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Citation: Wood, Matt, Wood, Gavin and Balaam, Madeline (2017) "They're Just Tixel Pits, Man": Disputing the 'Reality' of Virtual Reality Pornography through the Story Completion Method. In: Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems. ACM, New York, USA, pp. 5439-5451. ISBN 9781450346559

Published by: ACM

URL: <http://dl.acm.org/citation.cfm?doid=3025453.302576...> <<http://dl.acm.org/citation.cfm?doid=3025453.3025762>>

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“They’re Just Tixel Pits, Man”: Disputing the ‘Reality’ of Virtual Reality Pornography through the Story Completion Method

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ABSTRACT

Pornography is a substantial part of humans’ everyday interaction with computers, yet to date the topic has been underconsidered by HCI. Here, we examine some of the common cultural ideals non-experts constructed of a ‘new’ pornographic experience - Virtual Reality (VR) Porn - through use of the ‘Story Completion Method’. Forty five participants completed a story stem about a male character who was about to have his “very first virtual reality porn experience”. Through our analysis, we demonstrate a narrative of a ‘perfect’, idealised sexual experience, as well as one which emphasised the imagined ‘precarious’ and dangerous consequences around this technology use. We indicate how the stories reproduced ideals around heteronormativity and hegemonic masculinity, suggesting an agenda of ‘Designing for Eroticism’ as a tactic which could avoid such problematic discourses. We also suggest the opportunities and challenges presented through use of the ‘Story Completion Method’.

Author Keywords

Pornography; porn; virtual reality; design fiction; speculative design; thematic analysis

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

INTRODUCTION

Pornography has historically played a pivotal role in interactions with digital technology [13,17,47], and we see increasing calls from outside the field for HCI to engage in a cross disciplinary discourse on the topic [3]. However, to date, discussion within the HCI community has been limited [9]. Research on pornography is relevant for HCI, not only

for matters of “usability” as Bell et al. note [9], but for the lessons that can be learnt from recent democratization of content [43]. Moreover, a study of the socio-cultural dimensions of pornography gives insight as to how this very prominent, and not often talked about, ‘human computer interaction’ is experienced and considered. This is also relevant to the developing movement of Feminist HCI [7,23], since pornography is a technology-orientated industry, exploitative of women [36] for corporate gain [3,19].

Pornography plays a key role in the development of new and emerging technologies [13]. Similarly, many technologies become sexually appropriated for pornographic or sexual purposes, from the sharing of explicit photographs [34], to ‘hook ups’ becoming one of the most prominent uses of geosocial networking apps [10]. While HCI is quick to analyse and evaluate emerging technologies and social media [29,32], the sexual dimensions around technology usage often go underconsidered. Consider, for example, the ‘unexpected’ sexual appropriation of the popular photo sharing app ‘Snapchat’, particularly amongst young people [40]. We argue that HCI can engage more meaningfully in these issues, investigating the cultural constructions around (apparently) ‘new’ technology use through creative and speculative methods.

In this paper, we take a critical lens to a ‘new’ sexual appropriation of digital technology, Virtual Reality (VR) Porn. With the recent surge of interest in the mainstream press around the ‘Virtual Reality’ (VR) headset, or ‘Head Mounted Displays’ (HMD), an interest has developed in how VR will change pornographic experiences [27,48,53]. We suggest this provides an opportune situation for HCI to take a fresh perspective on pornography. We see hints of what VR porn *might be*, with prototypes and initial experiences being developed, but predominantly we are still at the point of a ‘proximate future’, where we are considering what it *could be*. Aligning ourselves with the future-orientated positions of speculative design [20], in this paper we ask, how do we envisage the impending prospect of VR pornography?

The contributions of this paper are: (1) an early, speculative and critical enquiry of VR pornography, highlighting how the notion of ‘having’ a VR pornography experience is socially constructed; (2) the identification of ‘designing for eroticism’ as an approach to VR Porn which can offer an

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CHI 2017, May 06-11, 2017, Denver, CO, USA
ACM 978-1-4503-4655-9/17/05.

<http://dx.doi.org/10.1145/3025453.3025762>



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alternative to the often violent, explicit and degrading imagery in pornography; (3) the ‘Story Completion Method’ (SCM) as a tool to explore the sexual connotations of new and emerging technologies.

This SCM [31] is being used increasingly in qualitative psychology, but also draws parallels with recent work in HCI that has used design fiction as a tool to investigate and reimagine current and future technologies [18,33,35]. Story completion asks participants to write a fictional story around a hypothetical scenario, in this case a character about to have his “*very first virtual reality porn experience*”. In targeting those with only some or little experience of VR, we were interested in some of the commonplace assumptions made by ‘non-experts’ in writing around this scenario. We present a thematic analysis of the 45 stories written by participants, suggesting how in some ways they constructed this scenario as a euphoric, ‘perfect’ experience, whilst others indicated a ‘precarious’ nature to ‘VR Porn’. We suggest this indicates an opportunity for design work focusing on ‘erotics’, critiquing and responding to the problematic imagery of pornography, and suggest how we may consider the moral (sexual) dimensions around new digital technologies. We now give a brief historical account of ‘Pornography’ and ‘Virtual Reality’, to consider contextually how they are conceived in the present day, outlining how this positions our speculative enquiry of this space.

A (Brief) History of Pornography

Prior to the 19th century, pornography was restricted to literary texts, yet in the late 1800s expansion came about through the visual image. Pornographic content became available through new technologies such as transparencies and stereoscopes, but it was the postcard which introduced it to the masses, and quickly became a site of controversy; hugely popular, but also seen as making women objects for men’s perusal [47]. This mirrored arguments coming in the late 20th century, through the circulation of magazines such as Playboy and Penthouse, and then later through cable television and DVDs [2]. The porn industry is seen as one of the leading innovators in the development of digital technologies, specifically through home-video industry [17], and Playboy was one of the first national magazines to have a digital outlet for distribution, having had a website since 1994.

