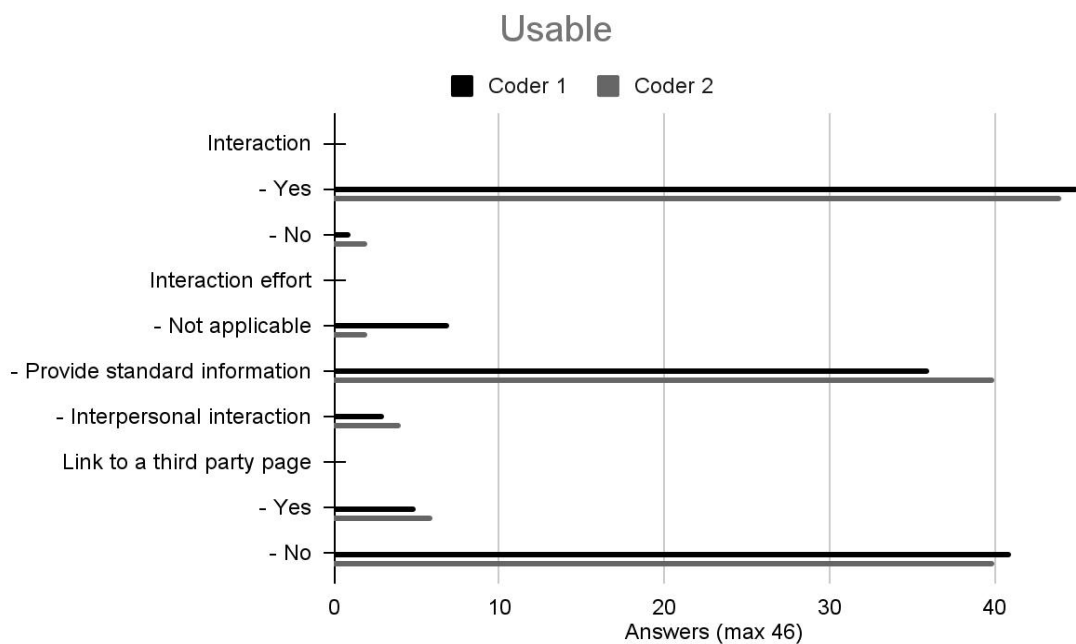


Figure 7: Coders' answers to the variables of Usable macro

Useful

The content of the images displayed elemental information about HIV. This macro is represented by the single variable "Educate." Basic information was the highest scored value on "Educate" with about 74%. That means most HIV information is brief, including terms or abbreviations. It seems logical once those terms often appear on profile and search parameters as described. Short terms are usually used on those selection features, which display several and, frequently, unrelated terms. Explanatory information was presented on 17% of the images. This number means that only a few images contains some sort of description of a term or acronym or question. Providing further information than descriptions was found in around 7% of the images, according to the scoring on value "Invite users to more knowledge." The number aligns with the features that make it possible to contact a health specialist using the app to ask personal questions.

Overall, the most apps (11 out of 13) have a feature where the information is basic. Once again, that may refer to their use on selection menus. Nevertheless, more than half of the selected apps, five exactly, explain or describe HIV terms or acronyms. Finally, only three apps provide a way to contact a public health specialist to clarify individual questions using email, forms submission, or direct conversation. Simply using HIV-related information loosely without further contextual knowledge or explanation has none or minimal impact on educating users about HIV. Additionally, more descriptive information is seldom, and access to individual question feedback is a limited feature. In conclusion, the apps fail to be useful to their users regarding HIV prevention and awareness.

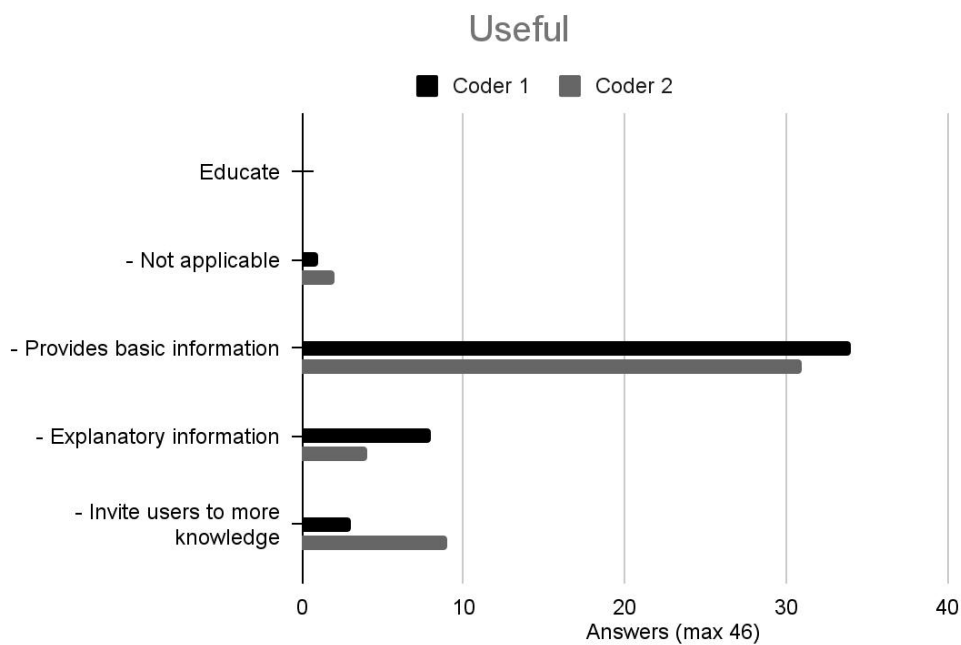


Figure 8: Coders' answers to the variables of Useful macro

Desirable

The term 'desirable' refers to something attractive, sought after, and possessing qualities that make it valuable. Desirability in design emphasises visual appeal and ease of understanding. To evaluate desirability, three key variables are considered: 'mode' assesses how information is presented (text, image, text and image, or video), 'dynamic' distinguishes between still and animated content, and 'colour' evaluates usability based on the color scheme (one colour, two colours, or three or more colours). These variables provide insight of what contributes to desirability in terms of visual aesthetics and information presentation.

The variable 'mode' determines what medium the feature uses to exhibit HIV-related information. Text is often clear and concise, making it easy to understand and communicate information effectively. However, text is a one-way form of communication and does not allow for interactive experiences. It can be less engaging than other forms of media and can lack the visual aids that help people understand complex concepts. The text was the most used mode. More than 93% of the information was delivered by text. Only nearly 7% of the information was delivered by text and image together. Video is a popular medium for delivering information, and its engaging nature sets it apart from other formats. The significant advantage of video lies in its ability to hold the audience's attention and make information more memorable (Kozma, 1991). This can be attributed to the multisensory experience offered by videos, combining audio and visual elements, which can greatly enhance the overall impact of the information. Choi and Johnson (2005) offer further endorsement of this concept, proposing that video-based education can effectively serve as a means to motivate learners by capturing their attention. Additionally, the standardisation of messages in videos could potentially enhance the fidelity of instruction implementation, leading to consistent and high-quality content delivery, as noted by Dusenbury et al. (2003). However, there was no video as a medium to carry the information. Screenshots containing diagrams or more educational content were missing. Only three apps (three out of 13) contained both text and image.

Under the 'dynamic' variable, the 'still' value was 100%. Animation possesses the ability to elucidate complex concepts and ideas, transforming them into engaging and entertaining content (Farmer, 2021). This unique approach not only simplifies intricate information but also renders it more approachable and captivating for the viewer. Furthermore, animation's dynamic nature serves to heighten the perceptual salience of the content, making it more likely to attract attention and thus become more impactful and memorable (Lowe & Schnotz, 2014). However, no animation is involved in the screenshots.

Colour has a significant impact on the usability of apps (Jonson, n.d.). Colour can also be used to visually organise information and highlight important elements, making it easier for users to understand and navigate the app. Under the 'colour' variable, nearly 98% of the HIV-related features used three or more colours in the design. Although the number of colours has been coded, the combination of those

was not. Thus, if the combination of colours creates a pleasant experience was not evaluated. Two percent of screenshots utilised two colours.

The results for 'desirable' were the most uneven among the multivariables. There were no videos, games, or any variety of multimedia resources to attract users' attention to HIV prevention information provided within apps. The apps failed in the 'desirable' macro, according to the coding results. Almost every piece of information was delivered in plain, standstill text, although colourful.

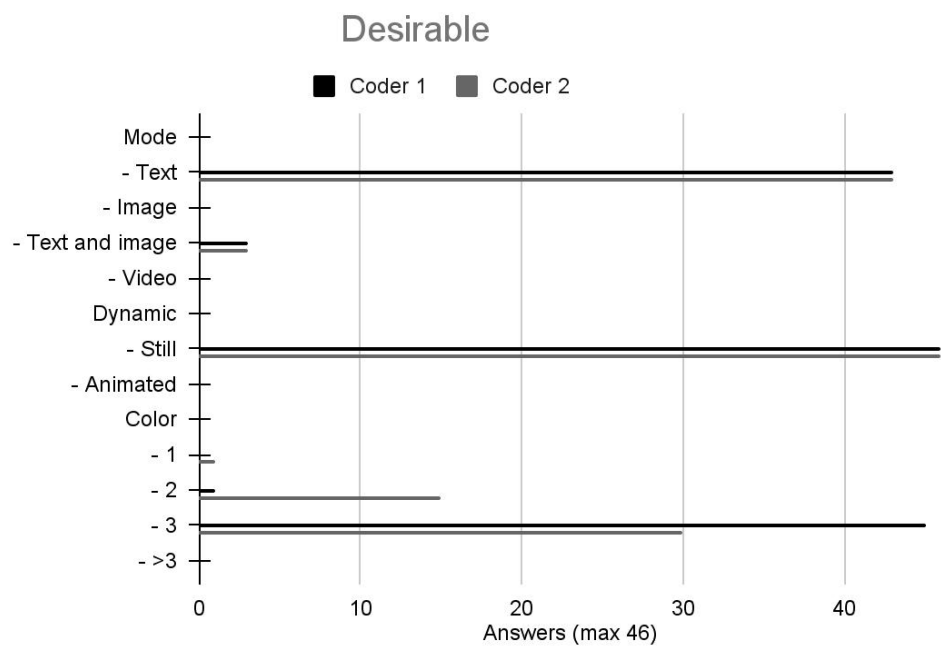


Figure 9: Coders' answers to the variables of Desirable macro

Accessible

'Accessible' refers to something easily reachable or available, minimising barriers to use. This applies to physical, digital, or conceptual access. When described as accessible, an object or concept is easily reached, entered, obtained, or understood. To assess accessibility, particularly in terms of visual effort, 'font size' is a key variable. It categorises text typeset into 'small,' 'normal,' or 'big,' providing insights into readability and user comfort. This variable offers a detailed understanding of accessibility, focusing on the ease of reading and user engagement with the text. The proper consideration of font size in mobile app design is an integral aspect of creating a user-friendly and accessible interface, which can significantly enhance the overall user experience (Guarana, 2019; App Master, 2022). The selection of comfortable font sizes can greatly affect the user's experience when interacting with the app, as

well as prevent eye strain and fatigue, leading to extended periods of use without discomfort. Moreover, the font size has a substantial impact on the overall design and aesthetic of the mobile application, contributing to a more professional appearance and visually appealing interface. This can result in increased user engagement and satisfaction. All screenshots coded displayed comfortable-sized fonts for reading. Therefore, the score of the 'normal' value was 100%. All screenshots coded contain text, even if mixed with images (sub-images), according to the variable 'mode'. Therefore, all apps utilised an accessible font.

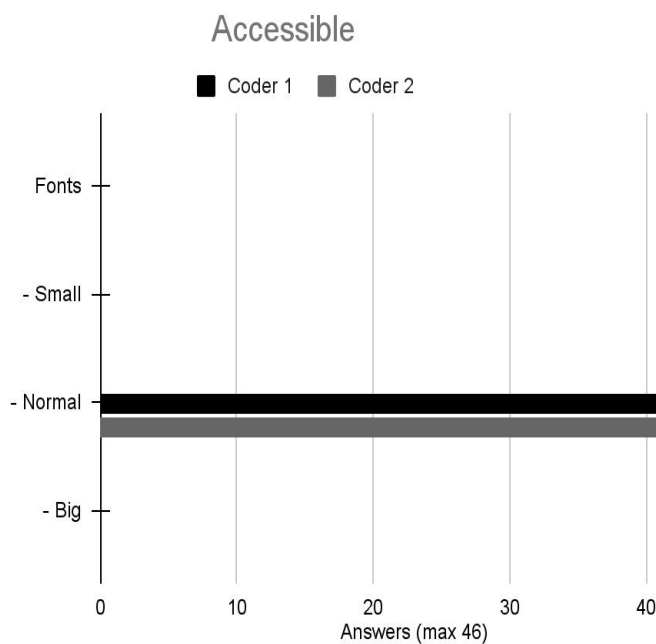


Figure 10: Coders' answers to the variables of Accessible macro

Findable

'Findable' refers to something easily locatable or discoverable, often with the help of search or organisational systems. It implies effective structuring and labeling for easy retrieval. In the context of HIV information, findability is crucial. To assess findability, the variable 'searchable' examines the presence of search mechanisms. It can be categorised as 'yes' (efficient search tool exists) or 'no' (lack of search tool hindering information retrieval). This variable offers a straightforward perspective on how easily users can access desired information.

According to Scacca (2019) and Dee (2022), the implementation of a search function in an app provides numerous benefits, such as enabling users to swiftly locate desired information without navigating through multiple menus or screens. This results in

significant time and effort savings, which can improve the overall user experience by decreasing the time needed to discover particular content. Furthermore, a well-designed search function can foster increased engagement, leading participants to spend more time using the platform, and contributing to user satisfaction by enabling more accurate and relevant results compared to manual browsing. Despite these recognised advantages, nearly 96% of the screenshots analysed did not contain a search function, accounting for the value 'no' for the variable 'searchable.' In the remaining 4%, the user can access a search mechanism. These results suggest that HIV-related information tends to be simple and basic, and thus the presence of a function to locate such information may not be considered necessary, as there is usually not much information shown.

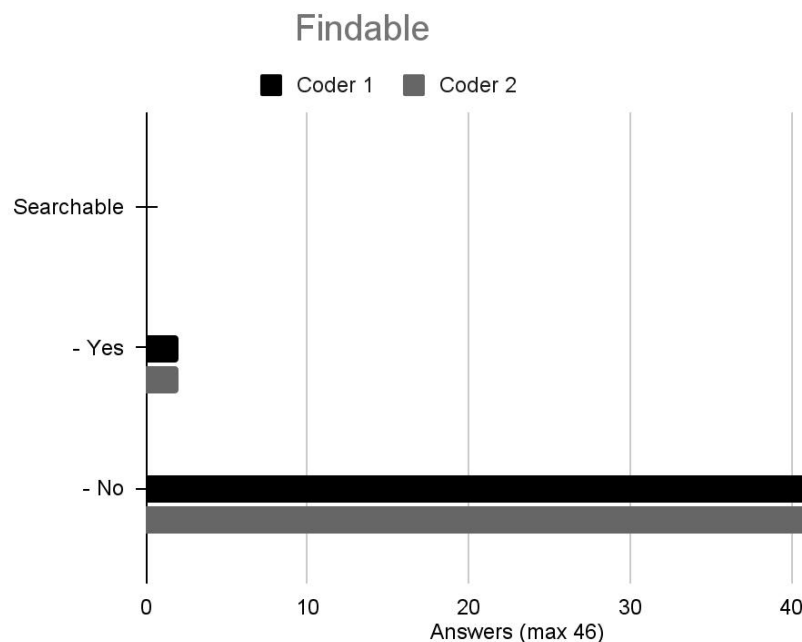


Figure 11: Coders’ answers to the variables of Findable macro

Credible

'Credible' refers to something trustworthy and reliable, crucial in the context of providing accurate HIV-related information through apps for education and awareness. To assess credibility, three key variables are used: 'reliability' gauges trustworthiness, 'error' evaluates accuracy in writing, and 'source' examines the origin of information. These variables offer a nuanced perspective, directly linking to the accuracy, consistency, and authenticity of the HIV-related information under examination.

