Virtual Reality for Sexual Harassment Awareness: A Field Study in the context of LUMS

Muhammad Talha
Lahore University of Management Sciences
23100266@lums.edu.pk

Hafsah Shehzad
Lahore University of Management Sciences
20030029@lums.edu.pk

Maryam Rasheed
Lahore University of Management Sciences
19030033@lums.edu.pk

ABSTRACT
Raising awareness regarding harassment is very crucial among students for both male and female in order to change the behaviors. In this study we provided a design that can be used to raise awareness so that students are aware of their actions and in case of victims can report to the concerned authorities. Altogether, we aim to provide a basic understanding of the issue and some design principles which can be used for future work in this area.

Author Keywords
Online platforms, online applications, mobile apps, harassment, awareness, universities

1- INTRODUCTION

Sexual harassment is a grave global issue and has long-term damaging effects. Since the "Me Too" movement started, several women came forward with their horrific experiences of sexual harassment, which depicts how common this act is. Not just in some particular section of the world, but it is happening almost everywhere. The whole world is dealing with this critical problem. By spreading awareness, we can help the victims not to tolerate such incidents and make people aware of their actions. A lot of work has already been done to educate the masses, including raising awareness through tv ads, social media, and short stories. Departments have been set up in different organizations to report such incidents, but it is still not enough. In this project, we extended the work done on harassment awareness in the context of LUMS, by using the previous user research done and developing a 3D environment to aware and train people against sexual harrassment. The goal of the original study has been to make the students aware of harassment issues and guide them on how to get the right help and make the students aware of their actions. We worked on this goal by projecting the work into 3D to feel more immersed in the situation.

In this project, we developed a Virtual Reality awareness game based on an ongoing 2D game project. The existing project aims to have scenarios that will raise awareness about sexual harassment to LUMS students by educating them on bystander intervention, identifying coercion, existing campus policies, and reporting harassment to related authorities. We aim to create a 3D version of the project by mapping the narratives and scenarios identified through user research and theme identification into a VR replica of LUMS. We propose the creation of a gamified version of the LUMS campus and the use of 3D avatars to depict the scenarios using VR technology.

Our target user group for this project is the LUMS Community, especially the first-year students who are not aware of the harassment and defining their boundaries. Multiple cases of sexual harassment have been reported in LUMS, and several remained unreported due to the lack of awareness. The critical point to be noted is that many reported cases occurred in the first year of victims, and they were reported later because victims came to know that it was harassment after a very long time, and this happened due to the lack of awareness. Our goal is to raise awareness among the LUMS Community against harassment beforehand, so everyone knows when they are being harassed and can communicate their boundaries to others.

2- RELATED WORK

Perception of sexual harassment and inappropriate conduct

The concept of sexual harassment is generally presented as a broad framework in terms of unwanted and unwelcome sexual advances and requests, as well as verbal and non-verbal conduct of a sexual nature that implies unwanted consequences for the target. [Philip J. Corr , Afroditi Pina]. However, the definitions followed by organizations do not illuminate on what is perceived to be sexual harassment among different groups within an organization [Philip J. Corr]. Perceptions on what entails sexual harassment varies across gender, attributional factors and social power [Philip J. Corr , Afroditi Pina, Maria Rotundo]. Gender differences in the perception of sexual harassment have been addressed extensively in research. Results from these studies show that men tend to take a more tolerant view of gender harassment or sexism as compared to women, and tend to categorize such behavior as flattery. [Philip J. Corr,Rotundo]. Females were shown to be more receptive and likely to acknowledge sexual harassment than men [Rotundo]. Certain research studies also highlight the effect of social and cultural factors on gender perception of sexual harassment. In situations where both genders adhere to traditional gender roles, both men and women are more likely to consider harassment behaviors as acceptable [Afroditi Pina]. Similarly, in relation to victim response, [Herrera] shows that women who confronted their harassers would be evaluated more negatively and would be viewed as more impertinent in defiance of traditional gender roles by men. This uncovers a bias that shows that men tend to blame the victim at a higher level as compared to women.