The push to internet pornography has largely been associated with more ‘explicit’ and ‘perverse’ sexual content [8], particularly with increased levels of violence [24]. Pornographic content typically situates women as the object of desire, seen as being orchestrated for men’s sexual pleasure through representations that largely subordinate women [19]. As such the feminist arguments against pornography have focused upon how it has become a site for the social subordination of women [21].

An increasing corpus of work has concerned itself with the social dynamic of how pornography is consumed, and individuals’ interpretations and experiences of this [12].

Through a cross disciplinary domain of ‘Porn Studies’ there are interesting developments in the role of ‘DIY’ pornographies, the rise of amateur communities, and opportunities for user-produced content. In the first issue of the journal ‘Porn Studies’ [3], Attwood and colleagues specifically identify HCI as a field that could contribute to this cross-disciplinary study, and we suggest here a way in which this might be done, that of orientating ourselves toward the potential, imagined future of ‘new’ technologies.

A (Brief) History of Virtual Reality

The term ‘Virtual Reality’ was first coined in 1987, and is widely attributed to Jaron Lanier, founder of ‘VPL’(Visual Programming Languages) research. Although this company was the first to sell HMD commercially, ‘Virtual Reality’ was in many ways naming and claiming various attempts to transport users into a fictional world occurring from the 1800s [44], from stereoscopes which fittingly provided some of the first visual pornographic experiences [47], to situated device experiences such as in arcades. One of the last high profile attempts at VR was in the early 1990s, when Sega and Nintendo produced HMDs for retail [54], both proving to be commercial failures.

In 2016, a number of companies announced new HMD VR products, perhaps most visibly the Facebook owned Oculus Rift, but also the HTC Vive, PlayStation VR, and low cost alternatives using smart phones such as Google Cardboard and a new mobile platform for VR Daydream [55]. These technological advancements have sparked a great deal of interest in the potential application of VR to a variety of settings beyond the typified gaming environment, from therapy to a number of high profile theme park installations. Often commented on, but rarely discussed, is the application to the pornographic industries, who have made prominent steps into this area [27,48]. Some adult sites currently offer streamed movie-style experiences, although these experiences use a fixed position which respond only to users’ orientation, often allowing exploration of the forward facing hemisphere. However, technology in this area is developing significantly, increasingly websites are offering more advanced content, additional options such as zoom, elements of viewer movement, Bluetooth synchronization for devices to provide intimate haptic feedback, and customization options [48].

HCI research into VR has focused upon usability [45] of HMDs, such as speed of use, practicalities and navigation [51], and cybersickness [46]. A more limited corpus of work has looked at gameplay experiences of these devices, focusing on users’ ‘engagement’ and ‘immersion’ in comparison to traditional desktop setups [50]. Seen in combination with ongoing technical advancements [51], we are still very much scoping out the space of what it means to have, and design for, a (modern) virtual reality experience.

Sexual Interactions, Speculative Design & Design Fiction

Intimacy in digital interaction continues to be revisited in HCI [25], particularly in how digital interactions are

mediated through technology, while considerable work has also gone into examining how sexuality may be played out through collaborative online systems [6,30,38]. The idea of designing predominantly for sexual pleasure has been raised by Bardzell and colleagues [4], focusing on an agenda of designing around sexual wellness [22] and body knowledge [1]. Sex, sexuality and embodiment appear attractive premises for designers, and this has been approached particularly through speculative work [5,14,56].

Dunne and Raby position their work in ‘speculative design’ as design which asks questions around possible technological futures [20]. They draw on a range of different disciplines in examining how new and emerging technologies can be responded to through design. This includes literary theory, and as such ‘design fiction’ can be considered a close brother of speculative design. Design fiction in HCI typically counters itself with ‘solutionism’ [37], problematizing and interrogating reductionist ‘upstream’ designs [33], often exploring potential of ‘non-solutionist’ design strategies [11]. Work around gender, sexuality and embodiment have been considered under this framework, such as *The Menstruation Machine* by Sputniko! [5,38] and parodies of erotic fiction [14].

Such speculative work typically exists through a designer / researcher holding an artefact, design or ‘fiction’ up for examination (or interrogation) by an audience, to stimulate discussion “amongst designers, industry and the public about the social, cultural and ethical implications of existing and emerging technologies” [20]. In this paper, we use the story completion method (SCM), which invites participant-led narratives to examine these socio-cultural ideas [31].

The Story Completion Method

Since our interests were in VR Pornography as a cultural phenomena, that is the broad ‘what ifs’ around this new technological experience, rather than existing VR porn experiences or the perspectives of VR porn users, we adopted the Story Completion Method (SCM) as a speculative method. Story Completion Tasks (SCTs) invite participants to complete a ‘story stem’ around a particular topic. These have traditionally been interpreted from an *essentialist* standpoint, seen as an alternative route to access participants’ ‘real’ expectations, feelings, motivations and beliefs around a topic. However, Kitzinger and Powell [31] argued towards *social constructionist* readings of stories generated in SCM research, rejecting the notion that these stories indicate any ‘real’ inner psychological state. Rather, this position argues that “there is only the text”, and that these stories must therefore be analysed for their “discursive achievements” [31]. In this research, therefore, we do not suggest the stories generated represent users’ ‘real’ expectations or desires, whether they are technically achievable, nor indeed ‘accurate’ representations of what VR porn is or will become. Rather we consider the stories *as stories*; how participants socially constructed the notion of ‘having’ a VR

pornography experience through completing the story completion task.