The variable 'reliability' evaluated if the information presented on the screenshots coded was correct and detected the presence of misinformation. The value of 'correct information' scored approximately 91%. Overall, the HIV-related information was correct regarding its content according to the current scientific knowledge. Approximately 9% (four screenshots) did not apply to all other screenshots because the information was insufficient for the researcher to make a judgement. No screenshots have shown incorrect information. Among the four not applicable, two are screenshots that contain mix-use image and text ('mode' variable). One contained a hyperlink to where to get tested but not the results, and the other was a form where the user can type questions and ask health professionals specialised in HIV prevention.

In general, typos and mistakes often seem detrimental to the information's credibility. Those show a lack of attention and care to content production and overall low quality, thus creating doubt and untruthfulness in the users. The variable 'error' tallied mostly typographical errors, such as misspellings and incorrect abbreviations. However, the variable 'error' also included ambiguous abbreviations and incorrect word splitting. Nearly 80% are free of errors. The most common error was incorrect word splitting and incorrect abbreviation. Only around two per cent of misspelt words were found on the coded screenshots.

Some information was considered common knowledge, such as HIV status information of HIV positive, and HIV negative. However, some acronyms' meanings might not be apparent to most users, for example, TasP. When deeper explanations, data, or studies are required for clarification, a reliable source might be needed to establish credibility. The variable 'source' showed the most spread results among all variables. 'Common knowledge' ranked highest with just over 60%; 'Not applicable' scored nearly 21% of the results; and 17% of the screenshots coded cited an 'accredited source.' The sequence of the 'source' values seemed to align with the kind of HIV information previously observed. The basic and straightforward information used on multiple-choice menus and parameters was assumed to be common knowledge. Not available consists of screenshots with text and screenshot mode, short texts that link to outside websites, and screenshots with omitted sources.

The HIV-related information was credible in general. Incorrect information is absent. One single app contains a misspelt word or typo. Incorrect abbreviations appeared on

three different apps, which had errors in using large and small caps. Two different apps incorrectly split words where the word breaks at the end of the screen. A single app concentrates on the occurrences of ambiguous abbreviations. Both occurrences are in the use of 'BB' as a choice option. The ambiguity stands for the fact that 'BB' can assume the different meanings of baby, bareback, big brother, or bodybuilder. For instance, when asking for the user's safety practice, it may cause confusion when seeing the option 'BB'. Lastly, as most apps restrict their HIV information to basic, simple, and standard terms, the information source was unnecessary.

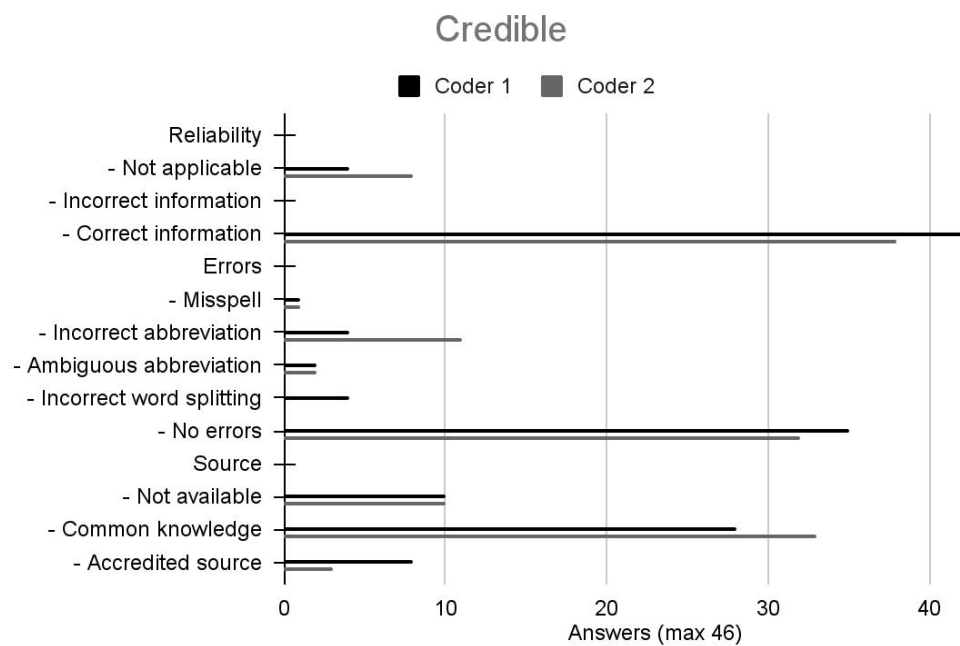


Figure 12: Coders' answers to the variables of Credible macro

6.2 Discussion

Interactivity in the realm of communication can be approached from multiple angles: as a process, which emphasises the ongoing dialogue between participants and showcases the reciprocal nature of their exchanges; as a function, where the focus shifts to the capabilities of platforms, highlighting how they enable this form of communication through their adaptability and responsiveness; and as a perception, which underscores the user's individual experience, centering on their unique and subjective sense of the interaction (McMillan & Hwang, 2002).

Many definitions prioritise the process or function aspects of interactivity, underscoring its dynamic nature in the digital communication landscape. Interactivity is an evolving concept shaping the manner in which information is communicated

and processed. This bidirectional or multidirectional form of communication fosters a deep connection between sources and receivers (Pavlik, 1998). Such engagement is not just about sharing; it's about understanding and participating actively. Interactivity's importance in enhancing communication is particularly pronounced in digital platforms, where user engagement becomes a critical marker of success.

Analysing the interaction in HIV-related apps reveals a two-fold approach: the app providing information to the user (e.g., locating nearby HIV test centres) and the user feeding information back into the app (e.g., updating HIV status). While the interaction might seem straightforward, many features present a simplistic form of engagement, often limited to basic information dissemination. One might find an HIV-related feature as mere text in a dropdown list, providing brief informational snippets.

Such an approach has its merits. By offering HIV-related details in standardised, short-term choices, users can convey their status transparently and allow easy comparison between peers. But this simplicity brings challenges. It can neglect depth, potentially glossing over nuances crucial for a complete understanding. Moreover, the utilisation of specialised jargon or abbreviations (like 'TasP') might perplex users, risking miscommunication. Reducing multifaceted details to short terms can dilute the message, causing misunderstandings, fostering incorrect assumptions, and leading to ambiguous communication.

An interesting observation was the stark contrast between these apps and the general trend in app development that leans towards enhancing user experience through increased interactivity and multimedia content. The HIV-related features in MSM social media dating apps seem confined mostly to information selection. There's an absence of more engaging elements like games, quizzes, and multimedia content such as videos. Past research has shown that multimedia and interactive elements can significantly bolster engagement and learning (Bledsoe, 2013; Cairncross & Mannion, 2001). The absence of such components might hint at missed opportunities to connect with users effectively. However, it's also possible that practical constraints, like development costs or concerns over data usage, influenced these design choices.

The pattern of presenting complex information through simplistic interactions is evident. While simplicity might make content accessible, it might also strip away valuable depth and context. An illustrative example is how certain apps redirect users

to external sites after a mere click, thus keeping the in-app interaction minimal.

The scarcity of comprehensive information from authoritative sources within these apps is concerning, especially considering the role of reliable information in HIV education and prevention. Renowned organisations such as the World Health Organisation and the Centres for Disease Control and Prevention offer updated HIV-related resources crucial for public awareness. Yet, a mere 17% of the examined MSM social media dating app screenshots referenced these accredited sources, pointing to a potential area of improvement.

The rise of the internet has indeed made HIV-related information more accessible, especially beneficial for those affected by the disease. As echoed by studies, a considerable portion of HIV-positive individuals turn to the internet for health information (Bledsoe, 2013; Cairncross & Mannion, 2001). Furthermore, research suggests that users also leverage MSM social media dating apps to gather health data (Chen & Ding, 2020).

The authenticity of HIV-related content is paramount. Misinformation can alter HIV-related behaviours and attitudes. Research underscores the significance of the reliability of information sources in influencing medical decisions (Chen et al., 2018). Misinformation can pose grave risks for those vulnerable to or living with HIV (Garett & Young, 2022).

While the use of multimedia resources seems underrepresented in these apps, their potential impact cannot be understated. A study by Grov et al. (2020) highlighted those advertisements combining text with images had a better reception than text-only ads. Yet, this research observed a predominant reliance on text in the examined HIV-related features, a deviation from trends suggesting users prefer content featuring relatable images (Vinjamuri, 2015).

Gamification can add another layer of user engagement. Incorporating game elements in non-gaming contexts, like educational apps, can enhance user interaction, motivation, and overall experience. A study conducted by Whiteley et al. (2018) investigated the efficacy of a mobile gaming intervention in enhancing adherence to antiretroviral therapy among young people with HIV. Participants engaged in a 45–50-minute iPhone game designed to educate about the treatment, motivate medication adherence, and cultivate the skills for consistent treatment regimen adherence. The

results highlighted the game's success in improving therapy adherence among its young HIV-positive participants. In a similar vein, LeGrand et al. (2016) detailed the development of a gaming application targeting young HIV-positive MSM. This game aimed to bolster adherence to antiretroviral therapy, underscoring the potential of electronic games in health education and promoting behavioural modification.

In sum, an initial assessment might paint a positive picture of the interactivity of HIV-related features in these apps, given the diverse features and largely error-free content. However, a deeper dive suggests a more nuanced narrative. While these apps do offer HIV-related insights, the nature of the content is often oversimplified. The interaction appears largely one-sided, with users primarily providing status updates. The limited depth, reliance on commonly known terms, and lack of engaging multimedia features highlight areas ripe for improvement.

In the context of the political economy of communication, media production can be influenced by market dynamics, advertising revenue, corporate ownership, and economic forces. The limitation observed in HIV-related content within MSM social media dating apps, such as oversimplified information and a lack of engaging features, can be attributed to economic factors, particularly within the context of capitalist societies. Media institutions, in their pursuit of maximising profit, may prioritise cost-cutting measures and simplified content that caters to a wide audience. This prioritisation often comes at the expense of producing comprehensive and informative material, which requires more resources and expertise to develop. Moreover, corporate ownership and market competition can further impact the allocation of resources for content creation, potentially contributing to constraints on the development of more engaging multimedia features.

6.3 Summary

This chapter examined how the design and functionality of HIV-related features in MSM social media dating apps influenced user interaction and usability. The findings indicated that while these features provide basic information, they lacked depth, multimedia integration, and opportunities for personalised interaction — elements essential for effective HIV prevention communication. By identifying these gaps, the chapter proposed specific improvements to app design aimed at enhancing user engagement and health outcomes. These implications underscored the need for user-centered development strategies that align with public health objectives. The next

chapter will focus on user perceptions of these features, providing insights into their effectiveness and identifying potential areas for improvement.

Chapter 7: Still a Long Way to go: Users' Perception of HIV-Related Features

This chapter is primarily focused on examining the perceptions of app users regarding HIV-related features within MSM social media dating apps. The study explores the experiences of 15 users of MSM social media dating apps, specifically focusing on their understanding and interpretation of the HIV-related features presented in these platforms. This chapter aims to respond to the third research question: "How do app users perceive HIV-related features within apps?" A series of interconnected themes that surfaced from the interview data are presented. The findings are systematised into two primary sections: users' experiences with MSM social media dating apps and their perceptions of the HIV-related features within these apps.

The initial segment of this chapter explored app users' experiences, encapsulating motivations, patterns of use, and concerns. Comprehending these experiences is instrumental for probing further into perceptions related to HIV-related features. The subsequent section examines users' attitudes towards HIV-related features, encompassing their perceived significance and the reliability of these apps as sources of HIV-related information.

7.1 Overview of interview findings on user experience

This section provides an overview of the interview findings on user experience, covering three key aspects. Firstly, it explores the motivations driving individuals to use MSM social media dating apps. Secondly, it examines the patterns of app usage among the participants, shedding light on their engagement levels and behaviours, as well as the diversity within the MSM community's digital dating practices. Lastly, the section addresses the concerns expressed by the users, shedding light on their apprehensions and considerations. Together, these findings offer valuable insights into the multifaceted nature of user experiences within the context of MSM social media dating apps. Gaining insight into users' awareness, knowledge, and attitudes towards HIV-related features on MSM social media dating apps is possible by exploring their experiences with the app.

7.1.1 The motivation for using MSM social media dating apps

The participants were asked to discuss their motivation for using MSM social media dating apps. The interviewees used MSM social media dating apps for various reasons. They used the app mainly for: (1) finding sexual partners, (2) meeting new friends, (3) chatting, and (4) looking for romantic partnership.

Finding sexual partners

The primary purpose reported by participants for using MSM social media dating apps was to seek sexual partners. This was particularly emphasised when discussing the use of Grindr. This finding aligns with the existing research on dating apps. Chan (2017b) and Licoppe et al. (2016) point out that dating apps provide several affordances that make them an appealing option for individuals looking to connect with potential partners. These affordances include mobility, proximity, and immediacy. Mobility refers to the fact that dating apps can be used on smartphones and accessed anywhere at any time. This allows users to connect with potential partners and makes it easy to communicate and connect with others even when they are not physically in the same location. Proximity refers to the use of GPS technology to connect users located in the immediate vicinity. It shows others located in the same area, helping users find and connect with potential partners who are nearby (Grosskopf et al., 2014). Immediacy refers to the promise of quick or instant sexual encounters offered by some dating apps. This can be especially appealing to individuals who are looking for casual or no-strings-attached relationships.

Participants echoed similar motivations in their responses. When asked to explain their motivation for using the app, the majority emphasised casual desires.

For instance, Justin (31 years old), who was in an open long-distance relationship, simply puts it as, "It was more about hooking up". This sentiment of seeking casual sexual encounters resonates with other participants like Jonathan (24 years old), Brian (58 years old), Eric (33 years old), and Nicholas (32 years old), all of whom expressed a similar drive for temporary hookups and no-strings-attached relationships.

This behaviour mirrors findings from studies like Goedel & Duncan's (2015), which reported that 38.0% of their participant base in Atlanta, U.S. used geosocial-networking apps to meet men for sexual encounters. Similarly, Holloway et al. (2014) found that gay men primarily used dating apps to look for casual sex. Macapagal et

al. (2018) reported that 52.5% of adolescent MSM in America used MSM-specific apps for the same purpose. In a recent study carried out by Zervoulis et al. (2020), almost half (49.2%) of participants reported using gay dating apps to seek sexual encounters.

Applying the Uses and Gratifications Theory sheds light on the motivation behind individuals seeking sexual partners through MSM social media dating apps.

The 'uses' aspect of U&G theory aims to elucidate why individuals choose MSM social media dating apps over other alternatives (Cheung et al., 2009). Within this framework, participants actively seek out and engage with these apps to satisfy their specific sexual needs and desires. By utilising these platforms, individuals gain access to a network of potential sexual partners, fulfilling their need for sexual gratification. These apps serve as a convenient and efficient medium for information seeking, enabling users to browse profiles, view preferences, and engage in conversations to identify suitable partners for sexual encounters.

The increasing trend of seeking casual sexual encounters via MSM social media dating apps, as indicated by the interviews and supporting literature, necessitates attention due to potential public health implications. Such behaviour may heighten the risk of HIV transmission and other STDs, particularly if safe sex practices are not consistently observed. This raises the potential need for dating apps to incorporate HIV-related features and information, fostering an environment conducive to informed, safer sexual encounters.