This social construct carries forward into sexual harassmnent situations where the woman is the aggressor by pandering to stereotypes about "typical" assault victims [Mally Shechory-Bitton], which shows that people are less likely to believe sexual harassment behaviors exhibited by women. Studies have also been conducted to cater to gender bias in context of other social factors such as authority and attractiveness. Research shows that behaviors are more readily defined as harassment by both men and women if the perpetrator is at a higher authority or status than the victim [Pina, Corr]. [Corr]'s study of the perception of sexual harassment by a liked and unliked boss suggests that an unpopular authority figure is more likely to be accused and held accountable by both genders than a popular one despite being guilty of the same crimes. This finding is further backed by systematic reviews that suggest that individuals, especially women, were more likely to evaluate sexual attention from superiors as harassment [Rotundo, Pina]. Sexualized attention from peers within the workplace often goes unreported as it is less recognizable as compared to misconduct from superiors for both victims and observers [Pira]. Perceptions of sexual harassment are also influenced physical attractiveness. Studies show that ambiguous behaviours tend to be classified as sexual harassment when the potential female victim was more attractive and the potential male harasser was less attractive by both genders.[John H. Golden III]. The interaction between an attractive male and unattractive female was also less likely to be regarded as sexually inappropriate in nature [Pira, John H. Golden III]. Current studies show that the female rating of attractiveness was more influential on the perception as compared to the male[Pira]. The current literature, however, lacks sufficient research on male victims of harassment and the role of physical attributes in the behaviors exhibited by their perpetuators. Furthermore, attractiveness is a subjective scale, so the overall judgment of the observer and the victim may be skewed in this regard.

Sexual harassment in academia and higher education

Sexual harassment in academia still remains marginalized, with almost 6 out of 10 countries in the world lacking adequate policies and laws for harassment in universities and higher education institutions [Bondestam]. Studies show that women in academia, particularly the STEM field, tend to be more susceptible to harassment [Karami, Memon]. Existing research highlights that while both undergraduate and graduate students can be victims, graduate students, despite their age and experience, are more likely to be victims of harassment as their age tends to absolve them as "students" in the eyes of the harassers [Karami, Menon]. Victims in academia not only face sexualized behavior from fellow students, but also professors. However, as highlighted by [Menon], a much overlooked perspective of sexual harassment in academia is inappropriate conduct and sexually explicit behaviour exhibited by students towards professors and faculty.

Exposure to sexual harassment in higher education leads to unwanted psychological, professional and physical consequences for the victims. Most survivors of assault and harassment tend to develop mental disorders such as depression, PTSD, irritation and take on coping mechanisms such as alcohol usage and drug usage [Bondestam, Menon].In countries other than the north, issues such as unwanted pregnancies, HIV/AIDS and usage of sexual favors to gain access to academic materials are issues that are in the foreground. [Kennedy, Bondestam]. To cater to sexual harassment claims and complaints, educational institute policies against harassment need to cater to the organizational level as compared to individualistic cases [Baker, Bondestam]. In their systematic review, [Bondestam] suggests the lack of research in understanding the role of preventative policies in actually affecting the harassment on-campus. Similarly, conventional training and awareness forums do not yield any consequential effects, however, men who do not participate in such forums tend to be less inclined to classify sexualized behavior as harassment [Bondestam]. [Baker] suggests that victims need to be proactive in confrontation of harassers and in informing their organizations in order to ensure timely action. A major enabler of harassment is also the lack of personal liability that is undertaken by a harasser in a position of authority, e.e., tenured professors. Since the harasser rarely faces direct consequence of action, the cycle continues [Karami, Baker] Despite the research conducted on academic sexual harassment, there is a severe lack of support systems in educational institutions for victims [Karami]. Instead, at an institutional level, there is focus on individualistic case management and isolation of the victim [Bondestam]. However, the Internet, as well as the recent MeToo movement has brought about a platform that allows for harassment awareness and a support system for victims [Moitra], hence creating an online community that enables victims to come forward with their stories and hold their harassers accountable.