METHOD

This study was approved by the Newcastle University Faculty of Science, Agriculture & Engineering ethics committee. Previous research using this method has suggested targeting fluent writers to elicit more detailed data which is more meaningful to analyze [15,26]. Therefore we explicitly targeted online writing communities, such as fan fiction forums, a number of Reddit forums, and advertised widely on social media. This resulted in 45 participant-generated stories (or fictions). Participants were roughly split by gender, 24 who identify as male, 18 female and 3 as other. The majority identified as heterosexual (30), white (36) and non-disabled (38). 26 identified as non-users of VR, 14 non-regular, 2 semi regular, 1 regular, and 2 did not answer this question. Data was collected digitally on the closed survey website ‘Bristol Online Surveys’. After reading an information sheet about the study, participants were presented with the following scenario:

Jack starts up his new virtual reality headset and positions it carefully over his head. He isn’t quite sure what to expect. He’s about to have his very first virtual reality porn experience...

Following previous research using this method [15,26,31,52], parts of the story were left deliberately ambiguous. No details are given about Jack, other than he is a ‘man’, which was specified since men are the primary consumers of pornography, and in this study we were interested in collecting the commonplace assumptions around this topic. It is also specified that this experience happens on a HMD, and that this is his ‘very first’. This was to indirectly highlight the (apparently) new, emerging state of new VR technologies, and to situate the narrative explicitly on these well-known products.

Under the scenario, participants were asked “what happens next?” and presented with a large dialogue box. Participants were to “please spend around 10 mins writing your story”. After completing their story, participants were then asked to provide some demographic information. Data was analyzed using thematic analysis, following a process of developing from lower level ‘codes’ to higher level ‘themes’, under the abovementioned social constructionist framework. Data in the following analysis is tagged with both participant number, gender (Male/Female/Other) and age.

RESULTS

Participants wrote stories which were varied and far ranging. Stories ranged from 3 words in the shortest instance (“A power outage.” P22, M, 57) whilst the longest was 1252 words (P18, M, 31) (Mean=281, SD=256). Some stories on the whole featured more basic descriptions, whilst others were very detailed, as we will discuss. Through a process of thematic analysis, we present here 2 main themes of meaning-making that occurred throughout the stories. First,

we consider how some participants painted Jack's experience as something approaching perfection, a seamless event that was "beyond his wildest dreams", and suggest the facets of stories that delivered this 'perfect' experience. This 'perfection' was sometimes described as being 'too perfect', almost dangerously so, which previsions our second theme, 'a precarious experience'. Here we consider some of the barriers constructed to this idealized perfection, and more broadly how the experience was sometimes perceived as something unstable, risky or otherwise unsafe. Present throughout was an apparent disjoint between 'Virtual Reality' and 'Real Reality', and a negotiation of the barriers between them.

A 'Perfect' Experience

Beautiful and intense

One of the most notable features from the stories was how some participants scoped this imaginary VR experience as something euphoric, "beautiful", "intense" and "perfect". In some stories, this began as an expectation of what Jack might experience, with him having "palpable" (P10, M, 24) anticipation before the scenario was laid out:

He curls his hands into fists, unwraps them, and drags them down the sides of his thighs to dry the sweat beginning to soften his fingertips. The headset is blank, silent. (P27, F, 32)

He pauses to wonder what it will feel like - will he gesticulate widely thinking he is about to grab a handful of breasts? Will he be as aroused as usual? Will it be more intense with less visual distractions now that he won't see his surroundings beyond the screen? (P6, F, 26)

He'd always been frugal with spending money on porn, but this wasn't an experience he couldn't afford to miss out on. (P15, M, 22)

A "nervous but excited" (P38, F, 22) atmosphere was common in the stories, as was Jack's initial anticipatory physiological responses, with one story describing: "His breathing was fast. His heart was racing. His blood was pumping" (P10, F, 24), and in another Jack was "wet with anticipation" (P18, M, 31). Notions of this being a noteworthy and pertinent experience were also present, an experience "he couldn't afford to miss out on" (P15, M, 22).

A Phased Entry

Characteristic in these stories was the notion of scenarios which took their time, and began gradually:

Slowly the virtual world around him starts to form. (P12, F, 32)

The darkness begins to break up in to light spots and he begins to see a shape emerge. (P4, F, 29)

The blackness receded just as if he were opening his eyes to the virtual world generated by the computer. (P26, M, 34)

This anticipation was a key facet of many of the stories, as a slow and gradual introduction to the VR world. A sense of this slow and building tension was common amongst stories, in one story "with each step his anticipation grows" (P14, F, 35) and in another "the hairs on the back of his neck prickle erect" (P27, F, 32). At times, and particularly present in stories by participants who have had some experience of VR, the 'blindfolded' qualities of having a headset on was described as an important part of Jack's experience:

Jack spent a little while in the dark. He was soon entangled among his limbs, and his frequent efforts to disengage himself only served to bind him faster. (P44, M, 30)

With his vision and hearing deadened by the headset, his body begins to tingle, his sense of touch suddenly heightened. (P27, F, 32)

In the above quotes, rather than being a distraction or drawback from the experience, the sensory deprivation provided through the headset was incorporated into an 'erotic' experience, much like blindfold use in foreplay or sexual activity. Whilst this slow, gradual and anticipation-fueled process was an important part of these stories, in others Jack is "suddenly" absorbed "within seconds" (P34, 34, M), keen to immerse himself into this experience:

He went into the options menu quickly, scanning what was available before jumping into the game itself. (P9, M, 28)

Trish [the virtual character] wasted no time on dancing (He'd turned the strip tease off in the settings, and choose (sic) all the shortest dialog options. He hadn't expected to need any time warming up, and he'd been right) (P18, M, 31)

Whilst a 'building' narrative was common, in other stories a precursor to the 'action', be it options or foreplay, was frustrating or unnecessary. Rather, in many stories the experience was characterized by a more sudden 'jump' into the 'action'.