Understanding the main purpose of using MSM social media dating apps, such as finding a sexual partner, is important because it allows for targeted interventions and strategies related to HIV prevention. By recognising this purpose, app developers can implement effective measures to promote safe sexual practices, provide education on HIV transmission and prevention, and facilitate access to testing and treatment options. These interventions can help mitigate the risks associated with casual encounters facilitated through dating apps.

Considering the increasing usage of MSM social media dating apps for finding sexual partners, there is an opportunity to incorporate HIV-related features within these platforms. These features can include information on safe sex practices, HIV testing locations, and resources for HIV prevention and treatment. By integrating such

features, dating apps can play an active role in raising awareness and promoting behaviour that reduces the transmission of HIV and other STDs.

Meeting new friends

The 'gratification' aspect of U&G theory aims to explain what people pursue in the apps that satisfies their requirements and results in ultimate gratification (Whiting & Williams, 2013). Contrary to the common notion of dating apps being primarily used for casual sexual encounters (LeFebvre, 2018), research has increasingly highlighted their use for a variety of social purposes (Albury & Byron, 2016; Duguay, 2019; Pond & Farvid, 2017). This study supports this broader view, revealing an alternate motivation among users – networking and forming new friendships. This was particularly prevalent among the MSM participants, who considered the apps a useful tool for meeting new people without having to ascertain their sexual orientation upfront.

For example, Tyler (28 years old) and Jason (33 years old) both found dating apps helpful when moving to a new location and wanting to make friends within the gay community.

As Tyler said: "Whenever you move to a new location, probably want to meet new friends, especially gay friends, so you can turn on Grindr looking for friends". (Tyler, 28 years old)

The ability to meet new friends through dating apps can be particularly valuable for individuals who have recently relocated or lack a strong sense of community offline. By connecting with others who share similar backgrounds and experiences, MSM individuals can develop a sense of belonging and foster friendships.

In a similar vein, Michael (29 years old) shared that dating apps, particularly Grindr, provided a more accessible platform for initiating conversations compared to traditional social settings. He emphasised the difficulties gay men might face in such settings, such as determining a person's sexual orientation and gauging their interest.

For many MSM individuals, making new friends can be difficult due to stigma and discrimination. Traditional social settings may not provide a welcoming or accepting environment, making it challenging to find others who share common interests or

identities. By contrast, dating apps offer LGBTQ+ communities where individuals can find support, validation, and social connections. These apps offer a secure and inclusive environment for individuals to connect with others who share similar identities and experiences (Doty et al., 2010; Pingel et al., 2013). They become especially significant for those who may feel socially marginalised or lack a strong sense of community in their offline lives (Chan, 2019; Fitzpatrick et al., 2015).

In conclusion, users also engage with an MSM social media dating app for the motivation of making new friends. By facilitating both online interactions and socialisation, dating apps play a role in cultivating a sense of community and making new friends.

Chatting

The third motivation that emerged from the research participants for using MSM social media dating apps revolves around communication. In other words, it pertains to the straightforward desire to engage in conversations with others.

The design of these apps seems to facilitate this interaction, offering a user-friendly interface that encourages conversation. Participants, including Ryan (31 years old) and Michael (29 years old), convey the value they find in these exchanges, emphasising both the ease of interaction and the significant social opportunities offered by the apps.

For Ryan, the appeal is in the app's intuitive design and the community it builds, he notes:

"You can see the photos and there are descriptions as well. And it's easy for you to use that because you can just message them right now. [...] It is easy to chat with people and you meet a lot of people as well. App is like a community." (Ryan, 31 years old)

His experience echoes the sentiment of the digital community that these platforms tend to nurture. Similarly, Michael speaks about the positive experiences derived from such interactions, "I've had a lot of positive life experiences... I think if I never had access to Grindr, I would've had a lot less interactions with other gay men". His

experiences hint at the significant role these apps play in amplifying social encounters within the MSM community.

In all conversations, the opportunity to connect with new people beyond romantic or sexual encounters emerged as a central theme. Without hesitation, participants emphasized that dating apps offered a wider array of potential connections than traditional dating methods, which enhanced their appeal. Additionally, the perception of these platforms as communities provided users with a sense of belonging and validation, further promoting their use for casual interactions.

Looking for romantic partnership

While most of the participants in this study used MSM social media dating apps primarily for casual encounters, several expressed a different motivation: the pursuit of romantic relationships. This outlook is well encapsulated in the sentiments of Kevin (21 years old), who straightforwardly states, "For me, it is finding a romantic partner", and Samuel (26 years old) who is looking to "go on dates, to find long-term romantic partnerships". The same motivation holds true for Christopher (43 years old), who is also seeking a "potential long-term relationship". This quest for romance through these apps aligns with prior research exploring similar motivations (Rice et al., 2012; Van De Wiele & Tong, 2014).

This romantic pursuit is not merely theoretical. For some participants, MSM social media dating apps have served as successful platforms to establish serious romantic relationships. Eric (33 years old), for instance, attributes a past long-term relationship of 3.5 years to his use of Grindr. He affirms, "Previously, I have tried using them to find a partner and it has worked. I had a 3.5-year relationship with somebody I met on Grindr. So, it can work". His experience provides a positive view of dating apps as feasible mediums for finding a lasting partner, challenging any narrative suggesting these apps serve exclusively for transient or casual connections.

A similar sentiment is echoed by Michael (29 years old), who recounts, "I've met 2 out of three of my boyfriends on Grindr". Clearly, the app has played a substantial role in his romantic life, underscoring its potential to foster meaningful relationships. These narratives suggest that, contrary to some preconceptions, dating apps can be a crucial catalyst for long-term relationships for some individuals.

7.1.2 App usage

In the exploration of dating app usage patterns among the study participants, a broad array of MSM social media dating apps was utilised. Notably, the majority of participants reported having active or previous accounts on various platforms. This finding aligns with prior research, signifying diverse app usage within the MSM demographic (Goedel & Duncan, 2015).

Grindr emerged as the most prevalent platform amongst participants, in line with previous research demonstrating its predominance in the MSM community (Badal et al., 2017). Tinder was identified as the second most commonly used application.

Notably, participants primarily associated Grindr with casual encounters, whilst viewing Tinder as a platform for pursuing potential romantic relationships. This illustrates the divergent intentions behind the use of different platforms. Furthermore, participants reported using a range of other applications, highlighting the diversity within the MSM community's digital dating practices.

In interviews, participants explained their preference for Grindr over other platforms. For example, Ryan (31 years old) stated, "Hornet, I feel that there are fewer users compared to Grindr [...] It's challenging to handle multiple apps, so I prefer to concentrate on one". Similar sentiments were expressed by Brian (58 years old) and Jason (33 years old), who predominantly used Grindr for their online dating activities.

The participants' extensive engagement with these apps was evident from their accounts. Andrew (27 years old), for instance, commented on the time-consuming nature of these platforms, stating, "You end up spending significant chunks of your week on these platforms". Both Ryan and Justin also acknowledged the substantial time commitment these platforms demanded.

The high level of engagement was evident in the routine of frequently checking the apps throughout the day. For example, Michael (29 years old) admitted to checking these apps multiple times daily, a habit which extended into working hours. Similarly, Jonathan (24 years old) reported checking the app frequently throughout the day to review messages and monitor nearby users.

The impact of app usage on their daily routine was significant to the extent that some participants, such as Eric (33 years old), felt compelled to temporarily delete the apps.

As Eric explained, "Sometimes I delete them for a while just to give myself freedom. I feel like I'm getting too invested in them or they're taking up too much time". This decision highlights the integral role dating apps play within the daily lives of MSM users, underscoring their significant influence and importance.

7.1.3 Users' concerns

While there are certainly many advantages to using dating apps, such as convenience and a wider pool of potential partners, there are also several aspects that are potentially harmful. During the interview, the participants were queried about their apprehensions in using MSM social media dating apps. Numerous worries have been articulated regarding their usage. After conducting a thorough analysis of the interview data, five themes emerged. The themes are: (1) fraud/catfishing; (2) getting unsolicited messages; (3) pictures getting stolen; (4) safety; and (5) security problems. While the discovered finding may not have a direct and strong relevance to the research topic, it nonetheless presents an intriguing aspect of the perceived risks in using dating apps nowadays.

Fraud/catfishing

"Catfishing" is a term which references the film 'Catfish' (Joost & Schulman, 2010). It was described as "the current internet trend of creating and portraying complex fictional identities through online profiles" (Nolan, 2015, p. 54). Fraud or catfishing appeared to be the participants' biggest concern while using the MSM social media dating apps.

Tyler (28 years old) expressed the concern: "There are people using this app to do illegal stuff, fraud, or something like this". Another participant, Christopher (43 years old), elaborated on the uncertainty that accompanies the use of these apps, stating, "You don't know if that person's real or not. In this way, we have the term catfish, someone who's just playing with you".

Samuel (26 years old) provided a detailed account of such an experience, describing how seemingly genuine profiles can turn out to be scams. "Its profiles and features are seemingly human, but in the profile, you only see links and websites of this insert page that are clearly like copy paste online. That's a clear scam".

This category of deceptive practices underscores the significant risk users face in the

digital dating landscape, demonstrating the need for effective countermeasures and increased user awareness.

In the context of dating, where emotional connections are often quickly formed, the discovery that these connections are based on false identities can lead to disappointment and mistrust when the truth is eventually revealed (AnKee & Yazdanifard, 2015; Joomratty, 2019). This corresponds with previous research conducted by Lauckner et al. (2019), over half of participants noted instances of deception or catfishing in the context of online dating, gay men were occasionally deceived by fake images on online dating platforms.

The trust erosion stemming from catfishing not only impacts the immediate interactions but also has a ripple effect on the broader landscape of HIV prevention. Trust is one of the factors on an individuals' willingness to share health information (Qin, 2022). Catfishing incidents may erode trust in online interactions, making it more challenging for MSM who use social media dating apps to have honest and open conversations about HIV status and sexual health. This can lead to negative impacts on HIV prevention efforts.

Getting unsolicited messages

Another commonly reported issue among participants was the receipt of unsolicited communications, including explicit pictures and messages.

When asked about this concern, participants shared how the anonymity provided by the internet emboldens individuals to behave in ways they might not in face-to-face interactions, thus negatively impacting the user experience on dating platforms.

As Kevin (21 years old) highlighted: "Some individuals send unsolicited pictures, which can be quite inappropriate. It's frustrating, as this is what can happen when people are given complete freedom to do so".

One participant, Christopher (43 years old), described the explicit nature of these unsolicited pictures: "They immediately send you explicit images". As a response, he chose to block individuals who engaged in such behaviour.

Similarly, Tyler (28 years old) voiced his experiences of receiving unsolicited messages, particularly from individuals under the influence of alcohol: "There are

many drunk messages. It seems a number of people use this platform as a 'drunk messenger,' indiscriminately sending messages". His tone conveyed irritation, as he described the messages as both disruptive and unwelcome.

These experiences shed light on the unfortunate downside of digital dating platforms, where the potential for misuse and violation of personal boundaries can be a significant drawback for users.

Pictures getting stolen

With the rise of social media dating apps, sharing, and viewing personal photos have become convenient. Yet, this facility is a double-edged sword, as it opens avenues for theft of these personal images. Participants expressed concerns about the potential misuse of their photos. As one interviewee, Ryan (31 years old), explained: "My primary concern is that someone might use my photos. On Grindr, we share pictures, or we have our profiles which can be easily screenshotted. Those images could then be used in someone else's profile".

Echoing similar apprehensions, Benjamin (32 years old) added, "People can steal your photos from these platforms. Once your photo is shared, it's essentially out there for anyone to use". These concerns highlight the issues around digital privacy and the potential risks associated with sharing personal images on these platforms.

Safety

Another critical concern voiced by participants centres around safety. Notwithstanding that most dating app users have benign intentions, some incidents of violence and harm inflicted on users have been reported who've met offline after online interactions (Gillett, 2018; Choi et al., 2018). These cases accentuate the importance of being cautious and prioritising personal safety when moving online relationships into the physical sphere.

Recalling this experience is a challenge to Nicholas:

"I had a bad experience once when I met someone on Tinder. We initially went up for a drink, so when we were drinking, it was fine and then he came back home and then we are watching a movie and then we were kissing which is fine. But

then he wanted to do something more, and I'm like. No, I don't want to do it, but he is very forceful. It was almost like sexual assault, so I am very scared. I mean, it could have happened on Grindr, could have happened on Hinge."
(Nicholas, 32 years old)

Such instances have led many participants to develop individual strategies to safeguard themselves. Christopher (43 years old) shared his tactic, "I want to ensure my safety. Grindr offers several safety tips. They recommend, for instance, always meeting in a public place. I learned these tips while using the app, which was beneficial".

On the other hand, Brian relies heavily on intuition to maintain his safety and being wary of potential negative experiences while using these apps:

"I tend to use my intuition a lot. If I am talking to somebody or messaging someone, we decide we want to hook up. I will get okay. And then I might drive to where they are. And if on the way on either driving there or even if I get there, I might suddenly get the feeling this is not right. So, I will either message them and say, I'm sorry, I'm not going to come or it has happened a couple of times where he got to the person's house, even got naked and then said to them, no, I'm sorry, I have got to go. It doesn't feel right. So, I have got to go. Yeah. So use my intuition a lot, and I feel that keeps me safe. Yeah, that's the thing. I know some guys that have bad experiences."
(Brian, 58 years old)

These findings suggest that the participant actively navigates the uncertainties and potential risks associated with using dating apps, demonstrating a proactive approach to their own safety. Safety concerns in the context of dating, particularly when using MSM social media dating apps, are closely linked to HIV prevention. Engaging in casual sexual encounters without proper precautions and awareness can increase the risk of HIV transmission. Given the potential risks associated with social media dating app usage, it is crucial to promote safe and responsible behaviours among app users.

Security problems

In addition to safety concerns, security issues are another significant concern when it comes to using MSM social media dating apps. Users often worry about the vulnerability of their personal information and the potential for unauthorised access or hacking.

As Tyler (28 years old) shared: "The security consists merely of an email address and a single password, which can be easily hacked". The quote from Tyler (28 years old), draws attention to the potential vulnerabilities in security measures on dating platforms. This raises concerns about data breaches and the misuse of users' personal information. These concerns resonate with the discoveries of Gibbs et al. (2010), who investigated the apprehensions of heterosexual individuals utilising online dating platforms. Their study delineated three main categories of concerns: privacy and security, misrepresentation, and acknowledgment.

Adding to Gibbs et al.'s work, Corriero and Tong (2015) conducted a study that focused on the concerns of Grindr users. In addition to the issues outlined by Gibbs et al. (2010), they uncovered unique challenges faced by Grindr users. These included the misrepresentation of health and serostatus information, as well as the risk of social stigma and judgment, including instances of slut-shaming.

The findings regarding the concern for security issues among users of MSM social media dating apps resonate with the privacy and security worries identified by Gibbs et al. (2010) in their study of web-based dating platform users. The vulnerability of personal information and the potential for unauthorised access or hacking, as highlighted in the research, parallels the overarching concerns about privacy and security in online dating environments.

It highlights a significant issue with the level of security on web-based dating platforms, indicating that the measures in place to protect user information are often inadequate. Specifically, the reliance on nothing more than an email address and password for login credentials, a practice that poses a serious vulnerability. Hackers can easily gain access to these accounts by exploiting weak passwords or using phishing tactics to trick users into revealing their login information. Such data breaches not only compromise personal information, but also put users at risk for identity theft, financial fraud, and other forms of online victimisation. Furthermore,

malicious actors can use the data gleaned from these breaches to engage in social engineering attacks that manipulate users into disclosing additional sensitive information or engaging in harmful behaviours. These concerns indicate a pressing need for improved security measures on dating platforms, such as multi-factor authentication or stronger password requirements, to protect users and maintain the integrity of their personal information.