Sexual harassment in Pakistan

Although sexual harassment is widespread in academic and organizational settings in Pakistan [AASHA], there is a severe lack of research on the matter within the country. Most of the existing literature focuses on identifying the problems that exist within Pakistani organizations and academia. Pakistan was one of the first countries in South East Asia to implement sexual harassment laws.[Thakur]. The Alliance Against Sexual Harrasment at Workplace (AASHA) was founded by like-minded women organizations to cater to the worsening situation across Pakistani organizations. AASHA was able to modify the Penal Code of Pakistan to get "Protection Against Harassment of Women at Work Place Act, 2010" passed by the National assembly, as well as a Code of Conduct to ensure that the act was implemented across the

organizations of the country [Thakur, AASHA]. The Higher Education Commission of Pakistan (HEC) also initiated a taskforce for the management and mediation of sexual harassment claims with different penaltis for student and staff perpetuators. However, despite the existence of educational harassment rules created by HEC on creating awareness and prevention of harassment scenarios, there is very little emphasis placed on the informal and formal methods of prevention and punishment [Thakur]. The formal sector of Pakistan, public and private, has a formal code of conduct in place[Ali, Yousaf]. While organizations are apparently committed to dealing with sexual harassment complaints at a policy level, analysis of the policies suggest lack of explicit procedures to handle sexual harassment complaints[Ali]. Therefore, these procedures and rules mostly exist at a surface level, and are often non-existent in higher educational institutes [Durrani, Sigal, Ali]. Studies pertaining to organizations in Pakistan show that company policies were often inadequate in recognizing and handling harassment charges [Ali], and employees often lacked awareness on how to handle harassment [Ali, Yousaf]. Furthermore, victims of sexually inappropriate behavior are often marginalized and victimized [Thakur, Ali], and socio-cultural aspects such as modesty and honor are often exploited to force victims into silence [Ali, Durrani, Merkin]. Given the lack of awareness and the overall patriarchal model of the Pakistani society, it is often difficult for the victim and the observers to understand and identify sexual harrassment [Durrani, Merkin]. Most cases of sexual harassment often begin as harmless flirtation, or as mutual interactions that escalate into harassment territory where neither the victim nor the harasser are aware of the inappropriateness of the situation [Durrani]. This applies to a lack of understanding by the victim on how to categorize harassment, as well as a lack of awareness on part of the perpetrator [Durrani, Sigal]. Due to lack of public awareness, lack of media attention and the general cultural concept of honor and shame surrounding the topic at hand, most victims are also at a loss on how to handle harassment and may prevent them from directly confronting their harassers [Sigal, Merkin]. There is a severe need of awareness and implementation of anti-sexual harrassment laws that exist in the educational environment to not only address the gender inequalities, but also cater to the patriarchal views of the society that allow victims to take action against their harassers indirectly [Thakur, Merkin, Sigal].

Digital solutions for sexual harassment

A lot of solutions have been presented to tackle this global problem of sexual harssment. One of the solutions is *Protabadi*. *Ahmed et al* discusses that even though there is a lot of need for such interventions, the adoption of such systems in the developing regions is still very low. 1 discusses the role of technology in sharing personal stories of sexual harassment showing that there is mistrust, fear and hope regarding the technology which affects their reactions towards these tools. This shows that more careful work is needed while designing such interventions so that we can create more sustainable solutions. *Rodríguez et al* provides an amalgam of different ICT tools that can be applied in the universities to tackle with sexual harassment and harassment on the grounds of sex. Different applications have been designed that helps women to make them feel safe. *SafeStreet* presents a mobile-based application that helps women to capture and share experiences privately. The application is based on the key observation that most sexual harassments are spatio-temporal in nature. So it provides a safe path to destination based on the data collected. Another such solution is *Harassmap* which is also a mobile-based crowd-sourced application that allows women to share their experiences and report the incident anonymously. It also provides data where harassment level is high based on the data fed by users. *Brynjarsdottir et al* discuss technologies that focus on individual behavior "*narrows the vision*". Meaning that instead of focusing on broader vision the modern technologies focus on making the individual safe not on changing the behavior of harassers. So instead of focusing on how to keep women safe, our main focus should be on why this is happening and how to tackle the root of the problem. Keeping this in mind last paper proposes a design to denormalize the act of sexual harassment using the concept of collection of data-in-place. We have also seen that raising awareness regarding a specific issue helps in tackling the problem. A lot of work has been done in this area. Storytelling has a huge impact in raising awareness and making a community. As more and more people find a platform that gives them a voice. *Diamond et al* presents a technical solution called *Hollaback* and dicusses that a CSCW technology can be leveraged to raise awareness regarding sexual harassment and shift perspectives of people. It's a program that focuses on the awareness of sexual harassment through trainings and providing a community platform where people can share their stories and is currently been operating in 21 cities and 18 countries around the world. A lot of work has also been done in Pakistan. One of the biggest platforms in Pakistan is *SoulSisters* Pakistan. Through this a lot of women find a safe community, where they can discuss different problems including their traumatic experiences of sexual and domestic abuse.