Lavish and Detailed

Although some stories were explicit in sexual details, particularly oral sex, for example: "after a few moments, she leaned over and took the head into her mouth" (P18, M, 31), in most stories the emphasis of the story was on the build-up to the sexual experience (there were only 19 instances describing or referring to penetrative sex). Participants often gave detailed descriptions of the characters involved, and the surrounding environment. Sometimes, lavish scenarios were richly described, and visual details often highlighted as important components of the character's experience:

He finds himself in the lobby of a plush hotel, but there doesn't seem to be anyone around. He walks up the lavish spiral staircase, and catches a glimpse of a slender, attractive young woman running naked through the corridor. (P12, F, 32)

He begins to notice the detail. The peacock pattern on her dress, the flash of stocking top as she paces around him, the reflections in her green eyes that catch the light of the sun through the window. (P7, M, 45)

Jack is usually described as having some form of sexual experience with another character, who is similarly described in lush detail, for example: “Her arms toned but not muscular. Her bosom full. Flat stomach and wide hips” (P11, F, 20), “a line of carefully trimmed pubic hair appeared” (P10, M, 24) and “Her eyes were blue like the sky but with the intensity of the ocean” (P11, F, 20). Alternatively, other scenarios were fantasy-driven, although equally descriptive, as P15 (M, 22) describes, “colourful, fantastical, escapist”:

Taking a breath he knew his choice: a voluptuous alien creature from some distant planet with double female conjoined bodies in which he could experience, at least one time in his life, an out of the world threesome experience. (P29, M, 69)

He sat and watched the improbable anatomy of the imaginary Dromaeosauridae... they had spent quite a bit of time on the feathers, kudos for that one. (P24, M, 47)

Plots which were more ‘make believe’ were often written as very creative scenarios, featuring, for example “a robe of seduction” and a “pixilated dungeon” (P30, M, 23), “what it’s like to be inside the real EU” (P45, M, 28) to details of “strange things and invented dreams; phantasms of black, inky strokes that arose insensibly from inward causes.” (P44, M, 30). Other scenarios were not so driven by fantasy, but, rather, were detailed descriptions of scenarios that were unlikely or harder to realize in ‘reality’, such as “a classroom, old style with individual wooden desks & a chalk board” (P8, F, 28), “a female in her twenties on the beach” (P36, F, 27) or outside by a “small outdoor pool” (P10, M, 24).

A Real Reality

Whether the scenarios were described as more realistic, or were more overtly ‘fictions’, many stories emphasized how ‘real’ and ‘immersive’ Jack’s experience was, often characterized by ‘perfection’:

He finds that [the experience] is much more real and intense with the headset, feeling so much better than before. (P2, F, 30)

She has beautiful, plump lips. She is everything Jack could of imagined in the ‘perfect woman’. (P4, F, 29)

Eventually, he has an intense orgasm, much stronger than anything he had ever had from watching porn and using his hand before. (P43, M, 22)

In one story Jack is described as “fully immersed”, the experience is “so real!”, with Jack “amazed how well the VR is working” (P39, O, 18). Jack’s experience is often described as something euphoric, an experience that was “just too good”, featuring multiple orgasms, i.e. “do you want to keep going honey?” (P18, M, 31) and intense sexual

pleasure, i.e. “he moaned again as she continued pleasuring him” (P18, M, 31). In two stories, Jack’s experience is likened to worship, in one where he is “sexually worshiped by the others” (P21, M, 23) and another where Jack “felt like he was worshipping beneath the body of a goddess” (P11, F, 20). Yet, these narratives of ‘intense’ sexual experience were often reliant on various sensory elements:

He hears a noise - could it be the door has opened again? But before he can turn round to look he gasps as her hands brush softly against his forehead, then his lips, then graze his chest and begin to journey down, down.... (P14, F, 35)

She lifts herself to her hands and knees, crawling the length of his body to press her mouth against his. She’s deliciously warm, and his tongue writhes with hers, tasting her. (P27, F, 32)

When sexual contact was depicted in the stories more ‘explicitly’, the emphasis on visual qualities was often minimized, focusing rather on other sensory elements, or giving suggestions of sexual contact. A number of stories put an emphasis on sound, with some featuring a disembodied voice which “instructs” (P14, F, 35) Jack or describes sexual contact, other put an emphasis on touch, taste and smell. The technical details of how this is achieved was not often described in the stories, although there was sometimes an ambiguous mention of “sensors” or “accessories”. As the above quotes show, when these sexual acts are depicted as producing an ‘embodied’ sexual experience, these were ‘seamlessly’ worked into the character’s narrative:

Jack reached out and attempted to pull at the strings of the woman’s teddy. The stimulation (sic) knew what he wanted, and the string pulled away from the teddy and the knot came undone. Jack put his hands on the virtual shoulders of his fantasy wife and pushed the garment back to reveal her breasts. (P26, M, 34)

VR had had time to mature, a lot of the bugs in the software had been ironed out, and it had given developers time to create programs which ran well and ran beautifully. (P9, M, 28)

Other stories mentioned how the scenario was “responsive to his touch”, and how “the VR set smoothly converted his movements into the scenario”. Therefore, we can see the ‘perfect’ VR Porn experience as smooth running, “following through on instincts” (P15, M, 22), delivering an experience which was largely indistinguishable from a ‘real’ sexual encounter. These ‘perfect’ scenarios also often included personal elements, such as calling Jack by name i.e. “Hello, you must be Jack.” (P7, M, 45), or had focused on the intimacy of the situation, i.e. “their faces inches away from each other” (P11, F, 20). Descriptions of these experiences also sometimes featured non tangible elements from sexual experiences, for example: “The space between them was static. The air was thick with lust and the tension of their gaze” (P11, F, 20), with the intensity in the stories distinguished more by suggestion than explicit depictions.

