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Traversing TechSex: benefits and risks in digitally mediated sex and relationships

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ABSTRACT

Background. Digital technologies play a significant role in people's sexual and intimate lives via smart phones, cameras, dating apps and social media. Although there is a large body of research on the potential risks posed by these technologies, research on benefits and pleasures is limited.

Methods. This study explored digital sexual practices, including perceptions of risks and benefits among a sample of Australian adults ($n = 445$). Data were collected in 2020 via an online survey. Descriptive and bivariate analyses were undertaken to identify significant relationships between demographic variables and the use of technologies in relation to perceived risks and benefits. The mean age of participants was 42 years, over half were women (58.5%) and identified as heterosexual (61.1%). **Results.** Findings reveal that use of digital media was common in participants' sex lives and relationships; 60.3% of participants had viewed pornography online, 34.9% had used dating apps, and 33.9% had sent sexual or naked self-images to another person. Over one in three reported positive outcomes from this: 38.2% felt emotionally connected to their partners due to online communication; 38.0% agreed that digital technologies facilitated closer connections; however, the majority of participants were aware of potential risks associated with online sexual engagement, particularly non-consensual exposure of their sexual or naked images, with women expressing greater concern. **Conclusions.** Policy, legal and educational responses should be based on holistic understanding of digital sexual engagement, acknowledging the ways in which technologies can support sexual relationships while also building people's knowledge and capacity to manage risks.

Keywords: digital sexual literacy, digital technologies, internet, online pornography, online safety, sexting, sexual health promotion, sexual practices.

Introduction

Digital technologies increasingly play a part in people's sex lives and relationships via dating apps, social media and internet-enabled communication.¹⁻³ Smartphones and other devices equipped with cameras mean digitally mediated sex is highly accessible and phones/devices are commonly used for meeting potential lovers, sending messages, 'chatting', sharing sexualised images ('sexting'), communicating via video, and accessing pornography.²⁻⁴

There is now a large body of research dedicated to understanding the social, health, legal and emotional impact of sex-related uses of digital technologies. Much of this work has focused on risks and dangers, such as concerns about public health implications, including increased rates of sexually transmissible infections (STIs), resulting from popularity of dating and hook-up apps,⁵⁻⁷ and safety implications, such as sexual violence linked to image-based abuse⁸ and non-consensual exposure of sexual images ('revenge porn').⁹ In recent decades, there has also been high-profile public debates in Australia, and internationally, centred on mental health, legal and safety concerns about young people sending sexual self-images ('sexting', naked or sexual 'selfies').¹⁰⁻¹³ More recently, law reform, including the recent Australian *Online Safety Act 2021*, has been

enacted in response to harms arising from non-consensual dissemination of sexual images, cyber-stalking, digital harassment and online sexual violence.^{14–17} Although such laws are important to address serious harms, their introduction has raised concern that the dominant focus on risk and danger in both policy and research could lead to censorship or curtailment of consensual online sexual activity or content.¹⁸ Further, digital sexual literacy education is likely to be more effective if education about risk is balanced with recognition of reasons why people use digital technologies in their sex and intimate lives, and that pleasure or sexual connection gained via technologies is important for many people.^{19–21}

Partially in response to these concerns, there is an emerging body of literature exploring the unique role that digital technologies play in facilitating sexual intimacy.^{4,10,20,22,23} This research has shown how smartphones enable people to communicate spontaneously and intimately with long-distance lovers,¹ or to share images or words that express sexual desire, pleasure or affection.^{1,2,24} Conversations via email or text messages can also facilitate an open exchange of emotion or explicit conversations in ways that build sexual and emotional intimacy.^{1,25} Further, the internet enables people to explore new sexual practices or fantasies in safe ways^{2,26} and has been an important space in which lesbian, gay, bisexual, transgender and queer and other gender-diverse people have sought community and connection.^{22,27,28}

This paper presents findings from an Australian survey that explored people's engagement with a range of online sexual practices and their perceptions of the benefits and pleasures, as well as the risks, associated with those practices. The paper has two aims:

1. To identify a range of ways in which people engage with digital technologies in their sex lives and relationships and explore which practices are more common.
2. To explore what is perceived to be the most important benefits and most relevant risks or concerns associated with use of digital technologies in sex lives or relationships and whether these are associated with particular demographic characteristics or experiences using technologies.

Guiding these aims is an overarching interest in the ways people engage with digital technologies to establish, support or enhance sex and intimacy. The literature cited above suggests that the benefits of digital technologies can best be understood in the context of human relationships and intimacy, the pursuit of sexual pleasure, or to explore sexual identity and seek information and support for this.^{1,4,22,29,30} The form and function of the technology is significant in that the internet enables affordable, accessible connection and the small, portable nature of smart devices enables constant and spontaneous communication, often involving visual communication via photos or video.^{4,24,25}

However, the functionality of devices or platforms does not wholly determine people's use or experiences of technology within their sex or intimate lives. Rather, this is produced through the interaction between technologies, human action and human relationships. Online pornography, online dating, messaging and use of webcams are all part of an infrastructure that increasingly forms part of people's sex lives and intimate relationships, producing unique forms of sexual communication, intimacy and experiences.^{4,23} Drawing from this sociomaterial approach to understanding human interaction with technologies,²⁴ in this study, we explored the ways people engage with technologies in their sex lives, with a focus on sexual relationships, intimacies, experiences and pleasures.

The study is intended to lay groundwork for holistic digital sexual literacy education and effective legal, policy and educational responses that recognise the complexity and breadth of people's online sexual experiences. This study is also intended to support further quantitative research into the use and impact of digital technologies in people's sex and intimate lives by trialling previously untested measures regarding perceived benefits and risks in the context of human sexual relationships, intimacy and pleasure.