Research has also shown that the roleplays of high-risk scenarios should be particularly limited in their ability to elicit strong reactions from participants, due to their familiarity with the harassment scenario actually happening with any participant, which can affect the impact of the practice. [1] The first concerns sexual harassment grievance procedures, which give victims a formal avenue for filing complaints. Survey research points to four problems. First, women distrust grievance procedures and rarely file complaints (9 of 6). Second, formal complaints rarely lead to the transfer or removal of the harasser (9, 10 of 6). Third,

women who do file complaints face retaliation—66% of them, according to one survey of federal workers (11 of 6). Finally, the adversarial grievance process itself can harm victims; studies comparing women who file complaints to women who keep quiet show worse career, mental health, and health outcomes for those who file (7, 8 of 6). Grievance procedures should make it more likely that women will leave their jobs [6] Computer-based training that assesses individual needs and provides individual specific training (without keeping permanent records) may increase training effectiveness [5] A computer-based training program could be developed that conducts an individual needs assessment (e.g., measures gender role conflict or knowledge about sexual harassment) and delivers training tailored to the trainees' assessed needs (Hartley West, 2007)[5]

Sexual Harassment and Virtual Reality Sexual Harassment Training

A common approach to dealing with sexual harassment in organizations is to provide sexual harassment training [5]. Sexual Harassment (SH) training can provide individuals in high-risk of SH an opportunity to identify potentially dangerous situations as well as learn and practice tools to combat it effectively [3 of 1]. The effects of available SH training programs have been found to be inadequate, due to the need to find a balance between impactful scenarios and ethical considerations [4 of 1]. It is also noted that not the SH couldn't be used effectively due to being incapable of producing sufficient SH-related fear and paralysis for participants to practice effective responses. [1] Training research shows consistent evidence for the effects of pre-training self-efficacy (perceived ability to master training content), pre training motivation, cognitive ability, and prior training experience on learning outcomes[5].