All participants agree that MSM social media dating apps offer a convenient and effective platform for potential partners to connect. However, they also come with potential drawbacks. From the risk of catfishing, receiving unwanted pitches, to concerns over safety and security, the necessity for users to be aware of these risks and take precautionary measures cannot be overstated. Simultaneously, it is incumbent upon developers to forge safer and more inclusive spaces for their users, proactively mitigating potential risks and improving the overall user experience.

The first part of this chapter, which examines participants' motivations, general usage patterns, and concerns, forms the foundation for the latter sections. Understanding these elements was a crucial initial step. It sets the stage to comprehend the context within which users interact with the apps, establishing their behavioural patterns and underlying motivations that might influence the way they perceive and use HIV-related features. It was essential to explore these general usage aspects first, as they provide a broader context that could impact the participants' reception and interpretation of HIV-related features. The following sections focus on the participants' perceptions of the HIV-related features of MSM social media dating apps, a more specific aspect of their usage experience.

7.2 Perception of HIV-related features

Participants were prompted to elaborate on specific HIV-related features incorporated within the dating apps they were aware of during their usage and to express their perspectives on these aspects. The responses elicited from the participants offer invaluable insights into end-users' perceptions of these HIV-related features. Grasping users' viewpoints holds the potential to inform enhancements tailored to cater to user needs more effectively. Furthermore, these insights could facilitate the normalisation of HIV-related features within MSM social media dating apps, fostering a more inclusive and health-conscious digital environment.

7.2.1 Overall positive attitude

The participants in this study had a positive attitude about HIV-related features within MSM social media dating apps. All of them were aware of certain kinds of existence of HIV-related features and the majority thought it was important to contain HIV-related features within MSM social media dating apps.

7.2.1.1 Awareness of the existence of HIV-related features

The participants were asked to share their observations of HIV-related features or information within their use of the platforms. Participants answered that they have noticed HIV-related features and information when using MSM social media dating apps. They articulated their discoveries as follows:

Kevin remarked:

"Grindr, it's actually possible to put your HIV status, and also, if you have been tested for HIV and if you're on PrEP or HIV medication, which I think is really cool and Tinder does not have that which I think it could add." (Kevin, 21 years old)

Michael (29 years old) also shared, "The profile permits you to disclose your HIV status, and even when you were last tested". Discussions about HIV-related features on dating apps were common throughout the research process. For example, during volunteer work at the Burnett Foundation Aotearoa, where the researcher frequently interacted with members of the MSM community, such discussions were often raised in casual conversations.

When interviewed for the study, Andrew (27 years old) lauded Grindr's initiatives, "Grindr certainly has abundant HIV prevention information. You can update your profile to reflect your status. It's commendable that they have reminders for check-ups, alongside numerous ads and promotions aimed at ending HIV".

Interestingly, only one participant claimed not to have noticed these features in the beginning. However, upon further exploration, it was revealed that the participant had actually become aware of the existence of HIV-related features. He did notice that some users have HIV status information on their profiles.

The fact that all participants recognised the presence of HIV-related features suggests

that these features are prominent and noticeable to users, indicating a higher likelihood of user interaction with them.

7.2.1.2 Perception on different HIV-related features

In the analysis of respondent feedback, the most frequently cited HIV-related features were HIV status, test reminders, last tested date, and HIV-related content advertisements. These three primary features were often displayed prominently within user profiles, accounting for their heightened visibility and participant awareness. This outcome aligns with expectations based on the ubiquity of these features in the app settings. Notably, most of the respondents gravitated towards the cost-free version of the application. Throughout the conducted interviews, only a single participant expressed willingness to pay for the premium subscription, although they also indicated an intention to discontinue this subscription shortly. The preponderance of users opting for the free version results in the inevitability of encountering in-app advertisements, typically appearing as pop-up prompts. Furthermore, additional HIV-related features were also mentioned by a subset of participants, for instance, 'getting support from public health professionals' and 'tribe of POZ.' The ensuing sections delve into the participants' interactions with these HIV-related features, focusing on their experiential accounts and perspectives regarding these aspects in their usage practices.

HIV status

The HIV status feature, prevalent in MSM social media dating apps, was identified by all 15 research participants. This feature allows individuals to disclose their HIV status, an element highly praised for its brevity, simplicity, and user-friendly nature. Ryan (31 years old) appreciated its succinctness, stating, "For me, it's sufficient because it's a brief and concise message".

The utility of the feature is heightened by its straightforward design. Jonathan (24 years old) and Andrew (27 years old) both underscored the clarity of the dropdown options and the minimised risk for user error. Jonathan (24 years old) detailed, "It's just HIV positive, HIV negative, short, small options... it's very easy to use". This reflects users' preference for efficient and uncomplicated features.

The complexities surrounding HIV status disclosure elicited a spectrum of perspectives. Most participants, like Nicholas (32 years old), championed

transparency, likening non-disclosure to withholding information about a COVID infection before visiting someone's home. He argued that health status sharing should not be stigmatised. A personal experience where a previous Tinder partner informed him of a positive Chlamydia test reinforced his belief in the necessity for such conversations for public safety.

Tyler (28 years old) mirrored this sentiment, emphasising his commitment towards responsible sexual health management. He said, "I wanted to be responsible for myself and other people I have contact with. So, I always update my status after each test". Andrew (27 years old) regarded such openness as indicative of a potential partner's responsibility and safety.

However, the importance of personal comfort and choice in status disclosure was recognised. As noted by Jonathan (24 years old) and Brandon (29 years old), not everyone might feel comfortable sharing such information. Thus, while HIV status transparency on these platforms is commended for its potential benefits for public health and stigma reduction, the right to withhold this information should also be respected.

These findings provide a user-centred perspective on the design and implications of the HIV status feature in MSM social media dating apps. The nuanced viewpoints further enrich the understanding of user attitudes towards HIV-related features and their broader societal implications.

Last tested date

Eight participants noticed the last tested date feature. During app usage, the last HIV test date is the kind of information that needs to always be updated in the app.

As a vital feature of the app, the last HIV test date informs both personal decision-making and the interactive digital health space. This user-led expectation of data upkeep intersects with app design, requiring a greater emphasis on features that support regular updates and counteract forgetfulness, a key barrier identified by Michael (29 years old). He emphasised the distinctive nature of this dynamic data element, contrasting it with static or auto-updated personal data like gender or age.

However, while this data upkeep is critical, it presents unique challenges for the users. As Michael (29 years old) states, "There are people who don't update it because they

just forget". This points to an opportunity for app developers to enhance the effectiveness of such features through mechanisms that aid user memory, ultimately promoting regular updates of critical health data.

Regular HIV testing, as recommended by the CDC, contributes to prevention efforts (CDC, 2022). The app's capacity to keep track of a users' last HIV test date presents an opportunity to foster informed sexual behaviour and the use of preventative measures. For instance, Justin's narrative demonstrates how users with limited sexual encounters may still uphold regular HIV testing as a proactive health practice. His diligent approach underscores the potential value of these apps as tools for individual health management, empowering users to monitor their HIV status regularly.

But beyond the individual level, the communication of such information can have broader societal implications. Brandon (29 years old) touched upon this, exploring the potential for stigma and judgement related to the frequency of HIV testing. He highlighted that the openness enabled by these apps might also expose users to judgement based on their last test date or testing frequency.

This duality of transparency and stigma, as emphasised by Brandon, highlights how health-related information is negotiated within digital dating spaces. Brian's narrative, in which he uses others' last HIV tested date as a deciding factor for potential relationships, brings a practical perspective to this issue. His behaviour shows how personal health practices and social stigma can directly influence decision-making processes in these spaces.

"It helps me determine whether or not I'm going to meet with a person and for me, even looking for a long-term relationship as well I would be interested in knowing that [...]So for instance, I get tested every 3 months and I will count the amount of months since the last tested sort of thing. And if it was longer than 3 months, I sort of yeah, like I sort of categorise. So, if it's longer than 3 months, but less than 6 months, I might hook up with them, if it is 6 months or longer, I'm less likely to hook up with him. And if it's over a year or they haven't had a test for more than a year, then I will not hook up with them." (Brian, 58 years old)

Through these narratives, it is evident that personal health practices and societal judgement intertwine to shape the communication dynamics within digital dating spaces. This understanding is crucial in the design and optimisation of digital platforms that aim to facilitate HIV prevention. Therefore, future research and app development should focus on navigating the complexities of HIV-related information sharing to support both individual and public health outcomes.

Getting support from public health professionals

Several interviewees stressed the importance of having in-app support from public health professionals. Samuel (26 years old), voiced this desire, saying "Get support from public professionals. It's something that I think I would love to see". Benjamin (32 years old), seconded this sentiment, emphasising the need for accessible expert advice, especially for younger users, via an interactive feature like a chat service.

There are two avenues within the app for consulting health specialists: engaging in direct chat with a health professional whose profile is verified by the app or emailing and receiving a response within 48 hours. As might be expected, direct chat was favored due to its immediacy. The participants expressed their need for timely feedback, with the direct chat feature facilitating immediate, real-time communication and mitigating the inconvenience and uncertainty associated with waiting for email responses.

Jonathan (24 years old) underscored the advantages of real-time interaction and visibility offered by direct chat. He highlighted the contrast between the unpredictability and potential delays of email and the transparency and immediacy of chat. His viewpoint was echoed by other participants, emphasising the value of speed and immediate support. Direct chat also paves the way for more personalised exchanges, allowing users to engage in one-on-one conversations, which enhances their user experience and cultivates a stronger relationship with the app.

These findings stress the importance of direct, real-time interaction with health professionals, facilitated by a chat feature. They underscore the importance of immediate support in ensuring a more efficient and reassuring user experience. These insights point to the need for prioritising features that facilitate instant, transparent communication with health professionals, potentially leading to improved user satisfaction and credibility of the app.

7.2.1.3 Perception of HIV-related content ads

Pop-up ads in dating apps manifest a wide spectrum of content, largely dictated by the advertiser's intentions and commercial objectives. These ads span various categories from promotions for other dating apps or affiliated services, to surveys, discounts, and even dating and relationship advice. Most participants reported encountering HIV-related information within these pop-up ads, suggesting the integration of health-related advertising into these platforms.

This finding points towards an interesting intersection of the political economy of these dating apps and public health communication. While the provision of HIV-related information may serve a public health purpose, from a political economy perspective, these apps are also profit-driven entities. The inclusion of such health content could be part of a broader strategy to attract and retain users, thereby boosting engagement and ultimately, profitability. It's important to critically examine this interplay between economic interests and health promotion efforts, as it informs the understanding of how dating apps can support HIV prevention while also maintaining their commercial viability.

A primary revenue source for app developers is advertising; ads are often unable to be skipped for users of the free version of these apps. This observation was confirmed by the participants during their usage of Grindr. As one participant Ryan (31 years old), noted, ads show for around "five seconds", leading Nicholas (32 years old), to remark that "even if you don't want to learn more about it, the ads force you to learn about it, so that's good".

Participants noted a frequent exposure to HIV-related pop-up advertisements on MSM social media dating apps. Specifically, they reported seeing campaigns from the 'New Zealand AIDS Foundation,' 'Ending HIV,' and 'Body Positive.' These campaigns captured the participants' attention due to their prevalent presence, visually appealing designs, and digestible content.

The pervasive nature of these ads serves as a continuous reminder of HIV's relevance, primarily acting as prompts for users to adopt protective behaviours, seek testing, and pursue further information or assistance. According to Milton (2020), these ads have been effective on Grindr in motivating MSM to get tested for HIV. Therefore, these pop-up ads play a crucial role in promoting HIV awareness and directing users to

potentially vital resources. As participant Justin (31 years old), stated, "I like the way how NZAF pop-up ads are on Grindr. I think it's helpful. I think it's catching. I think it's a good reminder for me to get tested".

Despite some participants expressing disinterest in HIV-related ads due to prior knowledge or personal preferences, they acknowledged the potential benefits for the broader community. As Nicholas (32 years old), and Brian (58 years old) stated, they recognise the value of these ads, especially for those who may lack knowledge about HIV/AIDS.

The findings showcase a range of attitudes towards HIV-related pop-up ads. Despite mixed reactions, participants acknowledged their potential in promoting HIV awareness and testing, supporting community engagement, and enhancing health literacy among users, particularly those with limited HIV/AIDS knowledge. It suggests HIV-related content ads can play a vital role in promoting HIV awareness and prevention among MSM social media dating app users. They serve to disseminate information and facilitate access to additional resources, thereby enhancing the health literacy of the users. This highlights the potential use of dating application advertisements as a medium for conveying HIV-related content.

7.2.1.4 Important to contain HIV-related features

Most of the participants positively viewed the HIV-related features within MSM social media dating apps. One participant, Tyler (28 years old), highlighted this sentiment, stating, "Definitely, I think that is very important for most people". These features are seen as essential tools for disseminating crucial sexual health information, such as HIV prevention, testing protocols, treatment options, and stigma mitigation strategies. As Michael (29 years old) emphasised, "I do think it's important, like I said, it shows that the app is being responsible".

However, this study revealed divergent opinions on personal health information disclosure. Some participants, like Eric (33 years old), suggested that sexual health information on the profile should be mandatory. By contrast, others like Jonathan (24 years old) championed personal autonomy, stating, "You can choose to have it displayed or not displayed at all on your profile". This dichotomy underlines the complex challenge in designing these apps; balancing the need for HIV prevention awareness and responsibility against ensuring individual privacy.

The study participants provided valuable insights and recommendations for improving the app's functionality. For instance, Jonathan (24 years old) suggested collaboration between apps and local social health authorities. Tyler (28 years old) proposed expanding the disclosure requirement to include other STDs, and Michael (29 years old) proposed direct links to local sexual health testing centres.

The study also reveals how these HIV-related features serve as a crucial tool for fostering open discussions on sexual health. These features not only enhance users' understanding of their potential partners but also help navigate potentially uncomfortable conversations, thereby breaking down barriers of discrimination and stigma.

One participant articulated this point:

"I think [the HIV status disclosure feature] sort of maybe saves [us] from needing to have awkward conversations necessarily... Often when you're having conversations on Grindr, you don't want to be talking about those sides. You just want to be talking about the fun of it. So, it's nice to not have to stop the conversation to bring up those sorts of questions." (Michael, 29 years old)

Echoing Michael (29 years old), Eric (33 years old) underlined the role of such features in breaking down societal stigma, enabling a sense of ease and transparency within the platform. Similarly, Jonathan (24 years old) emphasised that these features facilitate candid discussions about sexual health.

Moreover, Brandon (29 years old) reflected on the role of these features in fostering open dialogues about HIV status, and Kevin (21 years old) highlighted their potential for combating HIV stigma, thereby encouraging acceptance and confidence among HIV-positive users.

In conjunction with fostering open conversations, these features also serve as critical reminders of HIV prevention practices. Ryan (31 years old) noted how these features function as a "good reminder for the user". This sentiment was echoed by Tyler (28 years old), who emphasised the necessity of such reminders given the inherent risks associated with sexual interactions, especially concerning HIV transmission.

Importantly, the presence of HIV-related features was seen as an indication of an app's responsibility towards its users, implying that these features should be standard across all such platforms. This normalisation may lead to a greater acceptance of open discussions on HIV and sexual health.

Despite the perceived importance of HIV-related features, a minority of participants did not find these essential. Jason (33 years old) succinctly expressed this perspective: "I get what I want, and I use it". The participant's confidence in his existing sexual health knowledge also minimised the need to engage with the HIV-related features. Jason (33 years old) elaborated: "I believe I have enough knowledge to know how to protect myself or how to protect others and how to find information sources that I trust".