Data were collected when Australia and many parts of the world experienced an extended period of social lockdown due to the SARS-CoV-2 virus (i.e. the COVID-19 pandemic).³¹ Although one part of this study, to be published elsewhere, looked at the impact of lockdowns on people's use of digital technologies, the broad aim was to explore use of digital technology in sex lives over people's lifetimes, and that is what is reported here. That said, the pandemic and associated lockdowns provided a unique context for this study in that digital technologies were part of many people's social and intimate lives in likely unprecedented ways.^{24,32}

Materials and methods

Ethics approval was granted by the La Trobe University Human Research Ethics Committee (HEC20130). A cross-sectional survey of adults (aged ≥ 18 years) currently living in Australia was used to collect data via an online questionnaire. The survey was widely advertised on Facebook as a study about digital sex and intimacy, including use of technology to establish or maintain relationships. Participants could opt-in to the study by clicking a link that directed them to the questionnaire. Participants were advised that the survey was anonymous and that responses to all items were optional. Data were collected between May and July 2020. There were 445 valid responses. Although this is a relatively small sample drawn using convenience sampling, the aim of the study was to explore use of new digital technologies in sexual relationships rather than draw conclusions on the pattern of digital technology use across the population. Hence, the sample size and sampling strategy was appropriate.

Measures

Demographic characteristics

Standard measures were used to gather information on: age; gender; sex assigned at birth; sexual orientation; country of birth; cultural identity; place of residence; Australian citizenship/residency status; religious affiliation; current household income; employment status; and highest level of education. Participants were also asked their current relationship status, whether they cohabited with their partner(s), and living arrangements at the time of the survey (e.g. live alone, live with others).

Use of digital technologies for sexual purposes

Participants were asked about the use of digital technologies in their sex lives and relationships, including: use of dating apps to arrange in-person hook-ups, dates and/or to meet potential sexual or romantic partners; use of digital devices for sexual communication via texting or talking; production and/or dissemination of home-made pornography or sexual/naked self-images (sexting) or videos; and sending sexual self-images to someone met online or offline. Participants were also asked about perceived benefits of such practices, including sexual gratification or emotional closeness. Participants were also asked about whether they use technologies to view pornography online or to seek information about sex or sexual health.

Perceived benefits

Participants were asked about perceived benefits of digital technologies in three areas: access to information and sexual cultures; developing or enhancing sexual intimacy/connection; and whether technology facilitates sexual gratification. The items used were a combination of novel items developed for this survey as well as items adapted with permission from Lehmler *et al.*,³ who reported on US adults' use of digital technologies to facilitate sex and intimacy. Three benefits scales were created: (1) 'access to information about sexual cultures' (four items: e.g. 'The internet has enabled me to explore sexual cultures I did not have access to previously'); (2) 'sexual connection online' (five items: e.g. 'I feel more sexually connected to my partner(s) because of our online communication'); and (3) 'sexual gratification from online sexual contact' (four items: e.g. 'I find it sexually gratifying or exciting to have sex online via a webcam with another person or persons'). All responses were measured on a five-point Likert scale, ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). All three benefits scales yielded good estimates of internal consistency in this sample ($\alpha > 0.78$).

Perceived risks

To measure risks associated with the use of digital technologies for sex and intimacy, participants were asked to indicate the extent to which they were concerned about a defined set of circumstances and outcomes and the extent

to which they worried about exposure associated with the use of digital technology related to sexual activity. Two risks scales were created to capture concerns about consequences: (1) 'concerns about potential problems or consequences of online sexual engagement' (four items: e.g. 'sharing explicit or naked images or videos risks criminal prosecution'); and (2) 'worries about unwanted exposure' (five items: e.g. 'I worry that if I search for pornography online, my search history will be seen by others'). Responses were measured on a four-point Likert scale, ranging from 1 (*not at all concerned*) to 4 (*very concerned*). Both scales yielded good estimates of internal consistency in this sample ($\alpha > 0.75$).

Analysis

Descriptive analysis was used to explore demographic characteristics and responses to the perceived risks and benefits statements. Bivariate analysis was undertaken to identify significant relationships between demographic variables and the use of technologies in relation to the risks and benefits scales. For continuous variables, correlation analyses using a Pearson's product-moment test were conducted. For categorical variables, chi-squared tests of independence and *t*-tests were used. Multivariate analysis was not undertaken as bivariate findings pointed to a range of issues relevant to perceived risks and benefits of digital technologies and sex, as per the study aims.

Participants

Participant characteristics are described in [Table 1](#). Some data were missing (range: 26.5–40.2%). Little's missing completely at random (MCAR) test revealed all data were missing at random, $P > 0.133$, possibly reflecting fatigue or boredom effects as non-response rates increased toward the end of the questionnaire. Participant ages ranged from 18 to 80 years ($M = 42.00$, $s.d. = 16.24$). Most participants were female (58.5%) (inclusive of cisgender and transgender women) and identified as heterosexual (61.1%). Over half the participants were partnered (56.4%) and 36.2% were cohabiting with their partner. Most participants were born in Australia (71.7%) and identified as Caucasian/Anglo Saxon/White (67.4%). The majority indicated they did not hold religious views or affiliations (56%). The sample was well educated, with 65.3% holding a university qualification, and 60.0% were currently employed.

Results

Digital technology in participants' sex lives and relationships

Viewing pornography online was the most common means by which participants used technology in their sex lives, with

Table 1. Characteristics of participants.

	<i>n</i> (%)
Age range (mean)	18–80 (42 years)
Gender identity	
Female (includes cisgender and transgender, <i>n</i> = 2 women identify as transgender)	252 (58.5)
Male (includes cisgender and transgender, <i>n</i> = 3 men identify as transgender)	146 (33.9)
Nonbinary or gender fluid	28 (6.3)
Other	5 (1.2)
Sex assigned at birth	
Female	267 (62.7)
Male	148 (34.7)
Other/prefer not to say	11 (2.5)
Identify as transgender	13 (3.1)
Born with intersex characteristics	3 (<1%)
Sexual identity	
Heterosexual or straight	256 (61.1)
Bisexual	60 (14.3)
Gay/homosexual/lesbian	39 (9.3)
Queer	25 (6.0)
Pansexual	13 (3.1)
Other or prefer not to specify	26 (6.2)
Relationship status (multiple responses permitted)	
Partner/s who lives with me	161 (36.2)
Partner/s who does not live me	90 (20.2)
No partner/single	131 (29.4)
Other	15 (3.4%)
Current living arrangement (household makeup) (multiple responses permitted)	
Live alone	64 (14.4)
Live with partner/spouse	161 (36.2)
Live with dependent children	54 (12.1)
Live with other family members	52 (11.7)
Live with friends/flatmates	60 (13.5)
Live with pets	57 (12.8)
Aboriginal or Torres Strait Islander	6 (1.4)
Country of birth	
Australia	292 (71.7)
Other	115 (28.3)
Cultural or ethnic identity	
Caucasian/Anglo/white/Australian	300 (67.4)
South East Asian	21 (4.7)
South Asian	10 (2.2)
Greek	8 (1.8)
Aboriginal or Māori	6 (1.4)

Table 1. (Continued).