An Effortful Experience (is rewarded)

Despite the 'seamlessness' of these depictions, the scenarios were at times written as requiring a great deal of 'work' to achieve. Preparatory 'action' prior to the experience was a common aspect of the stories, most often in the form of choices or selections:

"Choose partner model." (...) He spends a long time having difficulty choosing. Finally he narrows it down to three (...) and sees two of the models' boxes light up blue. He thinks to himself, "Oh. It's like picking multiple files!" He clicks on the three models he wants and confirms his selection. (P21, M, 23)

All the setup he had to do beforehand (...) putting the sensor stands in the corner of his room, clearing all the space around the bed, moving the bed to the center (...) but it was still surreal to see how well it... worked. (P18, M, 31)

These choices and set up work often led to an enhanced body for the character: "Finally he decides to pick a man with the same skin color and similar body, though a bit better built and well more endowed (sic)." (P21, M, 23), and these notions of choice were sometimes seen as leading to the 'perfection' of Jack's experience: "you could create your own perfect girlfriend, your own perfect you, and play the leading role in whatever escapade happened next!" (P9, M, 28) These 'perfect' experiences regularly put Jack in this 'leading role' of the encounter, as the object of sexual desire:

"Are you awake?" she asks. The screen brightens, light blurring and clearing as if he was blinking away a restful night. She props herself on her elbow, bringing her face into view. "Morning handsome," she purrs, "I'm sorry to wake you up, but I need you..." (P27, F, 32)

'What is your name?' He asks. 'I'm Helen.' A most appropriate name for the most perfect woman he's ever seen. 'And I'm yours.' The moment Helen uttered the word 'yours' Jack knew he was in life and would do whatever it took to spend as much time as possible with her. She was his, and he could do to her everything he had ever dreamed. (P7, M, 45)

In presenting Jack as the active, desiring male in this scenario, this experience is made to be 'perfect'. A number of stories depict a nirvana, dream-like state, "giving access to experience things that past generations could have only furtively dreamed under the cover of night" (P15, M, 22), an experience that is "out of this world" (P29, M, 69). Yet, as we will now discuss, participants also described levels of 'danger' to these euphoric experiences, giving access to unconscious sexual desires, or providing an experience that verged 'too close' to reality.

A Precarious Experience

Is This Too Far?

Despite Jack's experience often being described as 'perfection' or something euphoric, these scenarios were also

often written to have 'precarious' elements, at times "toying" (P16, F, 37) on the edge of danger. As the quote above from P7 points towards, Jack is sometimes seen as wanting to "spend as much time as possible" within his VR experience, something which could be "better than the real thing" (P17, F, 21). A number of stories ended Jack's experience on this 'euphoric high', reaching a state of intense sexual pleasure, but several also indicated the potential danger of such an experience:

It's a naked women being ravished by a velociraptor. "Dammit, Eileen, I knew you were into some kinky shit, but I didn't realise this is why you won't have sex with me anymore. How can I compete with that?" (P24, M, 47)

Over the following weeks, Jack finds himself using the headset every time he watches porn. This increases over the months so that he is using it every day, and even to the point where he is thinking about it at work, looking forward to getting home. (P2, F, 30)

P2 then went on to described how "for a while, he chooses this over any real life dates". Another story described how Jack then "decided to put his headset on forever". Such quotes indicate how the 'non-reality' provided through the VR experience was sometimes constructed as something better than a 'real' reality, taking up an increasingly important role in Jack's life (P2, F, 30) or a scenario which was impossible to live up to outside of the headset. This notion of 'non reality' was also constructed in some stories to be something almost 'dangerous':

Immediately, he is struck by how realistic the scene is, almost to the point where it feels a bit too connected with reality. (P43, M, 22)

He climaxes hearing a similar, computer generated gasp, from the woman he was using -god, wasn't that an odd way of looking at it. Using. Like she wasn't human. Well, he notes, she wasn't. But there must have been an actress once whom it was based on. The thought makes him uneasy as he puts away the headset and puts on his trousers. (P35, M, 18)

The disjoint between what is seen as 'virtual' and what is 'real' was a tension point in many stories. In other stories, Jack wonders "Is this a step too far?" (P6, F, 26), or in anticipating future iterations of VR pornography it is described that "for now, this would be more than enough for him" (P15, M, 22). Overall, in some stories, there was a sense of this experience brushing up a little "too close to reality" (P6, F, 26), causing in one case Jack putting the headset away (P35 above), or in another "stick to using the headset for video games and movies, because he doesn't want to confuse his brain anymore" (P43, M, 22).

A Second Rate Reality?

As P43 goes on to describe, this was also sometimes described as imitating a 'second rate' reality:

"[he] would much rather just have sex with his girlfriend instead of trying to imitate it with slightly more attractive women." (P43, 22, M)

He is a traditional male so he wants to see two women having sex. But he has seen that so many times on Boobtube that he quickly becomes bored so he adjusts the settings so he can start spanking them and making them squeal with delight. (P31, M, 50)

Commenting on the 'lack' of reality of the scenario was common, and was sometimes compared with 'regular' porn, i.e. "In reality some utterly normal porn rubbish comes on", "he just knows that it's fake and computer generated. At best he's making love to a hologram" (P35, M, 18). Elsewhere, VR porn is highlighted as a 'novelty' experience i.e. "making them squeal with delight" (P31, M, 50), with stories highlighting the 'falseness' of the situation: "these fake titties remind me of the time I used sandbags" (P40, F, 34) and "they're just tixel pits man!" (P42, M, 22). Other stories highlighted the loss of personal contact coming from a VR experience:

He automatically reaches out to her before remembering that doesn't do anything; he has to wait for her to come to him. And she does. Her breasts are in a bra, but they bounce as she walks, and he wishes he could touch them. (P39, O, 18)

For one selfish second his jaw slackens and his eyes screw closed. Then he opens them again, breathes, prepares to finish her, over and over to thank her for what she did. But the screen is blank. (P27, F, 32)

Whilst some, typically those who identified as 'non-users' of VR, described a seamless integration of touch within the VR experience, by contrast, P39 - who had some experience of VR - identified the lack of 'touch' abilities, which in turn became a source of frustration. Likewise, the lack of a physical presence in P27's story means the sexual favour cannot be reciprocated. Yet in some cases this lack of ability was identified as 'teasing', or a resource that enhanced the eroticism of the scenario, since "Their bodies didn't touch but Jack felt the electricity coursing through his veins" (P11, F, 20), and the characters in the scenario "panting as they beg for his touch" (P20, F, 21):

His mouth moves automatically as she leans, desperate to kiss her, but instead she turns, smoothly lifting one knee across his face, to land beside his ear... (P20, F, 21)

She needed him, and he wants so badly to give her what she craved, but she's just too good with her mouth and he's struggling to hold back... "Oh god, I'm close" she gasps, and it's too much, he's gone, his climax splashing wetly up his stomach. (P27, F, 32)

Building on notions of a euphoric experience discussed earlier, and being the 'object' of sexual desire, i.e. "she needed him" (P27, F, 32), the VR experience in some stories

is almost seen as getting "the better of him" (P34, M, 34), since it "knew what he wanted" (P26, M, 34).