Gender Differences in SH Training

Gender differences in perceptions of sexual harassment suggest that training may have different effects on female compared to male trainees. And, in fact, a number of studies have found that sexual harassment training has a greater positive impact on men than women (Beauvais, 1986; Blakely, Blakely, Moorman, 1998; Bonate Jessell, 1996; Moyer Nath, 1998)[5] Sexual harassment training has been shown to be less effective in changing attitudes of men who have a higher proclivity to harass (Robb Doverspike, 2001) or who report more gender role conflict (Kearney et al., 2004). Pryor (1987) developed the Likelihood to Sexually Harass instrument, which asks men to respond to a series of scenarios to measure their propensity to commit the most severe forms of sexual harassment [5] Relative to men, women are more likely to recognize ambiguous and less severe forms of sexual behavior as examples of harassment (Gutek, 1995). They are also more likely to be at risk of sexual harassment (Bergman Henning, 2008; U.S. Equal Employment Opportunity Commission [EEOC], 2008) [5] Sexual harassment training may have a greater positive impact on men (e.g., Beauvais, 1982; Bonate Jessell, 1996; Moyer Nath, 1998) because it provides them with knowledge about sexual harassing behaviors they do not have. Men may particularly benefit from training that helps them recognize less extreme forms of sexual harassment such as telling jokes of a sexual nature. On the other hand, training directed at women could focus on how to respond to overtures from men who may not understand that their behavior is sexually harassing.[5] Sexual harassment training may also have a greater positive impact on men because they are less likely than women to be targets of sexual harassment (e.g., Bergman Henning, 2008; U.S. EEOC, 2008) and may see the issue as less relevant than women prior to the training. This suggests that sexual harassment training provided to men must "sell" them on the value of such training. Training should thus be designed to encourage men to engage with the training and carefully process the information provided.[5] Effects of SH Training A study by Perry et al. (1998), however, suggests that sexual harassment training methods may have differential effects across training outcomes. In Perry et al.'s (1998) research, videos were effective at improving trainee knowledge about sexual harassment and reducing inappropriate behaviors but did not change attitudes related to the propensity to harass others. The authors suggested that attitude change may require more interactive and experiential training methods. Consistent with this, Beauvais (1986) assessed a training program that included an interactive discussion of a video series and found some evidence that the training changed sexual harassment related attitudes. [5] Role-play, discussions, videos, and case studies were among the most common training methods discussed in the literature. Although much of the content was descriptive, several authors made more explicit recommendations regarding the use of interactive and experiential methods, suggesting that these methods (e.g., role-play) are likely to be particularly effective in the context of sexual harassment training (e.g., Carey, 1998a; Moore Bradley, 1997; Orlov Roumell, 1999)[5]. The effectiveness of particular instructional methods is likely to depend on the training content (Alvarez et al., 2003) and the specific competency being trained (Arthur et al., 2003; Salas et al., 1999). Interactive instructional methods such as role-plays may be most appropriate to help trainees develop the interpersonal skills required to effectively respond to a potential harasser [5] One research has been done that treats trainees as victims' allies, reviewing how to prevent harassment, recognize its signs, intervene to stop it, and use grievance processes (12 of 6). "If you see something, say something" curriculum has been studied extensively among college students and military personnel. A meta-analysis of campus field studies finds that it increases reported trainee efficacy, intention to intervene, and helping behavior (13 of 6). One study showed increased intention to intervene and confidence about intervening after a year (14 of 6). Four months out, Army trainees were more likely to report

having intervened to stop sexual assault or stalking (15 of 6). The findings point to the promise of harassment training that treats trainees as allies rather than as potential perpetrators[6]. Bystander intervention training, gives trainees the tools to recognize and address harassment. It has the broadest positive effects. By contrast, the training, which most often uses legalistic forbidden-behavior curriculum, shows null or adverse effects [6].