	<i>n</i> (%)
Eastern European	5 (1.1)
Other	16 (3.6)
Religiosity	
None/atheist	225 (56.0)
Christian	82 (20.4)
Agnostic	39 (9.7)
Buddhist	11 (2.7)
Jewish	9 (2.2)
Muslim	8 (2.0)
Hindu	2 (<1)
New age	2 (<1)
Other/prefer not to say	23 (5.7)
Importance of religion	
Not at all or a little important	236 (67.6)
Important, very or extremely important	113 (32.4)
Have a disability that affects ability to engage in everyday activities or work	61 (15.5)
Highest level of education completed	
Primary school only	1 (<1)
Up to 4-years high school (year 10)	15 (3.8)
Leaving certificate/HSC/Year 12	56 (14.1)
Tertiary diploma/trade certificate/TAFE	61 (15.3)
Undergraduate university degree	100 (25.1)
Postgraduate university degree	160 (40.2)
Prefer not to say	5 (1.3)
Annual household income in 2019 (Australian dollars)	
<AUD50 000	94 (23.8)
AUD50 000–AUD99 999 per year	113 (28.5)
AUD100 000–AUD199 999 per year	110 (27.8)
≥AUD200 000 per year	30 (7.6)
Don't know or prefer not to say	49 (12.4)
Current employment status (multiple responses permitted)	
Employed full time	138 (31.0)
Employed part time or casual	129 (29.0)
Unemployed	47 (10.6)
Retired	32 (7.2)
Home duties	13 (12.9)
Student	74 (16.6)
Other	23 (5.2)
Currently working from home (at time of survey)	
Working from home entirely	147 (42.4)
Working from home part of the time	51 (14.7)
Not working at home	149 (42.9)

Table 2. Use of online technology in participants' sex lives.

Dating and hook up apps	Occasional or regular use, n (%) ^A
Dating apps/websites to meet people for casual dates	108 (30.1)
Dating apps/websites to meet people for long-term relationships	79 (22.3)
Dating apps/websites to meet people for casual sex	79 (22.0)
Ever used dating apps for casual dates, long-term relationships or casual sex	128 (34.9)
Production or consumption of pornography and erotic imagery	Occasional or regular use, n (%) ^A
Viewed pornography online	207 (60.3)
Sent erotic images (sexts) to a lover or partner you were also seeing in real life	117 (33.9)
Received sexually explicit messages or images without asking for them	68 (20.0)
Sent erotic images (sexts) to someone you knew online but not in real life	47 (13.6)
Information-seeking related to sex and sexual health (ever in lifetime)	Frequently or occasionally, n (%) ^B
I have used the internet to find information about sex	146 (32.8)
I have used the internet to find information about sexual health	151 (33.9)

^APeople reporting regular or occasional use compared to those who have never used technologies for these purposes. Valid percentages, missing data excluded.

^BPercentage of total dataset reported as it was not possible to differentiate between 'no' and missing data for these items.

60.3% reporting 'ever' having viewed pornography online, whereas 34.9% had used dating or hook-up apps 'ever' and 33.9% had sent sexual images (sexts) to a lover or partner whom they knew offline (Table 2). Participants were less likely to have sent sexual images to someone they did not know offline, with 13.6% reporting they had done so, and 20% had received an unsolicited sexualised message or image.

Those aged under 30 years were more likely than other age groups to have sent sexual images to partners ($\chi^2[3455] = 32.95, P < 0.001$), used the internet to seek information on sexual health ($\chi^2[3275] = 26.06, P < 0.001$), or have received unsolicited sexual images from another person ($\chi^2[3455] = 12.86, P = 0.005$; Table 3). Participants who had a sexual partner with whom they were not cohabiting were most likely to have used dating apps ($\chi^2[2375] = 19.00, P < 0.001$), sent sexual images to partners ($\chi^2[2375] = 26.78, P < 0.001$), or used the internet to find information on sexual health ($\chi^2[2268] = 15.99, P < 0.001$; Table 3).

Men and gender non-binary people were more likely than women to have viewed pornography online ($\chi^2[2426] = 23.29, P < 0.001$); however, women and non-binary people were more likely than men to have sent sexual images to

partners ($\chi^2[2426] = 6.73, P = 0.035$). With respect to sexual identity, participants who identified as lesbian, gay, bisexual/pansexual or queer were more likely than heterosexual participants to have used dating apps ($\chi^2[1419] = 25.49, P < 0.001$), sent sexual images to partners ($\chi^2[1419] = 10.47, P = 0.002$), sent images to someone met online ($\chi^2[1419] = 16.30, P < 0.001$), sought information about sexual health online ($\chi^2[1275] = 13.32, P < 0.001$), or to have received unsolicited sexual images ($\chi^2[1419] = 28.22, P < 0.001$; Table 3).

Access to information and new sexual cultures

When asked whether information found online had helped them feel more comfortable about sex, 54.4% agreed, whereas 49.1% agreed that the internet had enabled them to explore sexual cultures to which they did not previously have access (Table 4). Participant characteristics associated with a greater likelihood of perceiving benefits associated with accessing sexual information and cultures online included: being younger ($r = -0.173, P = 0.006$); identifying as lesbian, gay, bisexual/pansexual or queer ($t[245] = -2.94, P = 0.004$); past use of digital technology to view pornography ($t[245] = 4.55, P = < 0.001$); and having sent erotic/sexual images to partners ($t[245] = 3.45, P < 0.001$; Table 5).