I Didn't Sign Up For This!

Although at times depicted as something teasing and erotic, there was also a sense of Jack being 'at the mercy' of this experience, either in its intense sexual sense, i.e. "He gapes as she withdraws it, desperately seeking her again. More. Please." (P27, F, 32), or with more sinister undertones:

A small larva is inserted into his ear which eats its way through his brain out his tear duct causing weeks of excruciating pain and permanent brain damage. (P25, M, 60)

"Hey! I didn't sign up for this!" He feels a firm chest brush against his back, and Jack straightens with a gasp. "What *did* you sign up for?" The deep voice vibrates behind his right ear, and Jack swallows. "No—let me out." The man chuckles. "There *is* no escape, Jack." (P16, F, 37)

Several of the stories play out as a "worst nightmare" (P1, M, 23) scenario, on one occasion the story ends with "Jack is dying. Jack is dead" (P30, M, 23), and another "once the brain is dead all organs will be harvested and the remains sent to a rendering plant to become cat food" (P25, M, 60). Sometimes the stories also involve an element of humiliation, such as "images of vaginas laughing at him while an ultraviolet LED burns out his retinas" (P25, M, 60). Interestingly, these 'horror' stories often had elements of homosexuality, most frequently through the revelation that the character Jack has his experience with was a man:

Jack realizes that there is a *man* standing behind him. The man chuckles. "There *is* no escape, Jack." ...the man's arm tightens and he presses his hips against Jack's ass, an unmistakable hardness pushing between Jack's buttocks, against his jeans. (P16, F, 37)

It took a moment for Jack to process this as he struggled for a moment of clarity in his lustful haze. She is a he. Jack went flaccid... (P11, F, 20)

Homosexuality is sometimes seen to take on a 'corruptive' role in the stories, Jack is worried "whether or not the headset can read his mind and reveal the weird homosexual thoughts he keeps having around other guys" (P5, F, 28). On only one occasion does the story feature an 'erotic' story with a male character (P10), which was written by a gay man. However, the stories did sometimes feature elements of challenging perceptions, particularly around sexuality, as the story from P11 above continues:

We're gonna have fun tonight" "she" said and proceeded to fuck him super hard and Jack got a boner again and it was an unforgettable night and Jack turned gay. The end. (P11, F, 20)

His eyes widen. "No. This can't be." She covers her tiny cock with one hand and reaches for his face with the

other. He pulls away. "I don't fuck with guys like you." he said. She replied "But you were convinced before weren't you?"... "Okay I guess it won't hurt this one time" (P40, F, 34)

Therefore, despite the potentially 'dangerous' role of the virtual reality experience conveyed in the stories, be it "read[ing] his mind" (P5, F, 28) or exposing him to an unwanted experience, VR in the stories also challenges perceptions, particularly around experiences of sexuality. In other stories this is taken even further. In one, Jack considers "tail, ears, or paw pads. Maybe he'd try the shimmery-rough skin of a shark's body, just once" (P15, M, 22). Yet some stories did push their depicted scenarios to 'extremes' with vivid and striking sexual scenarios:

He grabs her by the throat and slaps her delicate face. "Now hold on bitch! I have nothing on but my socks and baseball cap and I expect you to strip down to your socks too!" (P40, F, 34)

A cascade of hot juices gushes around their cocks, and Jack bucks hard, unable to stop himself from sinking his teeth into the side of her neck as he joins Jim in a mad dash to the finish line. Their cocks ram away, powerfully pummeling inside the gasping, writhing girl, synchronized to pulverize her tender pussy as she shakes and screams. (P20, F, 21)

Violent imagery was a notable feature of some of the stories written, as were group sex experiences. On some occasions Jack's experience is taken "right to the limit" (P21, M, 23) "looks like an orgy film, with him bouncing around trying out different women", and in another his experience forms with a "cacophony of grunts and groans". Whilst in some stories this was described as "pretty hot" (P31, M, 50) for Jack, on other occasions this is represented as sexual excess, providing a 'pause for thought'. P20 above, depicting a VR experience for multiple 'players' in the story, provides some reflection after a depiction of vivid sexual acts:

I don't know if this is right... Even WE signed consent forms to work on this project, and that's saying nothing of the fact that we just allowed our intern--someone in OUR responsibility -- to access highly classified technology that won't be market ready for another year - - ! (P20, F, 21)

Therefore, participants wrote potential 'dangers' to the 'intensity' of the experience depicted, on one occasion Jack "went so far as to disconnect himself from the internet" (P9, M, 28) since the VR headset was "something interesting and powerful enough to make people wonder 'I wonder which way he swings' or, 'I wonder what his perfect girlfriend is like.'" (P9, M, 28).