Virtual Reality as an effective tool for SH Training Virtual Reality (VR) has been defined as the "*ultimate empathy machine*" because it allows the user to take other people's perspective [8]. Virtual Reality (VR) has the potential to deliver SH prevention training in novel methods.[1] Today, VR technology is very popular and might be a distributable and comparably cheap training environment soon, laying a promising foundation for widespread implementation [2]. Compared to traditional training methods and knowledge acquisition settings, VR might help to concentrate on a topic much better without external distraction[2]. VR-environments can easily display multimedia content and include multiple representations, ensuring that several senses are addressed, which is said to have positive effects on learning outcomes [6 of 2]. VR allows participants to experience a computer-generated environment, in a manner that gives the individual the illusion that they are in the real world [6 of 1]. The more embedded the person feels in a VR environment, the more they feel an integral part of the scenario created [6 of 1]. For a training to be successful and affect the learners' future behaviors, a simulation must feel realistic and generate strong reactions in participants that resemble real life.[1] Research also showed that the female participants were unable to define their boundaries in VR job interviews and they got ultimately harassed [1], so there's the need to have appropriate SH training for female boundaries in VR they could learn to define boundaries. The introductory program for freshmen in VR proved to raise their awareness for street harassment and using a playful opener to other sexismrelated topics [2]. VR-environments have shown to be effective in knowledge acquisition, awareness raising and behavior change. For example, *Ahn et al*. showed VR to promote environmental behavior and behavioral change successfully (as compared to video/text) [7 of 2]. That VR-environments are effective in sensitizing and empathy raising is illustrated by *Ingram et al.* [8 of 2], who showed that a VR bullying prevention training was more effective in raising empathy, reduced bystander tendencies and provoked a higher willingness to stand up against bullying. The VR-game presented by *Muller et al*. is designed to support empathy in the context of sexism and gender stereotypes [9 of 2]. The results show that the changing situations and character roles have a positive effect on the level of empathy as well as on the participants' willingness to intervene in sexism related situations.[2] Studies show that offenders have lower levels of both cognitive and emotional empathy than the general population.[5 of 8] One possible reason is that individuals with low levels of empathy do not understand the other person's distress, and they are unable to take the perspective of the victim [8]. Previous studies have found that taking the perspective of someone else through VR can be an effective way to promote empathy in different situations, such as increasing helping behavior,[10 of 8] reducing implicit racial bias,[11 of 8] or decreasing prejudice[12 of 8]. More specifically, recent studies have focused on modifying violence toward women and increasing empathy in men through the embodiment of virtual female avatars. They have shown promising findings, such as improving the men's ability to recognize the woman's emotions,[13 of 8] reducing the shock given to a woman on a VR obedience task,[14 of 8] and creating a sensation of fear, helplessness, and vulnerability in a scene of intimate partner violence [15 of 8] Previous literature has found that the 360°- video-based VR is effective in increasing empathy in several contexts. For instance, the work "Cloud Over Sidra" showed changes in perspective taking and a high sense of presence.[18 of 8] More specifically, in the field of SH, Steinfeld [19 of 8] found that the use of 360° video predicted—among other variables—a decrease in stereotypical views of SH. A study showed that both types of tasks (360° video and narrative) led to changes in empathy and violent attitudes, compared with baseline, in a sample of men[8]. In addition, we found a tendency (marginally significant) to experience higher empathy after the 360° video than after the narrative[8]. Furthermore, we found a carryover effect of the 360°-video condition. That is, empathy after the narrative was significantly higher when the 360° video was presented before the narrative task rather than after it [8]. Seinfeld, et al. [28 of 9] embodied male domestic violence offenders, and a group of male controls (non-offenders), in the virtual body of a woman who was then subject to an abusive attack from a male virtual character. It was found that the prior deficit of offenders in recognising fear in the faces of women, compared to the controls, was extinguished after the VR exposure. Both of these latter experiments used a rapid reaction time test, for empathy in the first case and emotion recognition in the second [9]. A relevant limitation of 360° video is that it can produce sickness, as previous studies have discussed.[36,37of 8] In this study, sickness may be caused by the movements of the camera. A possible solution would be to improve the resolution with an apparatus that could better fix the camera to the performer's head. However, our findings could also suggest that sickness may arise because of the psychological impact of feeling oneness with the victim[8]. Solutions in Virtual Reality In VR, harassment can be in three categories: verbal harassment, such as personal insults or hateful slurs; physical harassment, such as simulated touching or grabbing; and environmental harassment, such as displaying graphic content on a shared screen [3]. The first wave of community regulation, emerging in the 1980s [44 of 3], involved establishing norms for pro-social behavior and sometimes assigning community members special privileges (e.g., admins and moderators) to enforce those