Developing intimacy and sexual connection

When asked about intimacy and sexual connection, 38.2% reported that they felt more emotionally connected to their partners due to online communication, 38.0% agreed that connecting with people online helped them develop closer connections, and 27.4% felt more sexually connected with partners due to online communication (Table 4). Participant characteristics associated with a greater sense of connection included: being younger ($r = -0.131, P = 0.004$); not cohabiting with partners ($t[154] = -2.81, P = 0.005$); experience in using digital technology to view pornography ($t[247] = 2.63, P = 0.009$); having sent sexual or naked images to someone met online ($t[247] = 3.33, P = 0.001$); or having sought information online about sexual health ($t[237] = 3.67, P < 0.001$; Table 5).

Sexually gratifying connection

There were 30.9% who indicated they found it sexually gratifying to share sexual text messages with someone they met online, whereas 30.6% indicated they found it sexually gratifying to receive erotic or sexual images from someone they had met online (Table 4). Participant characteristics associated with a greater sense of gratification included: being male ($t[220] = 4.30, P < 0.001$); not cohabiting with a partner ($t[140] = -4.14, P < 0.001$); being born overseas ($t[241] = -2.97, P = 0.002$); experience in using

Table 3. Regular or occasional use of digital technology × characteristics of participants.

	Used dating apps ever	Viewed pornography online	Sent erotic images (sexts) to a lover/partner you were also seeing in real life	Sent erotic images (sexts) to someone you knew online but not in real life	Received sexually explicit messages or images without asking for them	Used the internet to find information about sex	Used the internet to find information about sexual health
Age (years)							
<30	38 (29.2)	66 (50.8)	54 (41.5)	16 (12.3)	29 (22.3)	55 (67.9)	58 (71.6)
30–39	33 (34.4)	54 (56.3)	28 (29.2)	11 (11.5)	19 (19.8)	38 (60.3)	40 (63.5)
40–49	19 (29.2)	27 (41.5)	17 (26.2)	10 (15.4)	6 (9.2)	19 (48.7)	21 (53.8)
50+	38 (24.7)	60 (39.0)	18 (11.7)	10 (6.5)	14 (9.1)	34 (37.0)	32 (34.8)
	$\chi^2 (3455) = 2.75$	$\chi^2 (3455) = 8.78^*$	$\chi^2 (3455) = 32.95^{***}$	$\chi^2 (355) = 4.80$	$\chi^2 (3455) = 12.86^{**}$	$\chi^2 (3275) = 18.37^{***}$	$\chi^2 (3275) = 26.06^{***}$
Gender^A							
Male	46 (31.5)	91 (62.3)	29 (19.9)	21 (14.4)	24 (16.9)	42 (49.4)	40 (47.1)
Female	70 (27.8)	98 (38.9)	78 (31.0)	21 (8.3)	38 (15.1)	89 (52.7)	97 (57.4)
Non-Binary	12 (42.9)	18 (64.3)	10 (35.7)	5 (17.9)	6 (21.4)	6 (21.4)	14 (70.0)
	$\chi^2 (2426) = 2.95$	$\chi^2 (2426) = 23.29^{***}$	$\chi^2 (2426) = 6.73^*$	$\chi^2 (2426) = 4.87$	$\chi^2 (2426) = 0.80$	$\chi^2 (2274) = 4.33$	$\chi^2 (2274) = 4.37$
Sexuality							
LGBQ ^A	73 (44.8)	88 (54.0)	60 (36.8)	31 (19.0)	46 (28.2)	76 (66.1)	78 (67.8)
Heterosexual	55 (21.5)	119 (46.5)	57 (22.3)	16 (6.3)	22 (8.6)	70 (43.8)	73 (45.6)
	$\chi^2 (1419) = 25.49^{**}$	$\chi^2 (1419) = 2.24$	$\chi^2 (1419) = 10.47^{**}$	$\chi^2 (1419) = 16.30^{***}$	$\chi^2 (1419) = 28.22^{***}$	$\chi^2 (1275) = 13.41^{***}$	$\chi^2 (1275) = 13.32^{***}$
Disability status							
No reported disability	106 (31.9)	178 (53.6)	101 (30.4)	39 (11.7)	53 (16.0)	118 (51.1)	125 (54.1)
Disability	22 (36.1)	29 (47.5)	16 (26.2)	8 (13.1)	15 (24.6)	28 (63.6)	26 (59.1)
	$\chi^2 (1393) = 0.40$	$\chi^2 (1393) = 0.76$	$\chi^2 (1393) = 0.43$	$\chi^2 (1393) = 0.09$	$\chi^2 (1393) = 2.68$	$\chi^2 (1275) = 2.34$	$\chi^2 (1275) = 0.37$
Relationship status							
Cohabiting r/ship	32 (20.4)	80 (51.0)	30 (19.1)	14 (8.9)	24 (15.3)	50 (46.7)	46 (43.0)
Non-cohabiting r/ship	39 (44.8)	54 (62.1)	44 (50.6)	16 (18.4)	18 (20.7)	43 (66.7)	47 (74.6)
Single	51 (38.9)	68 (51.9)	37 (28.2)	14 (10.7)	24 (18.3)	49 (50.0)	53 (54.1)
	$\chi^2 (2375) = 19.00^{***}$	$\chi^2 (2375) = 3.09$	$\chi^2 (2375) = 26.78^{***}$	$\chi^2 (2375) = 5.06$	$\chi^2 (2375) = 1.20$	$\chi^2 (2268) = 6.75^*$	$\chi^2 (2268) = 15.99^{***}$
Living arrangements							
Live alone	32 (50.0)	37 (57.8)	19 (29.7)	8 (12.5)	10 (15.6)	25 (54.3)	29 (63.0)
Live with other adults	96 (25.2)	170 (44.6)	98 (25.7)	39 (10.2)	58 (15.2)	121 (52.8)	122 (53.3)
	$\chi^2 (1455) = 16.45^{***}$	$\chi^2 (1455) = 3.83$	$\chi^2 (1455) = 0.45$	$\chi^2 (1455) = 0.30$	$\chi^2 (1455) = 0.01$	$\chi^2 (1275) = 0.06$	$\chi^2 (1275) = 1.48$

(Continued on next page)

Table 3. (Continued).