His understanding of HIV, primarily derived from healthcare professionals and organisations specialising in HIV and sexual health, was revealed in conversations with the researcher. This highlights the diverse user motivations and pre-existing knowledge bases that app designers need to consider.

This study illuminates the complexity of designing MSM social media dating apps, which must navigate between encouraging open discussion on HIV and sexual health, ensuring user privacy, reducing stigma, and meeting diverse user needs.

Providing users with accurate and comprehensive sexual education can be a powerful tool in HIV prevention. Sexual education can help individuals understand the risks associated with sexual behaviour, promote safe practices, and reduce the spread of HIV (American Academy of Pediatrics, 2023; Sales & DiClemente, 2016).

Moreover, it is essential to recognise that equipping children and young people with the knowledge and skills necessary for making informed decisions is important for their health and well-being. Comprehensive sexuality education providing individuals with a comprehensive understanding of important sexual health matters. By empowering them to navigate their choices responsibly, this education not only contributes to HIV prevention but also addresses other related issues (UNESCO, 2021).

Looking ahead, future research should continue exploring how these social media dating apps can effectively function as platforms for sexual health education while maintaining an engaging user experience. By striking the right balance between

educational content and user engagement, these apps have the potential to serve as valuable tools for promoting sexual health and HIV prevention awareness.

7.2.2 Not a reliable source of HIV-related information

MSM social media dating apps are generally not considered reliable for obtaining accurate HIV-related information, as noted by research participants. Within the realm of MSM social media apps, users expressed dissatisfaction with the limited availability of local New Zealand information pertaining to HIV. This scarcity of region-specific content poses a challenge, as it prevents individuals from accessing accurate and tailored information that is relevant to their specific location and needs. Additionally, respondents who regarded in-app HIV-related information as important expressed significant concerns regarding errors within such content.

In contrast to the skepticism surrounding MSM social media apps, research participants consistently regarded the Burnett Foundation Aotearoa, previously known as the New Zealand AIDS Foundation and Ending HIV NZ, as a trusted and reliable resource for obtaining accurate HIV-related information. The foundation's established reputation, expertise, and commitment to HIV education and prevention make it a go-to source for reliable information in the New Zealand context.

The perceptions of MSM social media apps as unreliable sources of HIV-related information also intersect with discussions around corporate social responsibility. Among the respondents, a majority believed that these apps should actively promote safe sexual health, while a minority redirected responsibility to other entities such as the government or the app users themselves. This divergence underscores the multifaceted nature of corporate social responsibility within the context of HIV-related information dissemination through MSM social media apps.

This section highlights the limitations and challenges associated with relying on MSM social media apps as sources of HIV-related information. The lack of local New Zealand HIV-related information, concerns about errors in content, and the contrasting perceptions of the Aotearoa Foundation and corporate social responsibility underscore the need for reliable and context-specific HIV-related information within MSM social media dating apps.

7.2.2.1 Lack of local New Zealand information

The participants identified a lack of geographical relevance, specifically regarding New Zealand, within the apps' HIV-related and sexual health information. This lack of local context was consistently noted across participant responses.

Eric (33 years old) pointed out, "Nothing is about New Zealand, it was mostly with the U.S.A. because we know Grindr more as a U.S.A. app, it is designed in the U.S.A.". Brian (58 years old) felt that the US-centric information was potentially misleading: "I choose not to look at their information because to me, the information that they share from America, I feel is contradictory in certain areas". Jonathan (24 years old) suggested that the apps could do better in catering to non-U.S. users: "I think this assumption that the app does not create specifically for New Zealanders".

Echoing these sentiments, participants highlighted their preference for pertinent, local information over general or foreign (U.S.-based) data. Nicholas (32 years old) eloquently expressed this preference: "I would expect local information... U.S. laws or health information don't apply to New Zealand because we have a lot of local laws. I would expect Grindr to give me local information, not U.S. information".

These responses underscore the importance of geographical context and tailored information for users, emphasising the need for localised HIV and sexual health information.

However, participants also recognised the challenges of integrating local New Zealand information into a global app. Andrew (27 years old) reasoned, "Obviously, it's a bit hard because it's a global app that might be really hard to do... But I do think that would be a great feature if they were able to". Christopher (43 years old) echoed this sentiment, acknowledging the logistical realities: "I think they should have something local for New Zealand. But the reality is a population of five million in a world with how many hundreds of countries".

Despite these challenges, the majority asserted the importance of local information, particularly from reputable sources such as the New Zealand AIDS Foundation. Justin (31 years old) conveyed, "I think it's important to contain local information... It's important, especially with New Zealand AIDS Foundation, providing different locations of support groups and contact numbers and what not".

Participants proposed potential solutions such as enabling users to find the nearest HIV testing centre based on their location. Benjamin (32 years old) praised this as a desirable feature, "It is a great feature, so when people are really concerned about their status... they want to get a test... I would like to find the centre based on location".

This feedback reinforces the importance of incorporating localised, geographically specific HIV-related information in the design of dating apps.

The lack of localised New Zealand information on MSM social media dating apps can be explained through the lens of political economy theory. Global tech corporations, such as those behind popular social media apps, are profit-driven. They may prioritise profit over the specific needs of local communities. New Zealand has a population of around five million (StatsNZ, 2023), which may make it less attractive for large tech corporations to invest in developing localised features for MSM social media dating apps.

Moreover, the prevalence and impact of HIV/AIDS vary in different regions (UNAIDS, 2019), highlighting the importance of providing local HIV-related information to meet specific community needs. If an application does not provide local HIV-related information, it may not be regarded as a valuable resource by users in New Zealand. Recognising and understanding the diversity between regions is essential to create interventions and information that meets the specific needs of different communities. By integrating local information, MSM social media dating apps can better meet the needs of local users.

7.2.1.2 Perception of errors in HIV-related content

Chapter 6 identified errors in HIV-related content, including misspelt words, incorrect abbreviations, ambiguous abbreviations, and improper word splitting. This section aims to shed light on participants' experiences with these issues.

Specific abbreviations frequently found in HIV-related content, such as PrEP, TasP, and BB, were queried to gauge participants' understanding. While most participants were familiar with PrEP and BB, eight participants were unsure about the meaning of 'TasP.' In case of uncertainty, participants typically resorted to web searches, which occasionally resulted in confusion due to the multiple meanings associated with certain abbreviations. Nevertheless, some participants recognised these abbreviations

as part of the 'gay lingo.' For example, Ryan (31 years old) stated, "It's a short word for a slang word, and it can be a gay lingo as well. It's our language. I think that's how I see it".

According to Ryan, gay abbreviations serve as a means of communication within the LGBTQ+ community. This aligns with Red's (2012) definition of gay language as a code used by the gay community to connect members through their distinct form of communication and prevent outsiders, especially heterosexuals, from understanding it. Members of marginalised social units, who have experienced social discrimination, have often developed their own varieties of speech or lingo as a way of opposing the cultural authority of the dominant language (Baker, 2010). For instance, Romero (2019) examines the use of gay lingo among Filipino teenagers, utilising a descriptive-qualitative design alongside a quantitative approach. The study finds that gay lingo functions as a cover-up, creating tools for staying current with the latest trends and expressions, and reflections of personal environments and identities. These findings suggest that gay lingo is not only a means of communication but also a way for LGBTQ+ individuals to assert their identities and resist cultural norms imposed on them.

Participants had divided opinions on the impact of spelling errors. Jason (33 years old) found it challenging to spot errors due to English not being his first language, thus they did not affect his experience. Others, like Ryan (31 years old), was unfazed unless the errors were egregious. Most echoed the sentiment that minor errors did not significantly impact their app experience since their primary intent was not accessing HIV information but finding sexual encounters. If the issues pertained to this main goal, they would consider it a problem.

About half of the participants considered spelling and other errors a minor issue as long as they did not affect understanding. They anticipated that developers would fix these in future versions. For instance, Justin (31 years old) stated, "I know they will correct the information and I trust that".

On the other hand, the other half of participants perceived these errors more seriously. They highlighted the importance of correct information, especially for sensitive topics like HIV. As Andrew (27 years old) expressed, "I think it's very important that information needs to be shown correctly, and it needs to be shown... in the most appropriate ways". They voiced concerns that such errors could induce anxiety and

undermine trust in the app's credibility. Nicholas (32 years old) elucidated this concern:

"I definitely think that isn't doing it correctly... it is not being taken seriously. And if I don't see it as being taken seriously, then how are you meant to trust that this app has the right attention for preventing HIV." (Nicholas, 32 years old)

Respondents who regarded in-app HIV-related information as important expressed significant concerns regarding errors within such content. This feedback underscores the critical need for adhering to rigorous standards of accuracy and professionalism when creating digital health resources. In their review of 165 articles published between 2002 and 2013, Zhang et al. (2015) discovered that despite some improvement over time, 55% of the articles concluded that the quality of online health information was problematic. The study highlights the ongoing challenge of ensuring high-quality online health information.

Maintaining high standards of accuracy is paramount in ensuring that those seeking HIV-related information receive reliable and factually correct content. Inaccuracies in digital health resources can lead to misinformation and potentially harmful consequences, including misinterpretation of prevention strategies and treatment options. The research conducted by Read et al. (2021) emphasises the crucial aspect that misinformation has the potential to cause harmful interventions and hinder individuals from seeking evidence-based care in a timely manner.

Furthermore, errors in HIV-related content can erode the credibility of digital health resources. Individuals relying on these resources may question their reliability and effectiveness in addressing their health concerns. By prioritising accuracy and professionalism, developers can enhance the credibility of digital health resources, instilling trust and confidence among users.

7.2.1.3 Aotearoa Foundation considered to be a trustworthy resource

The study delved into user perspectives concerning HIV-related information presented within dating apps. The convenience of accessing information via social media dating apps was widely recognised and appreciated by users. However, this appreciation was accompanied by a discernible level of critical scrutiny directed towards the content obtained from such platforms. Notably, a significant proportion

of the users portrayed MSM social media dating apps as not being reliable conduits for HIV-related information.

For instance, Jason (33 years old) expressed, "For me, Grindr is not a trustworthy source... it's just for basic information, if you want something really academic or 100% true, then I go to other sources". Similarly, Jonathan (24 years old) remarked, "I wouldn't take anything necessarily that I read from the app as absolute truth. It would be more so a guide..

Ryan's response seemed to resonate with the prevalent sentiment, offering a particularly poignant reply: "Because it is Grindr". This succinct answer swiftly captured the researcher's attention, prompting an immediate request for further elaboration to ascertain its full implications. Subsequently, he proceeded to provide a explanation, delving deeper into his initial response:

"It's the synonym for hooking up, so that's why because it's Grindr. It's sort of undermining Grindr. That's just how you feel. How I see it, how I feel it." (Ryan, 31 years old)

In his opinion, Grindr was a 'hookup' app. The interviewee's perception of Grindr seems to create a cognitive dissonance when this platform ventures into the realm of providing health information, particularly on a topic as serious as HIV. This dissonance seems to be driving the respondent's skepticism, undermining the credibility of the information presented due to the context in which it's placed. The notion of 'undermining' as voiced by the interviewee, provides an interesting insight into how the perceived primary purpose of a dating app can influence users' trust in the HIV-related information it offers.

When inquiring about sources for HIV-related information, Google searches emerged as the primary choice for participants, often supplemented with local keywords. Local institutions, notably the New Zealand AIDS Foundation (rebranded to Burnett Foundation Aotearoa in June 2022), were considered reliable sources. Participants shared, "Ending HIV is the first place that I go" (Nicholas, 32 years old), and "First place I would go would be the Ending HIV website" (Jonathan, 24 years old).

Trust in these institutions was primarily driven by their visibility within the community and perceived reliability. Jason (33 years old) highlighted that the New Zealand AIDS Foundation is a "well-known brand within the community... I will go

to the website to get that information". Brian (58 years old) added, "I trust them because... the people that belong to those organisations have been with the organisation for a number of years, they do a lot of research, etc."

A suggestion from the study participants was that the endorsement or involvement of a reputable organisation like the New Zealand AIDS Foundation could boost confidence in the HIV-related information provided on dating apps. Jason (33 years old) emphasised, "I would need some trustable source to tell me that there's some trusting information there. Then I will look, otherwise, I'll just go to the best one I found".

These insights indicate potential avenues for collaboration between professional health organisations and dating apps to disseminate reliable HIV-related information more effectively.

7.2.1.4 Conflicting views on corporate social responsibility

Participants expressed divergent opinions concerning the corporate social responsibility of MSM social media dating apps in HIV prevention. The majority of respondents believed that these apps should promote safe sexual health, while some felt that the responsibility should lie with other entities, such as the government or the app users themselves. Intriguingly, the reasoning between the two groups was remarkably similar.

Those advocating for corporate responsibility argued that as the apps facilitate sexual activities and connections between potential partners, they inherently bear a duty of care. For instance, Tyler (28 years old) drew a parallel between Grindr and gay bars from the 1980s, arguing that just as a bar has a responsibility to ensure patrons' safety, Grindr should similarly be held accountable for preventing "HIV and STD's transmission in the community".

This viewpoint was echoed by other participants who asserted that the apps' role in promoting sexual activity carried with it an obligation to encourage safe sex and HIV prevention. They considered the facilitation of sexual activity as a form of encouragement, and hence saw an intrinsic duty for the apps to ensure sexual health safety.

Contrarily, some participants saw the primary function of these apps as facilitating

social encounters and dating rather than being involved in health promotion or HIV prevention. They emphasised the concept of individual responsibility, stating that it falls within users' purview to safeguard their health. This viewpoint was compared to expecting McDonald's to be responsible for obesity – the app, like McDonald's, offers a service, but the ultimate responsibility lies with the consumer. As one participant said:

"No. Because they are just offering a network for people to meet. [...] It's a bit like asking McDonald's to fund a weight watch... like people go to Mcdonald's and they get fat, but Mcdonald's isn't held responsible for that. Nobody's holding a gun to the head to eat the food." (Eric, 33 years old)

However, a pragmatic perspective was also prevalent among the participants. They acknowledged the commercial nature of these apps but believed it would be beneficial for these platforms to engage in health promotion, albeit not considering it a fundamental obligation. They proposed that it would be mutually beneficial for both users and the app companies if they participated in health promotion. The benefit to users would be direct in terms of public health while for the app companies, the benefit would be indirect through fostering a healthier user community, thus ensuring sustained usage of the app.

The diversity of these perspectives underscores the complex expectations users have regarding dating apps' roles in HIV prevention. They demonstrate a pragmatic understanding of these apps' primary commercial objectives while advocating for their potential contribution to public health.

This chapter has thus far provided an in-depth analysis of the users' experiences and perspectives on HIV-related features. During the interviews, the theme of underage users emerged. Although not directly pertinent to the primary research objectives, this issue still constitutes a significant and compelling area that undoubtedly warrants further exploration.

7.3 Underage users

A theme that emerged prominently from the interview data is the issue of underage users navigating dating applications. This issue was highlighted by participants like Justin (31 years old) and Jonathan (24 years old), both of whom reported initiating

the use of these apps at an early age, 13-14 and 16 respectively.

These cases are not isolated instances but reflect a broader trend indicated in prior research. Such research suggests that among teenagers, the use of MSM apps is not only prevalent but also seems to have garnered a level of acceptance similar to that within adult MSM demographics (Macapagal et al., 2018).