norms, often with the support of moderation tools such as reporting, flagging, and editorial rights [18,31,32,34 of 3]. A second regulatory wave introduced crowdsourced approaches, such as the decentralized approaches used by Slashdot and Digg [33,43 of 3]. In an effort to scale moderation practices, a more recent wave of regulation uses natural language processing and machine learning techniques to generate classifiers for detecting abusive language [12,29,62 of 3]. Erikson [22 of 3] argues that communities use social norms to establish community boundaries—or rather, that those who misbehave establish community norms, which in turn influences how rules are made, enforced, and broken. Communities develop norms for appropriateness and enforce those norms through both formal sanctions, including formal policies and laws, and informal sanctions (such as shame, ridicule, disapproval, or ostracism, which all facilitate the regulation of non-normative behavior). Garland [23 of 3] argues that informal forms of social control exercised through everyday relationships and institutions—e.g., by families, neighbors, and communities in schools, workplaces, and other social institutions—can undermine the authority of formal law by creating an "everyday environment of norms and sanctions" that is more visible and available than systems of formal legal control. Seering et al.'s [48 of 3] theoretical framing, coupled with this empirical result, suggests that designers could directly influence the norms of individual communities and groups through design "nudges" that encourage prototypical group members to engage more directly with new or norm-violating users. This suggestion is compatible with other recent research, which found that users of Twitch (a video-streaming platform) imitated examples of behavior they witnessed—especially behaviors from users perceived as having authority over the group or being otherwise high-status [47 of 3]. We also find that norms for appropriate behavior in social VR spaces are still emerging; future research should explore strategies for establishing concrete expectations and norms, particularly as social VR applications gain in popularity and experience high volumes of new users. Finally, we find that many social VR users are committed to supporting their favorite communities. This result suggests that the development of community-driven moderation tools could empower communities to self-govern according to their own interpretations of appropriate behavior. [4]

3- HYPOTHESIS

For this study, we have finalized the following research hypotheses:

H1: Participants will be able to identify sexual harassment within the prototype
H2: Participants will be able to take a step against sexual harssment within the prototype
H3: The prototype will promote decisive behavior among participants which will help them to realize and make decisions against sexual harassment in similar situations.

4- METHODOLOGY

Based on the requirements, we developed a medium-fidelity prototype using Unity and HTC Vive. As we want to develop the product for the harassment awareness for the students in the context of LUMS, we have developed environments in Unity such that the user feels familiar with the environment.
We first made a storyboard that defines user scenarios based on one of the themes that have already been established by another team that is working on the harassment awareness project through 2D storytelling. We implemented two scenarios that were intended to raise awareness regarding stalking and one scenario has been implemented to raise awareness regarding how victims can report the harasser to the administration. We have also integrated in text form where the user can read how the user can report to the administration.
In order to create the scenarios, we created three virtual environments which represented commonly frequented areas of LUMS: 1) Pepsi Dining Center (PDC), 2) First floor of the Gad and Birgit Rausing Library, and 3) the walkway between Academic Block and PDC. Each of these scenarios was created in Unity 3D, with external assets being imported from Unity Asset Store and SketchFab. We imported the character models either from Mixamo, or created our own using Adobe Mixamo Fuse in order to create less generic models which we could use in a specialized context. The animations and rigging of these characters was done by uploading them to the Mixamo website.
The start scene gives the user five options; *How to report, Scenario 1, Scenario 2, Reporting Scene* and *Exit*. Figure 1

Figure 1 Main scene

"How to report" option takes the user where the user can get information regarding how the harasser can be reported to the right authorities and the user can take as much time as he/she wants to grasp the information. We have integrated this as humans are more likely to remember what they see than what they hear.

Figure 2 How to report

Figure 3 Reporting Scenario

In the *"Reporting Scene"*, we have tried to convey information on how harassment affects the well being of the person, and how certain behaviors can affect someone's mental health. The main purpose of this user scenario is to convey information regarding how the victim can report someone, what's the process and what are the concerned authorities so that the users are aware of the processes already in place but mostly students are not aware.

The *"Scenario 1"* and *"Scenario 2*" raises awareness regarding stalking and how it affects the wellbeing of the victim and also raises awareness regarding how certain behavior is not okay and why one person should be aware of the actions.

In both the scenarios, the user is being asked if he/she wants the victim to confront the harasser. In these scenarios we have tried to raise awareness regarding different behaviors of the harasser when confronted, either he denies or accepts. Through this we have tried to make the victim aware that even if he denies that he/she is stalking or making him/her uncomfortable, if still the user feels that harasser's behavior is making the victim feel uncomfortable, then this behavior still can be reported to the concerned authorities.