	Used dating apps ever	Viewed pornography online	Sent erotic images (sexts) to a lover/partner you were also seeing in real life	Sent erotic images (sexts) to someone you knew online but not in real life	Received sexually explicit messages or images without asking for them	Used the internet to find information about sex	Used the internet to find information about sexual health
Annual household income (AUD)							
<50 000	35 (37.2)	50 (53.2)	32 (34.0)	10 (10.6)	20 (21.3)	36 (61.0)	37 (62.7)
50 000–99 000	40 (35.4)	55 (48.7)	35 (31.0)	16 (14.2)	20 (17.7)	44 (52.4)	42 (50.0)
100 000–199 000	39 (35.5)	64 (58.2)	33 (30.0)	14 (12.7)	21 (19.1)	38 (50.7)	46 (61.3)
≥200 000	8 (26.7)	19 (63.3)	9 (30.0)	6 (20.0)	3 (10.0)	12 (48.0)	10 (40.0)
	χ^2 (3347) = 1.13	χ^2 (3347) = 3.14	χ^2 (3347) = 0.44	χ^2 (3347) = 1.85	χ^2 (3347) = 2.00	χ^2 (3243) = 1.93	χ^2 (3243) = 5.74
Importance of religion							
Not/a little important	83 (35.2)	132 (55.9)	82 (34.7)	29 (12.3)	43 (18.2)	91 (54.8)	96 (57.8)
Important ^B	35 (31.0)	56 (49.6)	25 (22.1)	16 (14.2)	22 (19.5)	41 (53.2)	44 (57.1)
	χ^2 (1349) = 0.60	χ^2 (1349) = 1.25	χ^2 (1349) = 5.73	χ^2 (1349) = 0.24	χ^2 (1349) = 0.79	χ^2 (1243) = 0.52	χ^2 (1243) = 0.01
Country of birth							
Australian born	93 (31.8)	131 (44.9)	82 (28.1)	32 (11.0)	51 (17.5)	104 (51.5)	107 (53.0)
Born overseas	35 (30.4)	76 (66.1)	35 (30.4)	15 (13.0)	17 (14.8)	42 (57.5)	44 (60.3)
	χ^2 (1407) = 0.08	χ^2 (1407) = 14.87***	χ^2 (1407) = 0.22	χ^2 (1407) = 0.35	χ^2 (1407) = 0.43	χ^2 (1275) = 0.79	χ^2 (1275) = 1.15

^AIncludes lesbian, gay, bisexual, pansexual and queer-identified participants.

^BReligion important, very important or extremely important.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Table 4. Perceived benefits of sex online, *n*(%).

	Agree	Unsure or disagree	Not applicable
Access to information and sexual cultures^A (perceived benefits scale 1)			
Information I have found online has helped me feel more comfortable about sex	149 (54.4)	78 (28.5)	47 (17.2)
The internet has enabled me to explore sexual cultures I did not have access to previously	134 (49.1)	73 (26.7)	66 (24.2)
Thanks to the internet, I have tried new things in my sex life	132 (48.5)	82 (30.1)	58 (21.3)
I have used the internet to find information about sex that has improved my sexual experiences	122 (44.5)	95 (34.7)	57 (20.8)
Intimacy and sexual connection^B (perceived benefits scale 2)			
I feel emotionally connected to my partner(s) because of our online communication	110 (38.2)	81 (28.1)	97 (33.7)
Connecting with someone online helps me to develop a closer connection with them	108 (38.0)	127 (44.7)	49 (17.3)
I feel more sexually connected to my partner(s) because of our online communication	79 (27.4)	103 (35.8)	106 (36.8)
I feel that I can be more honest with someone online than in person	79 (27.4)	160 (55.6)	49 (17.0)
I feel as emotionally connected with someone when communicating online as I do in real life	61 (21.3)	183 (63.8)	43 (15.0)
Sexually gratifying connection^C (perceived benefits scale 3)			
I find it sexually gratifying or exciting to share explicit text messages with someone I have met online	101 (30.9)	124 (37.9)	102 (31.2)
I find it sexually gratifying or exciting to receive erotic or sexual images from someone I have met online	100 (30.6)	149 (45.6)	110 (33.6)
I find it sexually gratifying or exciting to share erotic or sexual images of myself with someone I have met online	68 (20.8)	149 (45.6)	110 (33.6)
I find it sexually gratifying or exciting to have sex online via a webcam with another person or persons	49 (15.0)	159 (48.6)	119 (36.4)

^AMissing responses: *n* = 170.

^BMissing responses: *n* = 157.

^CMissing responses: *n* = 118.

digital technology to view pornography ($t[241] = 7.43$, $P < 0.001$); having sent sexual images to a partner ($t[241] = 7.15$, $P < 0.001$); having sent images to someone they met online ($t[241] = 8.19$, $P < 0.001$); or having sought information about sexual health online ($t[210] = 3.53$, $P < 0.001$; [Table 5](#)).

Perceived risks or negative consequences

When asked about their level of concern with potentially negative consequences of online sexual engagements, participants were most likely to agree that sharing naked or explicit images or videos could cause them embarrassment (58.7%), or that online sexual engagement could cause them problems in the workplace (51.3%; [Table 6](#)). Participant characteristics associated with a greater sense of concern about potential consequences or problems included: identifying as heterosexual ($t[246] = 4.52$, $P < 0.001$); never having sent sexual images to a partner ($t[246] = -3.47$, $P = 0.001$); and having less experience in using the internet to search for information on sexual health ($t[246] = -1.98$, $P = 0.049$; [Table 7](#)).

In relation to the potential exposure of their digital sexual histories, 50.8% indicated that they worried their search history could be seen by others if they searched for

pornography, and 26.0% indicated they worried that their data might be hacked if they shopped for sex products online. A similar number (24.0%) worried about providing personal contact details when shopping for sex products online ([Table 6](#)). Participant characteristics associated with greater concerns about potential exposure were: being female ($t[247] = -2.33$, $P = 0.021$); not cohabiting with a partner ($t[165] = 2.14$, $P = 0.034$); earning >AUD50 000 per annum (household income; $t[267] = -2.82$, $P = 0.005$); and never having sent sexual messages to a partner ($t[267] = -3.45$, $P = 0.001$) or to a person known only online ($t[267] = -3.49$, $P = 0.001$; [Table 7](#)).