Despite these platforms explicitly targeting adults, typically aged 18 or older, the access they provide to underage users remains a significant problem. Dating apps like Grindr, Scruff, Jack'd, and Adam4Adam highlight in their terms of service that they are intended for adults (Adam4Adam, n.d.; Grindr, n.d.; Jack'd, n.d.; Scruff, n.d.). Yet, they do not verify the authenticity of a user's age. Jonathan (24 years old) mentioned that he falsely declared his age to gain access to the app when he was 16.

The lack of age verification may expose underage users to inappropriate or even illegal activities. They could find themselves in potentially dangerous situations, such as engaging in sexual encounters with older individuals. This increases their susceptibility to exploitation and trafficking (Browne, 2015; Mckim, 2021).

Benjamin (32 years old) shared his personal experiences and concerns about younger users being groomed by older individuals on these platforms. He disclosed that he had experienced this issue during his youth. This participant's narrative emphasises the need for parental, educational, and adult supervision to manage the risks associated with underage usage of MSM social media dating apps.

Through the analysis of these personal narratives, one can gain a deeper understanding of the individual journey of users and the challenges they face. Moreover, these reflections point to the need for regulatory measures to safeguard underage users on dating applications. The experiences shared by the study's participants underscore the call for comprehensive strategies to protect underage users from potential hazards associated with navigating adult-oriented dating platforms.

7.4 Discussion

This chapter aimed to gain an understanding of users' perceptions regarding HIV-related features, uncovering insights into the effectiveness, usability, and impact of these features within MSM social media dating apps. Studying users' perceptions

provided insights into the potential behavioural changes that may have occurred as a result of interacting with these features. It helped in understanding: HIV-related features influenced users' decision-making processes; behaviours related to HIV testing; safe sex practices; or seeking support and resources. Furthermore, user perceptions are integral to shaping the overall user experience and satisfaction with the app. By gaining insights into how users perceived the HIV-related features, areas for enhancement can be pinpointed, and informed recommendations provided to improve their functionality, design, and accessibility. This inclusion of app users' perceptions enriched the research, completing a comprehensive analysis of user perspectives.

Grindr's prevalence, both within this research sample and in prior studies (Badal et al., 2017; Castro & Barrada, 2020; Filice et al., 2019), implies its features resonate with the significant needs of users in the MSM community. Rather than interpreting this dominance as mere popularity, it's an indicator that Grindr meets the diverse needs of its user base, with particular effectiveness in facilitating the primary motivation identified for app usage – locating sexual partners. The continued recognition of Grindr as the most utilised app in the MSM community, in line with the Uses and Gratifications theory, introduces the multifaceted motivations behind MSM social media dating app usage, which will be further explored in the subsequent analysis. This sets the stage for a deeper understanding of user motivation, especially in the context of their active search for sexual partners, thus highlighting the potential of these apps as platforms for targeted HIV prevention efforts.

The main motivation for using the app was to locate sexual partners. MSM individuals are taking active roles to satisfy a biological and psychological need through these apps. Here, the users are not passive receivers but active seekers, fulfilling their specific needs (Ruggiero, 2000). This active usage emphasises the dating app's primary utility as a tool to facilitate sexual encounters, underscoring the significance of leveraging these apps for targeted HIV prevention efforts, given their potential to reach a large population engaged in seeking sexual encounters.

Other than that, this research expands on this understanding, revealing a more diverse set of motivations behind app usage. Users engage with these apps to make new friends, to chat, and to search for romantic partners. Those motivations were also found in other studies (Rice et al. 2012; Castañeda, 2015; Wu & Ward 2020; Van De

Wiele & Tong, 2014; White Hughto et al., 2016). Altogether, the MSM social media dating apps extrapolate the casual sexual encounter tool, acting as a social and entertainment tool that can promote the inclusion of MSM individuals into their community (Ranzini & Lutz, 2017; Sumter & Vandenbosch, 2019; Sumter et al., 2017; Timmermans & De Caluwé, 2017) .

In the context of the Uses and Gratifications theory, these apps are not mere tools of entertainment but catalysts for societal change and empowerment. These platforms are responding to the evolving needs of their users, fostering a dynamic interplay between user motivations and platform offerings. This is consistent with the theory's claims concerning individuals' interactions with media, emphasising people's behaviours with media rather than the effects media has on them (Katz et al., 1973; Sundar & Limperos, 2013).

Research participants unanimously reported awareness of HIV-related features within MSM social media dating apps during their usage. The unanimous awareness of HIV-related features among all participants not only indicates the prominent and noticeable nature of these features to users but also emphasises the potential for utilising MSM social media dating apps as platforms for targeted HIV prevention interventions. This highlights the importance of integrating educational content within these digital spaces, as the presence of these features increases the likelihood of user interaction with them. Participants most frequently mentioned HIV status, last test date, and testing reminders in users' profile messages, an observation that aligns with the findings from Chapter 5. In that analysis, the most common HIV-related features present in MSM social media dating apps were safety practices, found in 11 of the 13 apps, closely followed by HIV status in 8 of the 13 apps. Moreover, these HIV-related features are actively presented to users, such as in option lists during profile completion. This approach makes these features more prominent to users, who do not need to navigate the app extensively to encounter them. A separate study confirmed that a substantial proportion of participants, approximately 76.5% (4993 out of 6525), noted the presence of preferred sexual health strategies in users' profile sections (Hecht et al., 2022). Given this finding, it was not surprising that participants in this study noticed these HIV-related features. Further, users expressed an expectation for these HIV-related features when using other MSM social media dating apps. One study demonstrated that 80% of participants supported the inclusion of HIV status in profile sections (Wohlfeiler & Hecht, 2019). This finding illustrates

the growing acceptance and potential normalisation of incorporating HIV-related features into MSM social media dating apps.

This study surveyed the attitudes of MSM social media dating users towards the integration of HIV-related features within these platforms. The overwhelmingly positive response from the participants revealed their openness towards receiving HIV-related information via dating apps. In fact, most of them considered it vital that these apps should contain such features. This implies a recognition of the potential of these platforms to serve as valuable conduits for crucial public health information. This viewpoint is in harmony with evidence that identifies digital interventions as potent instruments for HIV prevention within the MSM community (Badal et al., 2017; Bineau et al., 2021; Contesse et al., 2020; Eleuteri et al., 2018; Goedel & Duncan, 2015; Goldenberg et al., 2014; Hecht et al., 2022; Hirshfield et al., 2012; Hoenigl et al., 2020; Holloway et al., 2014; Kesten et al., 2019; Mitchell et al., 2016; Muessig et al., 2013; Newcomb et al., 2016; Rosser et al., 2010; Su et al., 2015; Ventuneac et al., 2018). Furthermore, prevention initiatives are most effective when directed at the population at risk (Goldenberg et al., 2014; Muessig et al., 2013; Rosser et al., 2010).

These HIV-related features, beyond merely dispensing information, are perceived as facilitators of increased HIV awareness and improved sexual health. They serve as persistent reminders to users about HIV prevention, fostering a culture of open conversation, stigma reduction, and promotion of safer sexual health practices.

Previous research has demonstrated that wide dissemination of HIV status information has the potential to contribute to public education efforts, raise awareness, and reduce the stigma associated with HIV (Brown et al., 2003; Levy & Barocas., 2017; Warner et al., 2018). Additionally, HIV-related features can significantly augment users' knowledge about contacts living with HIV, thereby fostering a less prejudiced understanding of the condition. This potential for enhanced traceability represents a major step towards ensuring a safer, more informed user community.

The benefits extend beyond HIV-related messaging to encompass a broader range of sexual health information. Participants in this research expressed their willingness to receive this kind of information through the apps, as noted in the Bineau et al. (2021) study. They would welcome not only the sharing of HIV status and sexual health prevention strategies on user profiles but also testing reminders. Moreover, they

showed interest in accessing additional sexual health resources and information, a sentiment echoed in the Wohlfeiler & Hecht (2019) study.

The incorporation of HIV-related features within MSM social media dating apps is not merely acceptable but indeed desirable to users. Their potential to contribute to HIV prevention efforts, increase public awareness, reduce stigma, and provide a platform for comprehensive sexual health resources aligns these features with user expectations and public health goals. Future iterations of these apps should consider this receptivity and contribute their utility as HIV prevention interventions.

While the findings reveal a favorable user attitude towards integrating HIV-related features into MSM social media dating apps, there remains substantial room for improvement in leveraging these apps for HIV prevention.

The fact that users seek the apps to find a community presents an opportunity for HIV prevention because features, such as, 'links to an outside organisation,' 'get support from public health professionals,' and 'where to get tested' (HIV-related features identified in Chapter 5), can provide reliable information, and most importantly, a physical space that users can reach their community. However, the effectiveness of these features is contingent on their localisation. At present, this element appears to be lacking, as particularly indicated by the lack of local New Zealand information reported by the participants.

Participants tend to treat Burnett Foundation Aotearoa, formerly known as New Zealand AIDS Foundation, as a dependable and trustworthy source of information pertaining to HIV instead of MSM social media dating apps. This finding is in stark contrast to previous studies (Bineau et al., 2021; Holloway et al., 2014), which posited MSM dating apps as acceptable and viable sources of sexual health information among a substantial proportion of MSM social media dating app users.

It suggests a potential direction for the future development of MSM social media dating apps. Specifically, the integration of localised HIV-related content, features, and trust-building initiatives may substantially enhance the reliability of HIV-related information disseminated through these platforms.

This discernible user preference for local, established sources over MSM social media dating apps presents a crucial opportunity for optimising these platforms' impact. Addressing this preference through the development and integration of

localised HIV-related content and features can significantly elevate the relevance of disseminated information. Furthermore, aligning with users' specific informational needs and local context can markedly augment the apps' credibility as trusted sources of sexual health information.

Subsequently, the transition towards localisation and trust-building emerges as a critical initiative in enhancing the effectiveness of MSM social media dating apps for HIV prevention. Achieving this goal mandates a deep understanding of regional preferences and trust dynamics within the user community. These insights can then guide the design and development of tailored, relevant, and reliable HIV-related content and features, aligning the apps with user expectations and HIV prevention objectives.

To improve HIV prevention and support for the MSM community, it is highly recommended for MSM social media dating apps to form partnerships with local health organisations. By working together, they can help app users have access to accurate information about HIV prevention, testing, and treatment. This collaboration also helps in creating targeted campaigns and interventions, making it easier to connect app users with the right support and care services. By joining forces, these organisations can build trust and credibility, ultimately making a positive impact on HIV prevention and overall public health.

Furthermore, an unexpected discovery emerged from interview data pertaining to underage participation in MSM social media dating apps. Four participants disclosed that they commenced their utilisation of these platforms while still minors. This phenomenon aligns with previous studies, suggesting underage usage is not an isolated incident. A particular investigation focusing on MSM adolescents, all of whom were under 18, revealed that more than half utilised MSM social media dating apps for casual encounters or 'hookups' (Macapagal et al., 2018).

Adding to this observation, another study conducted on a cohort of 219 sexually experienced adolescents, who were assigned male at birth and self-identify as sexual and gender minorities in the U.S.A., indicated extensive use of such platforms. A remarkable 70% of the underage participants reported usage of gay, bisexual, and queer apps (Macapagal et al., 2020).

Some social media dating apps may have inadequate age verification processes,

making it easier for underage individuals to create accounts and participate in these platforms. While ideally, addressing underage usage would be important, it is acknowledged that this may not have a straightforward solution. Nevertheless, this issue underscores the imperative for providing reliable and precise sexual health information, including HIV prevention, particularly given the widespread use by underage individuals. Instituting effective age verification measures can encourage early adoption of preventative behaviours and help mitigate the propagation of misinformation among young MSM populations.

7.5 Summary

This chapter examined user perceptions of HIV-related features in MSM social media dating apps to better understand their role in HIV prevention. The focus was on user motivations and experiences, and the app users' views on these features. Interviews revealed interconnected themes that reflect their understanding of the HIV-related features on these platforms.

The findings suggest that MSM social media dating apps have significant potential to serve as effective platforms for HIV prevention due to their high user acceptance. However, there is room for improvement in how these apps communicate HIV prevention information. The following chapter outlines the conclusion, which will tie together these findings, highlighting the study's significance, identifying its limitations, and offering recommendations for future research.

Chapter 8: Conclusions

In the context of modern technological advancements, mobile dating applications have experienced accelerated progression, thereby facilitating the interaction among the MSM community. Research indicates that MSM users have higher utilisation rates and longer usage durations of these apps compared to heterosexual users (Goedel & Duncan, 2015). A noteworthy aspect within this demographic is the disproportionate burden of HIV/AIDS. The MSM social group is identified as a high-risk group for HIV infection (CDC, 2021). Given the aforementioned factors, the social media-based dating platforms present a potential medium through which preventive measures against HIV can be propagated.

This study aimed to investigate the communication capacity of MSM social media dating apps in relation to HIV prevention. It sought to identify, document, and analyse HIV-related features within these apps, and assessed users' perceptions of these features. To achieve this, the study amalgamates the Uses and Gratifications Theory (UGT) and the Political Economy of Communication (PEC) approach. The application of the UGT allowed for an understanding of individual motivations and engagement with MSM social media dating apps, while the PEC provided insights into the broader societal, economic, and political forces shaping these platforms. Together, these theories uncovered the complex dynamics that influence the inclusion, design, and visibility of HIV-related features, thus forming a comprehensive theoretical lens for understanding and addressing HIV prevention.

By employing the UGT, this study has uncovered specific motivations behind the use of MSM social media dating apps within the MSM community, providing critical insights into how HIV prevention efforts can be tailored to address these motivations. This understanding is instrumental in suggesting relevant, engaging, and empowering interventions. Rather than describing the theories themselves, this analysis has focused on the underlying dynamics that shape the presence and effectiveness of HIV prevention efforts within these platforms, demonstrating why these insights are significant for both theoretical understanding and practical applications in HIV prevention.

The study was conducted with the objective of answering the following three research questions:

- 1) What HIV-related features are present on MSM social media dating apps?
- 2) How do the design and functionality of HIV-related features in MSM social media dating apps impact user interaction?
- 3) How do app users perceive HIV-related features within MSM social media dating apps?

This chapter began by reflecting on the most important discoveries from the research. Subsequently, the significance of the study was evaluated and discussed. Then moved on to address the limitations of the research, it acknowledged the areas where the research fell short. Finally, the chapter concluded by offering suggestions for future research which provided recommendations for how the research can be further developed and expanded, providing a roadmap for future studies to follow.

8.1 The main research findings

This section provides an overview of the main research findings related to dating apps and HIV prevention. It encompasses three areas: the presence and characteristics of HIV-related features, the simplistic interaction and limited engagement in the assessment of these features, and the positive reception and desire for enhanced, localised HIV-related features. In the subsequent sections, a more detailed presentation will be provided for each of these areas.

8.1.1 The presence and characteristics of HIV-related features

In response to research question 1, 'What HIV-related features are present on MSM social media dating apps?' Chapter 5 examined the HIV-related features presented on MSM social media dating apps. To answer this question, it required identifying what HIV prevention-related content was currently available on MSM social media dating apps in New Zealand's Android and iOS app market. The content under this research context referred to HIV-related features on MSM social media dating apps that include HIV prevention, awareness, information, or other related terms. An app feature was a specific functionality or capability that was offered by a mobile application. It could be anything from a simple button that performed a certain action, to a complex set of tools or services that provided users with a unique experience.

The study found that HIV-related features are not common for MSM social media dating apps, highlighting a potential lack of emphasis on HIV-related issues within

this domain. The limited prevalence of such features may suggest a disconnect between app design and public health needs. This gap opens a opportunity for both researchers, public health professionals and app developers to explore ways to further integrate these features to better serve MSM communities.

Furthermore, in comparison to a similar study conducted 10 years ago, recent research found that nearly 30% of mobile apps contain HIV-related information, indicating a notable increase. Nevertheless, despite this progress, there remains room for improvement. Additionally, despite the growth in including HIV-related information, a significant number of apps, particularly in New Zealand, do not offer local health resources, often redirecting users to international websites instead.