Vulnerable Path to Social Exclusion

On other occasions, Jack's 'vulnerable' situation with the VR headset is highlighted:

given that any one of his housemates could come knocking at the door, the isolation of his vision and hearing put Jack on edge, like to going to the bathroom with the door unlocked. (P3, M, 31)

Wearing earphones, and with the sound turned up loud to fully appreciate the moans of the girls he is playing with, he doesn't notice his flatmates entering his room unannounced. (P34, M, 34)

The headset in the story means Jack is susceptible to interruption, through unexpected visitors, i.e. "Jack, are you here? We decided to come back a bit early from my mum's." (P4, F, 29), or on some occasions by digital interruptions, such as "a harsh grey alert box" (P26, M, 34), "buffering" (P10, M, 24), or by trying to work out the controls "Menu. Uh, Help. Gah, Help Menu." (P21, M, 23). In some stories this defenselessness was highlighted as something potentially erotic, i.e. "he feels exposed, vulnerable (...) naked, anxious, excited and completely aroused", or simply inconvenient "He misses getting a good grip on his horn and can't find the lube" (P42, M, 22). However, more commonly this was identified as a source of humiliation, as the story from P34 above continues:

They are initially shocked, then amused. They take out their smartphones and snap away. Jack has become an internet sensation. Jack doesn't like this. Jack will never engage in virtual reality porn again. (P34, M, 34)

After a few minutes of some pretty good tugging, Jack jacks it right onto his keyboard. The mess is everywhere, Jack feels ashamed (P42, M, 22)

Elsewhere, Jack keeps word of his experience quiet since "he didn't want to risk people thinking that he was some kind of pervert or something", and in another is caught by his girlfriend with "his dick in his hand" (P21, M, 23). This tension of VR porn being 'cheating' on a significant other was a common occurrence within the stories:

They have a great relationship, and can usually talk about anything - so why has he not spoke to her about this (...) here he was doing this behind his wife's back, no wonder he's feeling guilty. (P37, F, 49)

Jack has every intention of uploading his girlfriend's model, some day. Using any other would feel like cheating. But, that's not ready yet. And, well, he does need to test it out before putting all that work into it, right? (P21, M, 23)

Likewise, in another story, Jack ponders whether the experience is "too close to reality to be considering cheating on his girlfriend", and, as detailed above, occasionally ended in embarrassment, i.e. "WHAT THE FUCK DO YOU THINK YOU'RE DOING!" (P21, M, 23). Yet on several occasions, this situation was resolved through a 'traditional' (always heterosexual) relationship:

Several years later, Jack and Sarah still enjoy using the headsets, but it is just one part of their sex life, and they have a happy and healthy life together. (P2, F, 30)

He decides to talk it through with his wife. Which he does. The discussion brings them closer. After a few glasses of wine together they decide to try the virtual reality together, ha ha. What fun. They have a laugh, and go to bed, happy, turned on and feeling very close, fun, happy amazing sex follows. (P37, F, 49)

Although all of these stories started with a sense of jeopardy around the relationship e.g. “Jack's girlfriend has had enough and tells him it's her or the headset”, on several occasions this was resolved since “He decides to speak to his girlfriend” or “talk it through” with his significant other, where it eventually becomes “one part” of their sex life. However, in some stories there is no excuse for use of the headset is met with only “a mixture of yelling and pleading of pathetic explanations” (P21, M, 23), whilst in others the scenario is ‘rejected’ with Jack ‘coming to his senses’ over use of a ‘pointless’ technology:

He realises this is a dark path to social exclusion so takes it off and goes back to his life. (P23, O, 22)

Jack realizes that it is a waste of time. He removes his headset and shuts down his computer. He decides to go out into the world and try to meet real people (...) He climbs into the driver's seat of his Toyota Celica and heads toward the local library. (P28, M, 40)

Therefore, we can consider the precariousness of Jack's experience as spanning the full spectrum from a feeling of uncertainty, i.e. “there isn't much information out there”, providing an ‘overly’ immersive or revealing experience, i.e. “he didn't want to risk people thinking that he was some kind of pervert” (P9, M, 28) to something simply dark and dangerous, i.e. “a dark path to social exclusion” (P23).

DISCUSSION

Through a social constructionist reading of stories written around a male character having his “first ever virtual reality porn experience”, our analysis revealed countering narratives of ‘perfection’ and ‘precariousness’. As we will discuss, this (re)produced problematic discourses around gender and sexuality, raised ethical questions, yet also provided opportunity to look at responses and alternatives HCI may take in this area. It is worth noting that although a male protagonist was chosen for our story stem as they are the primary users of internet pornography, this is a potential limitation of the study, and a gendered analysis of pornography would be a suitable focus for future work.

Discourses of Pornography

In situating our story completion task within the scenario of a ‘virtual reality’ experience, there were a number of common, noteworthy ‘discourses of pornography’ throughout the stories. Most notably, perhaps, was a prevalent discourse of hegemonic masculinity and

heteronormativity. Some more explicit stories, written by both male and female participants, featured men performing various ‘degrading’ sexual acts onto women, for example, men “forcing” themselves onto women, with sometimes painful depictions whilst the female character apparently enjoys this (i.e. “the girl cries out in ecstasy”). At times women were depicted as “incapable of resisting any type of male sexual advance” [19] while the woman character(s) are often described at the beck and call of Jack's sexual pleasure. It is also worth noting that the experiences were distinctively heteronormative, a term defined in queer theory describing the social privileges given to heterosexuality, assuming it is the ‘natural’ and ‘normal’ sexual orientation [16], with only one story written as an ‘erotic’ homosexual experience. Although these are discourses prevalent in pornography more widely, situating this experience on a HMD reproduced these discourses in new ways. Representations of masculinity were vivid and extenuated (i.e. “Their cocks ram away, powerfully pummeling inside the gasping, writhing girl”), sometimes included sensory interaction (i.e. “A cascade of hot juices gushes around their cocks, and Jack bucks hard, unable to stop himself from sinking his teeth into the side of her neck”) and was twice likened to sexual “worship”. Such was the nature of this euphoric, ‘perfect’ experience, it was susceptible to corruption, and it was notable that homosexuality often took on this corruptive role. In engaging with VR porn, and pornography more widely, we argue HCI should engage with the potential of new technological experiences to (re)produce such problematic discourses, and be willing to respond and challenge these ideals. In the next section we consider ‘Designing for Eroticism’ as an alternative direction HCI researcher/designers might take in responding to these normative scenarios.