Knowledge of rights and data ownership

When asked about knowledge of copyright and ownership of digital content, 85.9% were confident that sending or uploading an image meant that they lost control of where those images appeared, and 77.3% agreed that sharing explicit images of other people risked criminal prosecution in some circumstances. Participants reported uncertainty about whether uploading a sexual image to a website meant the website then owned the image; 56.1% agreed that the website would own those images, but 21.2% did not know. In addition, 19.0% indicated they did not know

Table 5. Perceived benefits (bivariate) of technology use according to participant characteristics and use of technologies in sex life, *n* (%)

	Access to information and culture	Intimacy and sexual connection	Sexually gratifying connection
Age	$r = -0.173^{**}$	$r = -0.131^*$	$r = -0.111$
Gender ^A			
Male	3.47 (0.98)	3.10 (0.95)	3.20 (1.08)
Female	3.36 (0.94)	2.84 (0.91)	2.51 (1.17)
	$t(226) = 0.78$	$t(227) = 1.98$	$t(220) = 4.30^{***}$
Sexuality			
LGBQ ^B	3.64 (0.86)	3.63 (0.79)	2.92 (1.16)
Heterosexual	3.29 (0.97)	2.84 (0.94)	2.64 (1.19)
	$t(245) = -2.94^{**}$	$t(247) = 0.22$	$t(241) = 0.41$
Disability status			
No reported disability	3.43 (0.93)	2.90 (0.91)	2.78 (1.17)
Disability	3.52 (1.01)	3.10 (0.90)	2.65 (1.29)
	$t(245) = -0.57$	$t(247) = -1.10$	$t(241) = 0.62$
Relationship status			
In relationship	3.45 (0.99)	2.93 (0.93)	2.79 (1.24)
Single	3.40 (0.86)	2.92 (0.87)	2.66 (1.10)
	$t(239) = 0.33$	$t(241) = 0.29$	$t(234) = 0.79$
Cohabiting with partner			
Cohabiting	3.39 (1.02)	2.75 (0.97)	2.44 (1.16)
Not cohabiting	3.56 (0.94)	3.16 (0.83)	3.26 (1.18)
	$t(152) = -1.03$	$t(154) = -2.81^{**}$	$t(140) = -4.14^{***}$
Living arrangements			
Live alone	3.42 (0.92)	2.99 (0.92)	2.88 (1.22)
Live with other adults	3.44 (0.95)	2.91 (0.91)	2.75 (1.18)
	$t(245) = -0.13$	$t(247) = 0.49$	$t(241) = 0.67$
Household income (AUD) ^C			
<50 000 p/a	3.46 (0.99)	2.90 (0.99)	2.76 (1.18)
≥50 000 p/a	3.43 (0.92)	2.93 (0.89)	2.77 (1.18)
	$t(245) = 0.23$	$t(247) = -0.24$	$t(241) = -0.09$
≥100 000 p/a	3.37 (0.9)	2.93 (0.89)	2.65 (1.21)
	$t(245) = 1.02$	$t(247) = 0.02$	$t(241) = 1.41$
Importance of religion			
Not important or a little important	3.40 (0.94)	2.94 (0.94)	2.73 (1.20)
Important, very or extremely	3.60 (0.90)	2.89 (0.92)	2.83 (1.20)
	$t(216) = -1.45$	$t(184) = -0.78$	$t(186) = 0.42$
Country of birth			
Australian born	3.42 (1.00)	2.94 (0.88)	2.62 (1.19)
Born overseas	3.48 (0.76)	2.90 (1.00)	3.12 (1.09)
	$t(245) = -0.43$	$t(247) = 0.33$	$t(241) = -2.97^{**}$
Viewed pornography online			
Never or once or twice	3.08 (1.03)	2.73 (0.91)	2.08 (1.08)
Occasionally or regularly	3.63 (0.83)	3.04 (0.89)	3.15 (1.07)
	$t(245) = 4.55^{***}$	$t(247) = 2.63^{**}$	$t(241) = 7.43^{***}$

(Continued on next page)

Table 5. (Continued).

	Access to information and culture	Intimacy and sexual connection	Sexually gratifying connection
Sent erotic images (sexts) to a lover or partner you were also seeing in real life			
Never or once or twice	3.29 (0.96)	2.85 (0.93)	2.37 (1.15)
Occasionally or regularly	3.71 (0.96)	3.04 (0.87)	3.38 (0.97)
	$t(245) = 3.45^{***}$	$t(247) = 1.96$	$t(241) = 7.15^{***}$
Received sexually explicit messages or images without asking for them			
Never or once or twice	3.32 (0.91)	2.87 (0.92)	2.62 (1.19)
Occasionally or regularly	3.86 (0.93)	3.13 (0.84)	3.17 (1.07)
	$t(245) = 3.83^{***}$	$t(247) = 1.96^*$	$t(241) = 3.22^{**}$
Sent sexual or erotic images (sexts) to someone you knew online but not in real life			
Never or once or twice	3.32 (0.93)	2.84 (0.91)	2.54 (3.75)
Occasionally or regularly	4.03 (0.72)	3.35 (0.79)	3.75 (0.84)
	$t(245) = 4.50^{***}$	$t(247) = 3.33^{**}$	$t(241) = 6.78^{***}$
I have used the internet to find information about sex			
Never or once or twice	2.99 (0.92)	2.65 (0.91)	2.36 (1.23)
Occasionally or frequently	3.77 (0.81)	3.12 (0.87)	3.08 (1.06)
	$t(245) = 6.97^{***}$	$t(237) = 4.06^{***}$	$t(210) = 4.61^{***}$
I have used the internet to find information about sexual health			
Never or once or twice	3.05 (0.97)	2.66 (0.93)	2.43 (1.20)
Occasionally or frequently	3.70 (0.83)	3.10 (0.86)	3.00 (1.13)
	$t(245) = 5.51^{***}$	$t(237) = 3.67^{***}$	$t(210) = 3.53^{**}$

^ANon-binary gender identity excluded from this analysis due to low numbers.