The implications of this growth signal a positive trend but also emphasise the necessity for consistent and thoughtful inclusion of HIV-related features across all platforms to maximise public health impact.

Lastly, the research categorised specific HIV-related features, such as: Safety practice; HIV status; HIV/Sexual health information centre; Link to an outside organisation; Get support from health practitioners; Where to get tested; Test reminder; Last tested; Tribe for POZ, and Search filters such as, Safety Practice/HIV status/Tribe for POZ. The primary HIV-related features found in these apps are 'safety practice' and 'HIV status,' which are easily incorporated into user profiles and facilitate informed decision-making and discussions surrounding HIV status and safe practices. These findings give a clear overview of what features are presented on MSM social media dating apps currently, underlining the potential of these features to foster responsibility, transparency, and awareness among users, illuminating a clear path for future app development and public health collaboration.

Having explored the presence and categorisation of HIV-related features in MSM social media dating apps, attention now turns to another critical aspect of this investigation. Whilst understanding what HIV-related features are available is essential, it is equally vital to examine how these features are designed and how their functionality influences usability for users. Thus, the following section addresses Research Question 2: 'How does the design and functionality of HIV-related features in MSM social media dating apps influence their usability for the users?' By investigating the design and usability of these features, a more comprehensive understanding of how they fulfil their intended roles and where there may be room

for enhancement can be gained.

8.1.2 Simplistic interaction and limited engagement in the assessment of HIV-related features

The analysis of MSM social media dating apps revealed that efforts have been made in providing usable, accessible, and credible HIV-related information. However, there are concerns regarding the lack of comprehensive information from accredited sources within these apps, given the essential role that reliable information plays in HIV education and prevention. The screenshots taken from MSM social media dating apps showed that only 17% of the content referred to accredited sources, highlighting the need for improvement in this aspect.

Although the content was presented in a manner that the average user can comprehend, suggesting its potential effectiveness in conveying HIV-related information, the opportunities for enhancing engagement and depth should not be overlooked. While availability of accurate and readily understandable content represents a crucial step in fostering awareness and education about HIV, further improvements can be made to enhance user engagement and expand the depth of information provided.

A key finding regarding interactivity in Chapter 6 was that the HIV-related features operated at two levels: information dissemination by the app and user inputs, typically simplistic and confined to basic information sharing. This finding suggests that while the information is accessible, the user engagement might be enhanced through interactive and engaging design elements. Future developments could consider more innovative design strategies to foster deeper understanding and connection with the content.

The study identified a significant absence of engaging tools in HIV-related features, such as games, quizzes, medals, awards, and videos and strategies, such as gamification. This lack contrasts sharply with contemporary trends in app development, where multimedia interactivity is considered essential for enriching user experience. This scarcity of interactive components not only deviates from the expectations of modern digital interactions but could also impede the potential impact and reach of these features. The absence of diverse engagement strategies may lead to missed opportunities for user education and connection regarding HIV-related content. Therefore, the implementation of more engaging tools could enhance user

interaction and foster a deeper understanding of the subject matter.

This juxtaposition between accessible information and limited engagement forms a complex picture. On one hand, the apps serve the vital function of providing essential HIV-related information in a manner that is straightforward and credible.

On the other hand, they may be missing an opportunity to leverage the engaging capabilities of multimedia to foster a more profound connection and understanding of the subject matter.

These findings raise questions about the balance between simplicity and engagement, between functionality and appeal. It challenges app developers, health educators, and policymakers to consider how to best harness the capabilities of modern technology to serve the diverse needs and preferences of users, without compromising the integrity and effectiveness of the vital information being conveyed.

Overall, while the HIV-related features in MSM dating apps do offer some benefits, there is room for significant improvement, particularly in enhancing the depth of content, promoting two-way interaction, and incorporating engaging multimedia elements.

After examining how the design and functionality of HIV-related features impact usability within MSM social media dating applications, this study now moves towards exploring user perceptions and experiences. Specifically, the focus turns to research question 3: 'How do app users perceive the HIV-related features within MSM social media dating apps?' This shift initiates an investigation into user perspectives, aiming to uncover their viewpoints. By analysing user perceptions, the understanding of how these features resonate with users can be gained, providing valuable insights for potential enhancements.

8.1.3 Positive reception and desire for enhanced localised HIV-related features

The research investigation delved into understanding how MSM individuals use and perceive social media dating apps in the context of HIV-related features. The study revealed that while locating sexual partners remains the primary motivation, there are diverse motivations driving app usage, such as making friends, chatting, and searching for romantic relationships (as explained in Chapter 7). The awareness and

generally positive reception of HIV-related features within the apps signal their potential value as tools for HIV prevention. However, a critical insight emerged that MSM social media dating apps are not considered reliable sources for HIV-related information, with participants in this research more likely to trust resources, such as the Burnett Foundation Aotearoa.

This chapter outlines the potential and challenges associated with leveraging MSM social media dating apps for HIV prevention and awareness. It also outlines a trajectory for future iterations and interventions in this domain.

The implications of these findings are manifold. First, the acceptance and awareness of HIV-related features within these apps underscore their potential as tools for HIV prevention, making it vital for developers, public health organisations, and policymakers to explore ways to enhance their effectiveness. Second, the study revealed that app users have a variety of motivations beyond seeking sexual partners, calling for a broader understanding of the user base and tailored interventions to cater to diverse needs. Third, the preference for established organisations over the apps for reliable HIV-related information implies a need to build trust and credibility within the apps. Collaboration with recognised health organisations, incorporating local and trustworthy information, could be key strategies in leveraging these platforms for HIV prevention and awareness. Fourth, the willingness to receive sexual health information through the apps opens the door for them to serve as comprehensive sexual health resources. This requires thoughtful design and collaboration with health professionals to ensure accuracy and effectiveness.

In conclusion, the findings highlight the dynamic nature of MSM social media dating apps, emphasising their potential as powerful tools in HIV prevention. However, they also point to challenges that must be addressed to fully realise this potential. The relationship between users and these platforms necessitates a nuanced approach that considers the diverse needs of the user base, cultivates trust, and delivers accurate and relevant information. By addressing these aspects, the apps could become valuable allies in the ongoing battle against HIV among MSM.

8.1.4 Synthesis of overall findings and implications

Through the systematic investigation of HIV-related features in MSM social media dating apps, the three research questions, although investigated through different

approaches, collectively unearthed several interconnected themes that together form a comprehensive understanding of the subject. This shed light on the complex relationship between communication, technology, and HIV prevention.

By applying the uses and gratifications framework, this research has identified the main motivations driving individuals to utilise MSM social media dating apps, which primarily revolve around seeking sexual partners. Given the app's primary purpose of connecting individuals for potential sexual encounters, it becomes imperative to incorporate HIV prevention efforts seamlessly into their functionalities and user experience.

Integrating HIV prevention efforts into these apps is essential to promote safer sexual practices and reduce the risk of HIV transmission within the MSM community. By leveraging the understanding of user motivations, app developers can strategically design features that facilitate access to information about HIV transmission, prevention methods, and the importance of regular health check-ups. This integration ensures that users are well-informed and empowered to make responsible decisions regarding their sexual health while engaging with potential partners through the app.

With this approach, MSM social media dating apps can become effective platforms for disseminating HIV prevention messaging, fostering open dialogue, and creating supportive networks within the community. By embracing this responsibility, these apps have the potential to contribute to reducing HIV transmission rates and promoting healthier sexual behaviours among their users.

The findings revealed the absence of HIV-related features in two-thirds of the apps examined. Despite the recognised potential of delivering HIV prevention via MSM social media dating apps, the limited presence of HIV-related features in most of the apps reveals a disconnect between the technological possibilities and the actual public health needs being met. Further, the study's examination of usability and engagement presents a dichotomy in the current landscape. While the information within the apps is commendable for its accessibility, comprehension and credibility, a lack of engagement due to simplistic designs and a paucity of interactive elements can undermine the overall effectiveness of HIV education efforts.

The intricate interplay between commercial objectives and public health possibilities is evident within the sphere of MSM social media dating apps when scrutinised

through a political economy lens. These platforms are fundamentally driven by profit motives, as their commercial objectives revolve around profit maximisation through user expansion, heightened user engagement, and revenue generation via subscriptions and advertising. It is apparent that the primary focus of these apps is not centred on HIV prevention; rather, public health considerations may be regarded as consequential byproducts.

The decision to integrate HIV prevention initiatives within dating apps is significantly influenced by the perceived commercial value of such content. In the context of profit-driven app development, the prioritisation of features that directly contribute to user acquisition, engagement, and revenue generation often takes precedence over public health considerations. Consequently, if app developers assess HIV prevention efforts as incongruous with their commercial objectives, they may be disinclined to incorporate these initiatives within their platforms. Conversely, the integration of HIV prevention content within these platforms may be framed as part of a broader strategic initiative aimed at enhancing user attraction and retention, ultimately fostering increased engagement and financial profitability.

By incorporating public health possibilities into their commercial objectives, dating apps can contribute to the overall well-being of their users and the broader community. In this way, commercial objectives and public health possibilities can align and reinforce each other. By addressing public health concerns and promoting responsible sexual behaviours, dating apps can enhance their value proposition to users, increase user trust and satisfaction, and attract a larger user base. This, in turn, can lead to increased commercial success and sustainability for the app.

Users' perceptions further enriched the findings. A complex relationship also emerges between the users and the apps. The users are found to be generally positive about the HIV-related features but still tend to lean towards local more traditional sources of information, such as Burnett Foundation Aotearoa. This finding presents potential avenues for collaboration between dating apps and professional local health organisations. By partnering with reputable local organisations, such as the Burnett Foundation Aotearoa in New Zealand, dating apps can bridge the gap between their platform and the trusted sources of information preferred by users. This collaboration can enhance the credibility and effectiveness of health-related content provided on the app. The collaboration between MSM social media dating apps and public health

organisations holds significant potential for addressing public health concerns, specifically for HIV prevention. By leveraging their respective expertise and resources, these entities can effectively promote HIV prevention among MSM populations.

The research also presents a forward-looking perspective, uncovering potential opportunities for collaboration and growth. Specifically, it identifies areas for enhancing the integration of HIV-related features, fostering user engagement, and building trust and credibility. This theme resonates with the broader ambition to synergise technological advancements with public health goals, creating a common ground among app developers, public health professionals, and the user community. By coordinating the efforts of these diverse stakeholders, the research outlines a pathway towards harnessing technology to achieve essential health objectives.

The implications of this research provide valuable insights for various stakeholders. App developers are encouraged to innovate and design more engaging HIV-related features by considering user feedback and integrating multimedia tools, thereby fostering a deeper connection and understanding of the subject matter. This promotes engagement and the effectiveness of HIV prevention within digital platforms. Insights into user behaviour and preferences can guide public health professionals in creating targeted interventions that leverage modern technology's capabilities without compromising the integrity and effectiveness of HIV-related information. Policymakers may find the research informative for advocating for thoughtful inclusion of HIV-related features across platforms, furthering the alignment between technological advancements and public health goals. The study also suggests a more inclusive and effective approach to HIV prevention, with particular focus on the MSM community's needs and experiences. Together, these implications open new avenues for further research and could inspire policy changes that promote a more thoughtful integration of HIV-related features. The collective contribution of these insights helps shape practical changes and improvements within the field, centring on user-focused and collaborative strategies in HIV prevention and digital health communication.

Findings from this study contribute to the overarching goal of HIV prevention, offering insights into how HIV-related features on MSM social media dating apps can enhance sexual health initiatives. At a more localised level, the research

specifically addresses the use of HIV-related features for prevention among MSM users in New Zealand, focusing on the enhancement of these features within social media dating apps to promote more effective prevention practices. These insights might also inform the development of similar interventions for MSM or other sexual minority populations outside of New Zealand.

This research provides a comprehensive view of the HIV-related features within MSM social media dating apps, highlighting both the progress in usability and existing shortcomings in engagement and trust. The study points to the necessity of collaborative efforts from various stakeholders, illuminating a path that leverages technology without losing focus on user needs and public health goals. This synthesis lays the groundwork for future discussions and actions, with the potential to foster a more inclusive and effective digital landscape in HIV prevention and awareness.

8.2 Significance of this study

This study contributes to advancing health communication research by providing empirical data on MSM user experiences and facilitating comprehensive discussions on sexual health, specifically focusing on HIV-related features within dating apps. It aims to enhance the current body of knowledge in several distinct ways.

Firstly, it addresses a gap in the literature by systematically assessing the landscape of MSM social media dating apps, examining the presence of HIV-related features, and exploring the perceptions and experiences of MSM users towards these features.

Secondly, it contextualises the experiences of MSM social media dating app users within New Zealand, an area not heavily covered in the existing literature. By doing so, the study provides a culturally specific understanding of digital technology usage related to dating and sexual health, broadening the scope of global MSM research.

Lastly, this research employs an evaluation of HIV-related features' usability, usefulness, desirability, accessibility, findability, and credibility within MSM social media dating apps. The study's innovative methodological contribution includes the content analysis of HIV-related features' screenshots, allowing for a nuanced understanding of the design and presentation of health information within these apps. This analysis will add a unique perspective to the digital health communication research methodologies.

8.3 Research limitations

There are some limitations in this research, mainly in the following aspects:

In recognising the constraints of this research, it is essential to consider the scope of search terms used to select apps for study. The choice of the four terms 'gay,' 'bisexual,' 'LGBT,' and 'homosexual,' though guided by existing scholarship, may not fully encompass the multifaceted landscape of MSM social media dating applications. Potential omissions include terms like 'gay dating apps,' 'same-sex dating apps,' and 'LGBTQ+ social apps,' reflecting a broader industry lexicon. The confinement of searches to the Google Play and Apple app stores, while standard in many studies, leaves out other platforms such as Huawei App Store and Amazon Appstore. This limitation potentially narrows the research's applicability, excluding Windows or BlackBerry smartphones or apps from unauthorised marketplaces. Additionally, focusing only on the New Zealand app stores may limit the global relevance of the findings, a challenge shared with other region-specific studies. The choice to scrutinise only Android versions, although aligned with most users, neglects possible variations in iOS apps, adding another layer to the research's constraints. These limitations, while specific to this study, resonate with broader challenges in digital social research, emphasising the need for nuanced methodologies and continual alignment with the evolving digital landscape.

Understanding the ever-evolving nature of MSM social media dating apps is a known challenge within digital sociology. This dynamism, which is frequently highlighted in existing scholarship, often results in a constantly shifting research environment. In this study, the rapid updates by developers, multiplicity of platforms, and the transient nature of features present challenges that resonate with wider difficulties in capturing the state of digital landscapes. This limitation, although consistent with the experiences of other researchers, affects the study's ability to provide a definitive perspective on the MSM social media dating apps. The snapshot captured as of June 2021 may not fully represent the complexities of this digital ecology. However, recognising this constraint not only informs the interpretation of the current findings but also adds to the ongoing discourse on methodological approaches within the field.

Thirdly, the investigation's choice of a sample size, consisting of 15 interviewees, raises a complex issue central to many social studies: representativeness. While the number was considered suitable for the research's objectives, the sample's

characteristics illuminate both the richness and the challenges of studying the MSM social media dating app user base. Primarily comprised of younger, urbanised users in Auckland, New Zealand, with higher educational and employment status, the sample leaves out significant portions of the community. This limitation is not unique to this study, as debates within the field often grapple with the balance between sample diversity and specificity. The prominent popularity of Grindr in New Zealand, leading to its overrepresentation in the study, further highlights the intricacies of platform-focused research. It serves as a reminder that a single app's prominence can skew understanding of the broader landscape, an issue also acknowledged by scholars studying other platforms. Consequently, this research offers a nuanced but limited view of apps like Scruff, Hornet, and Adam4Adam. The reliance on self-reported data, a common methodological choice, introduces potential biases, a challenge that resonates with wider debates on the validity and reliability of qualitative data. This specific set of limitations, while particular to this study, mirrors broader methodological considerations within the domain, adding to a continuing discourse on the complexity of representing diverse digital communities.