Considering ethical dilemmas is also a significant thread of speculative design [20], and the stories raised a number of questions around what the ethics of VR pornography can and should be. The narratives revealed a line negotiated between what was seen as a ‘reality’, a ‘non’ reality and a ‘too-close-to’ reality. For example, P21's story Jack has intentions for “uploading his girlfriend's model”. The availability of 3D imaging tools suggests this is a technical possibility, and certainly the rise in DIY Porn suggests there could be a market for this [43]. Revenge Porn [49], a growing phenomenon where embarrassing images are shared online without consent, could be exacerbated through the potential for sharing 3D models, based on real people. Not to mention, the troublesome notion alone that ‘Jack’ may upload a model of his girlfriend to undertake sexual experiences to which she would not consent in reality. All this indicates a need to engage with the sexual appropriation of digital technology seriously, suggesting a need for meaningful discussion, debate and possible safeguarding measures.

A Case for Erotic Design

An analysis of the stories suggested to us that ‘designing for eroticism’ may be a more acceptable way of framing the

erotic dimensions of human computer interaction, building on previous enquiries in HCI around designing for sexual pleasure [4]. Many of the stories in this study featured a narrative which challenged the standard ‘sexual scripts’ of internet pornography, perhaps most notably the horror scenarios, but many presented an innovative take on erotic VR experiences. We saw striking suggestions for a “colourful, fantastical, escapist” experience, such as experiencing “tail, ears, or paw pads”, to almost unfathomable descriptions of “phantasms of black, inky strokes that arose insensibly from inward causes”. Therefore, instead of delivering a “second rate reality”, an idea that was met with skepticism in the narratives presented, we suggest there is considerable opportunity for VR experiences to challenge traditional perceptions of internet pornography through offering different forms of experience.

It is observed that one of the main limitations of HMDs is that they socially isolate the user [50]. However, in some stories there was an indication this in itself could have erotic qualities, as Jack “spends a while in the dark” and feels “exposed, vulnerable (...) naked, anxious, excited and completely aroused”. Stories were also noteworthy in that they often featured non-visual elements such as touch, taste, smell and sound. A focus on binaural recordings (i.e. 3D sound) is increasingly used in creating virtual experiences [41], and we suggest an alternative erotic narrative could focus particularly on non-visual elements.

Moreover, sex is often constructed as a “deeply subjective” [4], embodied experience [28], both in the HCI literature and more widely: something that is, on principle, impossible to ‘design for’. We saw this reflected in the depictions of a ‘perfect’ VR experience, describing ‘intangible’ qualities of the sexual experience, such as “The air was thick with lust and the tension of their gaze”. We suggest this is integral to an erotic experience, and we saw suggestions of how this might be orientated towards in an erotic VR experience. Many of the most impactful scenarios came from ‘suggestions’ or ‘teasing’ with a focus on the peripheries of the ‘sexual’ experience, for example the setting, having high importance. Having a ‘personal’ element to these experiences also appeared a powerful ‘erotic’ resource, such as Jack being called by name. It was also notable how often the more ‘work’ that went into a scenario, such as preparing the room or character selection, the higher the depicted ‘payoff’. All this indicates an imperative to consider matters around a solely ‘visual’ experience, in enabling a dialogue around VR pornography that could challenge problematic sexual norms.

Story Completion Method

A final contribution we offer from this study is the application of the SCM. We suggest this builds and extends on work in design fiction, specifically as a critical tool in questioning and problematizing the status of technology [33], and more recent studies inviting responses to personable and ‘plausible’ works of design fiction [18]. In

democratizing this process, we found we were able to explore the moral dimensions of new and emergent technologies, a key tenet of speculative design [20], but also explore how a potentially problematic medium could be reimagined. The method enabled us to collect data from a reasonably high number of people (45), and generated rich and varied data. Several participants also contacted us to say that they enjoyed participation.

In contrast to previous work which has mostly used university ‘participant pools’ to recruit students receiving course credit for participation, we explicitly targeted writing communities, resulting in often more creative, narrative-led stories than previous work. However, this did require more ‘work’ in recruitment, and stories were also rather unpredictable, from a few lines to extensive and lavish, and from realistic depictions to highly creative fantastical scenarios. However, we argue alongside previous work [15,26,31,52] that the unpredictability of this method provides creative opportunities for analysis. For these reasons, we see SCTs as a promising research tool for HCI, particularly for speculative enquiry. We suggest that this was a useful tool in doing exploratory work, and an effective way of investigating an area which would be difficult, or ethically challenging, to explore using face-to-face data collection [31]. Like the use of personas and scenarios in HCI, SCTs ask participants to write in the third person, rather than providing personal responses, thus decreasing concerns around social ‘desirability’ [15].

CONCLUSION

Responding to calls from HCI to consider pornography more centrally in our work, we presented here a speculative enquiry into a new and emerging technological potential, VR pornography. Through this we explored how commonplace assumptions around pornography were reproduced, and negotiations around the ‘reality’ of VR in a sexual experience. This indicated a number of moral and social issues, and we suggest the SCM as a suitable speculative method for exploring these unexpected, and in particular sexual, appropriations of technology. We argue such speculative work is valuable and important in asking questions around the sociocultural and ethical implications of technology [20], and we argue this should also include matters of technosexuality.

ACKNOWLEDGEMENTS

Thanks to Victoria Clarke and all at the ‘Story Completion Research Group’ at the University of the West of England for their ongoing support. This research was funded through the EPSRC Centre for Doctoral Training in Digital Civics (EP/L016176/1). Data supporting this publication is openly available under an ‘Open Data Commons Open Database License’. Additional metadata are available at: <http://dx.doi.org/10.17634/154300-37>. Please contact Newcastle Research Data Service at rdm@ncl.ac.uk for access instructions.

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