^BIncludes lesbian, gay, bisexual, pansexual, queer.

^CIncome categories: <AUD50 000 vs ≥AUD50 000 and <AUD100 000 vs ≥AUD100 000.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

if they had a legal right to ask for their images to be removed from a website (Table 6).

Discussion

This paper contributes to a body of research striving to understand how new digital technologies enhance and facilitate face-to-face and digitally mediated sex and intimacy, while also exploring how people perceive associated risks and problems. The purpose is to build a nuanced understanding of the ways people engage with technologies in their sex lives and relationships to inform educational, health promotion, legal and policy responses to potential risks. People rarely take risks with their health or safety outside a context in which they are seeking some form of benefit or human connection. A better understanding of this context will lead to more appropriately targeted responses.

The findings from this study align with previous research that has shown the use of the internet to view pornography and to seek casual partners via dating apps or websites is not uncommon.^{33,34} Indeed, nearly half the participants had viewed pornography online, and almost one in three had

used dating apps at some point in their lives. However, these findings also suggest that digital technology plays an ongoing part in people's relationships, and is not simply a medium through which people meet sexual or romantic partners. The use of technology to seek sexual intimacy or gratification was common among participants who were in non-cohabiting relationships, and these participants were more likely to report that online communication facilitated a sense of sexual or emotional connection with partners and that online sexual communication was sexually gratifying.

Interestingly, people who were born overseas were more likely to report receiving sexual gratification from digitally mediated sex. Although these findings cannot explain why this is so, previous research has indicated that migrants often connect with people from their home countries via dating apps or stay in touch with lovers/partners via digital technologies (phones, text, webcams). Dating apps may also provide a way for newly arrived or temporary migrants to engage in social or dating cultures in their 'new' country.³⁵⁻³⁷

There is a tendency for digital communication to be viewed as superficial or inferior to face-to-face contact or physical intimacy, or as something that people do only when physical contact is not an option.^{24,38,39} Although digital

Table 6. Concerns and perceived problems and knowledge of law, *n* (%).

Concerns about potential problems or consequences of online sexual engagement (perceived risks scale 1)	Concerned	Not concerned		
Sharing sexually explicit or naked images or videos with someone could cause me <i>embarrassment</i>	158 (58.7)	111 (41.3)		
Sharing sexually explicit or naked images or videos with someone could cause me <i>problems in the workplace</i>	138 (51.3)	131 (29.4)		
Sharing sexually explicit or naked images or videos with someone could cause me <i>problems with friends or family</i>	123 (45.7)	146 (54.3)		
Sharing sexually explicit or naked images or videos with someone could cause me <i>legal problems</i>	112 (41.6)	157 (58.4)		
Worries about unwanted exposure (perceived risks scale 2)	Agree	Disagree	Not applicable	Don't know
I worry that if I search for pornography online my search history will be seen by others	135 (50.8)	83 (31.2)	35 (13.2)	13 (4.9)
I worry that my data will be hacked if I purchase sex products online	68 (26.0)	125 (47.7)	31 (11.8)	38 (14.5)
I worry about giving my personal contact details to companies if I purchase sex toys online	63 (24.0)	143 (54.4)	45 (17.1)	12 (4.6)
I worry that my friends or family will find out if I purchase sex toys online	58 (22.1)	154 (58.6)	40 (15.2)	11 (4.2)
Knowledge of rights and ownership	Agree	Disagree	Not applicable	Don't know
Sharing explicit or naked images or videos of <u>myself</u> online or via text means I no longer have control over where that image(s) or video appear(s)	231 (85.9)	13 (4.9)	17 (6.3)	8 (3.0)
Sharing explicit or naked images or videos of <u>other people</u> risks criminal prosecution	208 (77.3)	23 (8.5)	17 (6.3)	21 (7.8)
Sharing explicit or naked images or videos could potentially lead me to lose my job	159 (59.1)	43 (16.0)	35 (13.0)	32 (11.9)
Uploading sexually explicit or naked images or videos to a website means that website owns that image/video	151 (56.1)	34 (12.6)	27 (10.0)	57 (21.2)
Sharing explicit or naked images or videos of <u>myself</u> to a website means I have no right to ask for that image/video to be removed	76 (28.3)	113 (42.1)	28 (10.4)	51 (19.0)

Missing responses excluded (~*n* = 176).

communication may not replicate the experience of physical intimacy, the perception of it being inferior ignores the possibility that digital technologies offer a unique medium for facilitating sexual or emotional connections between people.^{22,38,40–42} Technology may also provide opportunities for people to explore or understand their sexuality or sexual connections in ways not available offline or elsewhere in daily life.^{43–46} The findings from this study confirm technologies provided both these experiences for participants. More than half reported that information they found online helped them to feel more comfortable with sex, and just under half agreed that the internet had enabled them to explore sexual cultures to which they had no previous access. In addition, more than one in three agreed that connecting with someone online helped them achieve a greater sense of sexual or emotional intimacy with that person.

Lesbian, gay, bisexual or queer participants in this study were more likely than heterosexual participants to have used dating apps, met someone online, sent sexualised images to another person, or sought sexual health information online. These findings reflect gay and bisexual men's early adoption of mobile phone hook-up technologies⁴⁷ and the part that online spaces play in connecting people of diverse sexualities.⁴⁸ For these reasons, technology may be more integrated into the sex and social lives of lesbian, gay, bisexual or queer people than it is for heterosexual people. This is important given the internet is a key site through

which specific lesbian, gay, bisexual or queer sexuality education can be made available to young people and school-leavers who have not had access to such content in school-based sexuality education.^{49,50}

There were distinctly gendered patterns in these findings. Women were less likely than people of other genders to report accessing pornography online but were more likely, along with non-binary people, to have sent sexualised or naked images of themselves to people met online. Men were more likely than people of other genders to report that they received sexual gratification from the use of digital technologies in their sex lives. These findings are not surprising given men are generally afforded greater freedom than women to express sexual desire or gratification,^{51,52} and sexualised images and pornography are more commonly created for a heterosexual male gaze.^{53,54} Women, particularly young women, may feel more pressure than men to send naked images to sexual partners.⁵⁵

Participants in this study, particularly women, were also aware of a range of personal, reputational and employment harms that could result from non-consensual use of data and audio-visual materials derived from digital technologies. Given well-publicised media reports and research on such harms,^{9,56–59} there is good reason to be aware of such risks.^{15,60} Participants were, however, less certain about their rights regarding ownership or control of digital

Table 7. Risk and concerns (bivariate) about technology according to characteristics of participants and use of technologies in their sex life, *n* (%).