Lastly, it is necessary to recognise the inherent limitations within the content analysis method employed in this study. Grounded in Macnamara's (2005) assertion, one must acknowledge that personal experiences, values, and knowledge may subtly shape the judgment of categories. This subjective dimension of content analysis, as critiqued by Graneheim (2017), can bring into question the authenticity of the findings. When compounded with the fact that the primary researcher served as the coder, the potential for bias becomes an essential consideration (Kolbe & Burnett, 1991). However, these limitations are not unique to this research but reflect broader methodological challenges in content analysis. They underscore the balance between the depth of understanding and methodological rigour, a tension that has been a subject of ongoing debate within the qualitative research community.

8.4 Recommendations for further research

This study, focused on HIV-related features within MSM social media dating apps, harnessed the potential of content analysis and interview methodologies, eliciting invaluable insights. However, alternative research methods could be considered by future scholars to augment understanding and inject fresh perspectives into the existing knowledge base. For instance, surveys could offer a broader quantitative viewpoint, supplementing this research. By accessing a larger and potentially more

diverse sample, surveys may unveil patterns or trends that are generalisable. Conversely, focus groups might enhance qualitative insights, revealing social aspects not apparent through individual interviews or content analyses. These methods, while promising, come with their own set of challenges, such as, sampling bias and moderator influence. Employed thoughtfully, they could augment the findings, fostering a more multifaceted understanding of HIV-related features within MSM social media dating apps, thereby enriching the academic discourse in this field.

Second, the unexpected discovery of underage users during this investigation into users' experiences highlights an area that demands careful ethical consideration and further exploration in future research. Understanding the dynamics and implications of underage participation could contribute valuable insights into the field of social media dating apps. Furthermore, the distinct HIV-related features of the Blued Chinese edition, as compared to its English counterpart, present an intriguing subject that has been largely overlooked in extant literature. This disparity between editions could reveal cultural, regulatory, or market-driven factors that influence app design and functionality. Future research could benefit from a comparative analysis of these versions, potentially shedding light on broader themes in the field of health communication in digital platforms.

Third, given the rapid pace at which MSM social media dating apps are evolving, it is essential that future research adapts to this dynamic landscape. The current study, capturing a snapshot of the apps as they were during the mentioned period, may quickly become outdated. Therefore, it is recommended that future investigations not only continue to monitor these apps as they evolve but also adapt methodologies to keep pace with these changes. Expanding the scope of search terms to encompass a broader array of language used within the MSM community, as well as considering additional app stores beyond the conventional platforms, could enhance the comprehensiveness of subsequent studies.

Finally, considering that most of the interview participants in this study reported using Grindr, future research should explore other MSM social media dating apps that feature HIV-related content for a broader perspective. This study's focus was primarily on users' perceptions of HIV-related features within these apps, with constraints on time and resources limiting the scope. Therefore, future research could benefit from extending inquiries to include interviews with stakeholders from MSM

dating app companies, public health professionals, NGOs, and policymakers. Such an expanded focus would facilitate a more comprehensive understanding of the subject. Additionally, further examination might be directed toward the collaboration between government departments, NGOs, and MSM social media dating apps, unveiling potential synergies or conflicts in the alignment of public health goals.

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2071-2084.business research

Declaration

The researcher acknowledged the use of ChatGPT 4.0 version for language editing purposes. Its use was strictly limited to editing support, while the whole text has been written by the author. The following prompt was used: “Act as an editor and proofread the following PhD thesis to enhance clarity and fix spelling, grammar and punctuation mistakes” Additionally, the thesis was professionally proofread.

Publication

Li, W., Wu, D., Xing, Z., & Chen, Z. (2024). A snapshot of the presence of HIV-related features in MSM social media dating apps in New Zealand. *Scientific Reports*, *14*(1), 22690.

Appendices

Appendix A: Participant information sheet



Participant Information Sheet

Date Information Sheet Produced: 1 May 2022

Project Title: Social media dating apps for men who have sex with men and users' perception of features aimed at HIV prevention

An Invitation

Kia Ora. My name is Jessica Wenjie Li. And I am a doctoral student in the School of Communication Studies, Auckland University of Technology. I would like to invite you to participate in a PhD research project. The research explores the communication capacity of MSM social media dating apps focusing on features and strategies used to communicate and promote HIV prevention among the app user base. I am contacting you to seek to hear your opinions and perspectives about in-app HIV prevention in MSM dating apps. Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. If you choose to withdraw from the study, then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible. I value your time and knowledge for this research. You will be given a gift card as a token of my appreciation.

What is the purpose of this research?

The research explores the communication capacity of MSM social media dating apps focusing on features and strategies used to communicate and promote HIV prevention among the app user base. Further, this research is a requirement to fulfil my PHD qualification. The output of the research will produce a thesis, papers publish in conferences, article in academic journals and other types of academic publication.

How was I identified and why am I being invited to participate in this research?

You have been invited to participate in this research through email invitation. The invitation email consists of brief information about the research, inclusion criteria of the participants and my email address and mobile phone number. You were selected to participate in the research because you meet the criteria of the research.

How do I agree to participate in this research?

Once you agree to participate in this research, I will ask you to sign a consent form stating you are freely giving consent. The interview will be only conducted after the written consent form has been obtained.

What will happen in this research?

The research is primarily centred around an interview between you and me. I envisage the interview lasting between 60 and 90 minutes. I will send you a list of questions and topics related to the conversation before the interview. So you can prepare the answers in advance. However, the conversation does not strictly follow a formalized list of questions. I might ask more open-ended questions, allowing for a discussion with you. The interview will be recorded and transcribed and that you are able to request that the recording be turned off. You will be provided with a copy of the interview transcript for consideration and correction before it is used. The interview will take place in New Zealand. You may choose a place which is convenient for you. Face-to-face interview will only be conducted on COVID-19 Level 1 status and according to AUTECC guidance during COVID-19 Public Health Rāhui. In the case of the Covid-19 Level 2 status or above and when you are unable to attend the face-to-face interview, it will occur via audio/video conference tools online.

What are the discomforts and risks?

I do not anticipate any discomfort or risk.

What are the benefits?

By participating in this research, you will have experience in semi-structure interview and to learn about research. You will also have a chance to discuss and reflect on your perspective of in-app HIV prevention. In addition, I am pursuing the research as part of my doctoral studies, for which I hope to gain a PhD qualification.

How will my privacy be protected?

You will be given a pseudonym to ensure no information provided by you can be directly traced. No others can access the data except me and my PhD supervisors. All data pertaining to you will be kept confidential. Limited confidentiality is acknowledged as limited due to the small pool of possible interviewees.

What are the costs of participating in this research?

There are no financial costs involved, just your time.

What opportunity do I have to consider this invitation?

You will be given one month to decide taking part in this study. You can send me text or email to ask any questions or any further information regarding the research.

Will I receive feedback on the results of this research?

A PDF copy of the research will be made available online after the completion of the doctoral degree. The research will also be disseminated through journal articles and conference presentations. Further, a summary of the findings will be sent via e-mail to you.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Verica Rupar, Professor, School of Communication Studies, verca.rupar@aut.ac.nz, (09) 921-9999 ext 6407.

Concerns regarding the conduct of the research should be notified to the AUTECC Secretariat, ethics@aut.ac.nz, 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Jessica Wenjie Li. Email: wenjie.li@autuni.ac.nz, phone (022) 062-9217.

Project Supervisor Contact Details:

Dr Verica Rupar, Professor, School of Communication Studies, verca.rupar@aut.ac.nz, (09)921-9999 ext 6407.

Approved by the Auckland University of Technology Ethics Committee on 2 May 2022, AUTECC Reference number 21/69.

Appendix B: Consent form



TE WĀNANGA ARONUI
O TĀMAKI MAKĀU RAU

Consent Form

Project title: Social media dating apps for men who have sex with men and users' perception of features aimed at HIV prevention.

Project Supervisor: **Prof Verica Rupa, School of Communication Studies.**

Researcher: **Jessica Wenjie Li**

- I have read and understood the information provided about this research project in the Information Sheet dated 11 Feb 2022.
- I have had an opportunity to ask questions and to have them answered.
- I understand that taking part in this study is voluntary (my choice).
- I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.
- I agree to take part in this research.
- I understand that notes will be taken during the interviews and that they will also be digitally audio-taped and transcribed.
- I wish to receive a summary of the research findings (please tick one): Yes No

Participant's signature :

Participant's name:

Participant's Contact Details:

.....
.....
.....
.....

Date:

Approved by the Auckland University of Technology Ethics Committee on 14 June 2021 AUTEK Reference number 21/69

Note: The Participant should retain a copy of this form.

Appendix C1: Ethics approval



Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
D-88, Private Bag 92006, Auckland 1142, NZ
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

AUT

TE WĀNANGA ARONUI
O TĀMAKI MAKĀU RAU

21 June 2021

Thomas Owen
Faculty of Design and Creative Technologies

Dear Thomas

Ethics Application: **21/69 HIV Prevention Intervention Features in Social Media Dating Apps for Men Who Have Sex with Men in Auckland, New Zealand**

We advise you that the Auckland University of Technology Ethics Committee (AUTEC) has **approved** your ethics application at its meeting of 14 June 2021.

This approval is for three years, expiring 14 June 2024.

Non-Standard Conditions of Approval

1. Please use the current templates for the Information Sheet and Consent Form.

Non-standard conditions must be completed before commencing your study. Non-standard conditions do not need to reviewed by AUTEC before commencing your study, but send them through for our files.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the [Auckland University of Technology Code of Conduct for Research](#) and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.

AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through <http://www.aut.ac.nz/research/researchethics>

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Appendix C2: Ethics amendment



Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
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T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

AUT

TE WĀNANGA ARONUI
O TĀMAKI MAKĀU RAU

4 February 2022

Verica Rupar
Faculty of Design and Creative Technologies

Dear Verica

Re: Ethics Application: **21/69 HIV Prevention Intervention Features in Social Media Dating Apps for Men Who Have Sex with Men in Auckland, New Zealand**

Thank you for your request for approval of amendments to your ethics application.

The amendments to location (all of NZ) and the eligibility criteria (now 18 and over) has been approved.

The change of applicant has been noted.

Standard Conditions of Approval.

1. The research is to be undertaken in accordance with the [Auckland University of Technology Code of Conduct for Research](#) and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard.
8. AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted. When the research is undertaken outside New Zealand, you need to meet all ethical, legal, and locality obligations or requirements for those jurisdictions.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through <http://www.aut.ac.nz/research/researchethics>

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Cc: vdj9520@autuni.ac.nz

Appendix D: Apps list

Table 6 shows the 13 apps that contain HIV-related features, as well as the number of images taken into analysis. These apps together provided 46 images (Li, 2021).

Table 6: Google play MSM social media dating apps

ID	App name	Launched (year)	Developer	Version	Number of images
A	Adam4Adam	2003	A4A Network Inc	4.6.2.6	8
B	Blued	2012	Blue City Holdings Co., Ltd.	3.7.2	1
C	Beuronline	2014	Studio Presse	5.12.328	1
D	Gayroyal	2000	42pixels B.V.	1.2.3	2
E	Grindr	2009	Grindr LLC	7.10.0	4
F	GROWLr	2010	Initech	16.3.2	2
G	Hornet	2011	Hornet Networks Ltd	7.3.0	4
H	Jack'd	2010	Perry Street Software	6.4303	7
I	Manhunt	2001	MHNext LLC	2.7.3	1
J	MUSL	2020	MUSL	2	1
K	RealMen	2018	RM Media GmbH	1.0.9	3
L	ROMEO	2002	ROMEO B.V.	3.12.0	2
M	Scruff	2010	Perry Street Software	6.4303	7

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Appendix E: Coding answers by app

Table 7 contains the coding answers given to apps. One app may contain more than one image, as listed on Appendix D Table 6. That also contains the ID that relates to the app. For instance, A for Adam4Adam, B for Beuronline, and so on. A table containing answers by images is also available with this study dataset (Li, 2021).

Table 7: Coding answers by app

Macros	Variables	App ID													
		A	B	C	D	E	F	G	H	I	J	K	L	M	<i>Sum</i>
USABLE	Interaction														
	Yes	7	1	1	2	7	2	4	7	1	1	3	2	7	45
	No	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Interaction effort														
	Not Applicable	0	0	0	0	0	0	0	6	1	0	0	0	0	7
	Provide standard information	7	0	1	2	7	2	3	1	0	1	3	2	7	36
	Interpersonal interaction	1	1	0	0	0	0	1	0	0	0	0	0	0	3
	Link to a third-party page														
	Yes	1	0	0	0	1	0	0	0	0	0	0	1	2	5
No	7	1	1	2	6	2	4	7	1	1	3	1	5	41	
USEFUL	Educate														
	Not applicable	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Provides basic information	5	0	0	2	7	2	1	5	1	1	3	2	5	34
	Explanatory information	1	0	1	0	0	0	2	2	0	0	0	0	2	8
	Invite users to more knowledge	1	1	0	0	0	0	1	0	0	0	0	0	0	3
DESIRABLE	Mode														
	Text	7	1	1	2	7	2	3	7	1	1	3	1	7	43
	Image	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Text and image	1	0	0	0	0	0	1	0	0	0	0	1	0	3
	Video	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dynamic														
	Still	8	1	1	2	7	2	4	7	1	1	3	2	7	46
	Animated	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Color														
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	1	0	0	0	0	0	0	0	0	1	
≥3	8	1	1	2	6	2	4	7	1	1	3	2	7	45	

Table 7 continues

Macros	Variables	App ID													Sum
		1	2	3	4	5	6	7	8	9	10	11	12	13	
DESIRABLE	Mode														
	Text	7	1	1	2	7	2	3	7	1	1	3	1	7	43
	Image	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Text and image	1	0	0	0	0	0	1	0	0	0	0	1	0	3
	Video	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dynamic														
	Still	8	1	1	2	7	2	4	7	1	1	3	2	7	46
	Animated	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Color														
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	0	0	0	0	0	0	0	0	1	
≥3	8	1	1	2	6	2	4	7	1	1	3	2	7	45	
ACCESSIBLE	Fonts														
	Small	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Normal	8	1	1	2	7	2	4	7	1	1	3	2	7	46
	Big	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FINDABLE	Searchable														
	Yes	0	0	0	0	1	0	0	1	0	0	0	0	0	2
	No	8	1	1	2	6	2	4	6	1	1	3	2	7	44
CREDIBLE	Reliability														
	Not applicable	2	1	0	0	0	0	1	0	0	0	0	0	0	4
	Incorrect information	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Correct information	6	0	1	2	7	2	3	7	1	1	3	2	7	42
	Errors														
	Misspelled	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	Incorrect abbreviation	2	0	0	0	0	0	0	0	0	1	1	0	0	4
	Ambiguous abbreviation	2	0	0	0	0	0	0	0	0	0	0	0	0	2
	Incorrect word splitting	0	0	1	0	0	0	1	0	0	0	2	0	0	4
	No errors	5	0	0	2	7	2	3	7	1	0	0	2	7	36
	Source														
	Not available	2	0	1	0	1	0	2	4	0	0	0	0	0	10
	Common knowledge	5	0	0	2	5	2	1	2	1	1	3	1	5	28
Accredited source	1	1	0	0	1	0	1	1	0	0	0	1	2	8	