	Worries about exposure	Concerns about problems
Age	<i>r</i> = 0.083	<i>r</i> = -0.004
Gender ^A		
Male	2.25 (0.71)	2.39 (0.88)
Female	2.42 (0.68)	2.69 (0.99)
	<i>t</i> (227) = 1.70	<i>t</i> (247) = -2.33*
Sexuality		
LGBQ ^B	2.10 (0.68)	2.58 (0.97)
Heterosexual	2.49 (0.67)	2.66 (0.98)
	<i>t</i> (246) = 4.52***	<i>t</i> (267) = 1.70
Disability status		
No reported disability	2.33 (0.67)	2.59 (0.95)
Disability	2.23 (0.86)	2.52 (1.08)
	<i>t</i> (246) = 0.32	<i>t</i> (267) = 0.46
Relationship status		
In a relationship	2.33 (0.68)	2.68 (0.96)
Single	2.36 (0.75)	2.44 (0.96)
	<i>t</i> (240) = -0.34	<i>t</i> (261) = 1.96
Cohabiting with partner		
Cohabiting	2.37 (0.70)	2.80 (0.96)
Not cohabiting	2.27 (0.64)	2.47 (0.93)
	<i>t</i> (155) = 0.83	<i>t</i> (165) = 2.14*
Living arrangements		
Live alone	2.41 (0.69)	2.64 (0.95)
Live with other adults	2.32 (0.70)	2.56 (0.97)
	<i>t</i> (246) = 0.76	<i>t</i> (267) = 0.50
Household income (AUD) ^C		
<50 000 p/a	2.22 (0.81)	2.26 (1.01)
≥50 000 p/a	2.36 (0.67)	2.66 (0.94)
	<i>t</i> (246) = -1.72	<i>t</i> (267) = -2.82**
≥100 000 p/a	2.41 (0.70)	2.71 (1.0)
	<i>t</i> (246) = -1.72	<i>t</i> (267) = -2.31*
Importance of religion		
Not important or a little important	2.28 (0.66)	2.58 (0.94)
Important/very/extremely	2.44 (0.79)	2.52 (1.04)
	<i>t</i> (181) = -1.52	<i>t</i> (195) = 0.51
Country of birth		
Australian born	2.36 (0.72)	2.59 (0.95)
Born overseas	2.25 (0.65)	2.53 (1.02)
	<i>t</i> (246) = 1.04	<i>t</i> (267) = 0.45
Viewed pornography online		

Table 7. (Continued).

	Worries about exposure	Concerns about problems
Never or once or twice	2.43 (0.72)	2.58(1.05)
Occasionally or regularly	2.28 (0.68)	2.57 (0.91)
	<i>t</i> (246) = -1.69	<i>t</i> (267) = -0.03
Sent erotic images (sexts) to a lover or partner you were also seeing in real life		
Never or once or twice	2.45 (0.71)	2.71 (1.00)
Occasionally or regularly	2.13 (0.63)	2.31 (0.85)
	<i>t</i> (246) = -3.47**	<i>t</i> (267) = -3.45**
Received sexually explicit messages or images without asking for them		
Never or once or twice	2.37 (0.68)	2.62 (1.01)
Occasionally or regularly	2.20 (0.77)	2.40 (0.76)
	<i>t</i> (246) = -1.55	<i>t</i> (267) = -1.60
Sent sexual or erotic images (sexts) to someone you knew online but not in real life		
Never or once or twice	2.40 (0.70)	2.64 (0.97)
Occasionally or regularly	1.98 (0.68)	2.16 (0.80)
	<i>t</i> (246) = -3.48**	<i>t</i> (267) = -3.49**
I have used the internet to find information about sex		
Never or once or twice	2.40 (0.73)	2.63 (1.05)
Occasionally or frequently	2.25 (0.67)	2.53 (0.89)
	<i>t</i> (246) = -2.10*	<i>t</i> (267) = -0.79
I have used the internet to find information about sexual health		
Never or once or twice	2.43 (0.76)	2.64 (1.03)
Occasionally or frequently	2.25 (0.66)*	2.52 (0.91)
	<i>t</i> (246) = -1.98	<i>t</i> (267) = -1.05

^ANon-binary gender identity excluded from this analysis due to low numbers.
^BIncludes lesbian, gay, bisexual, pansexual, queer.
^CIncome categories: <AUD50 000 vs ≥AUD50 000 and <AUD100 000 vs ≥AUD100 000.
 P* < 0.05, *P* < 0.01, ****P* < 0.001.

content. Legislative reforms may need to be supported by initiatives that aim to educate users on legal consent, ownership and privacy associated with digital sexual data and audio-visual materials, and what legal or other redress is available to those who suffer harm arising from non-consensual sharing of digital images (A Farrell, N Shackleton, E Agnew, unpubl. data).^{15,61}

Limitations

Revealing information on personal sexual and intimate practice can be uncomfortable for some, particularly concerning practices that might be considered harmful or

shameful. Hence, responses may have been influenced by some social desirability bias.

Conclusions

Findings from this study build on existing work²² to show that people's digital sexual experiences are often about engaging sexual intimacies, and that pleasure and connection are part of many people's online sexual experiences, even where risks are present.^{1,10,29} As we know from decades of research on sexual health education,^{62–64} people's choices and actions in sex and relationships rarely stem from simple, rational choices about risk and safety. Rather, choices and actions sit within a context of social, cultural and sexual practices and pleasures, as well as gendered relationships and patterns of inequality.^{27,65} Understanding what people perceive to be the benefits of online sexual engagements, as well as the risks people take and how these are perceived in relation to – and in balance with – pleasure and intimacy, is necessary for developing comprehensive educational and legal responses that build people's confidence and capacity to engage safely with digital technologies and online environments.

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