In the next part, we have integrated that the victim discusses with a friend regarding what she is feeling regarding the person who she feels like stalking her. Through this we want to raise awareness of the importance of sharing it with someone and conveying information that there are concerned authorities at LUMS, if the person is not aware of that already.

Figure 4 Stalking Scenario following

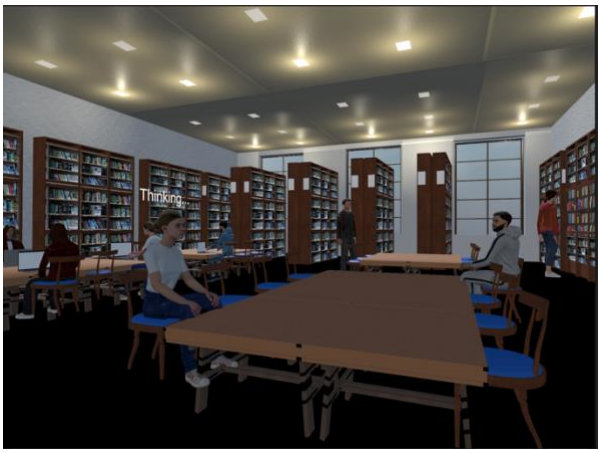

Figure 5 Stalking Scenario (Staring)

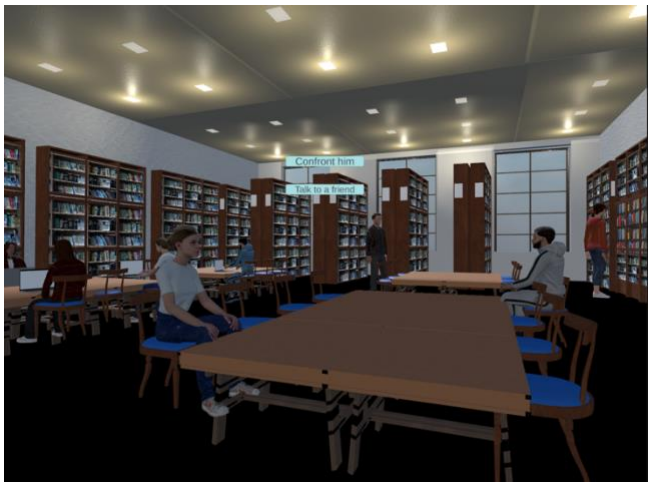

Figure 6 Asking user to either confront him or discuss it with friend

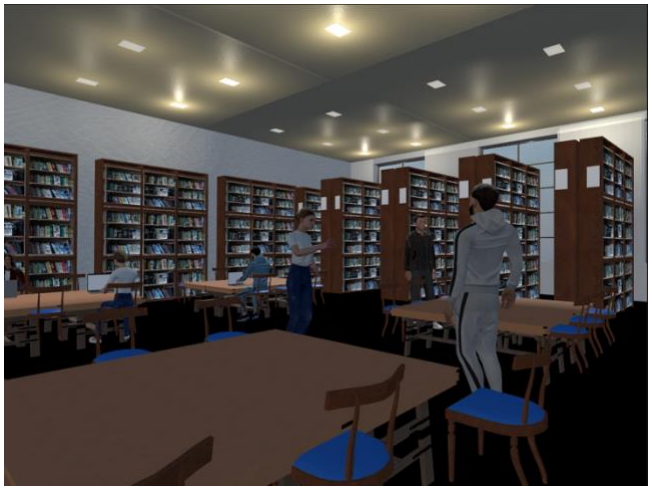

Figure 7 Confronting the other person

Figure 8 Discussing with friend

Field Study

Participants

For this study, we had 4 participants(2M & 2F) and all of them were college students with an average age of 20 years. The participants were randomly selected without any bias of experiencing sexual harrassment or not.

Study Design

The study consisted of a session in a VR where participants were exposed to sexual harassment happening with someone else and he/she can observe it in third person view. There were two scenarios and both of them were about stalking and staring. We chose harassment of low intensity so it couldn't trigger someone's memories of such experiences. The participants also had the option to make a decision on the behalf of the victim to whether to share the experience with a friend or confront the harasser. They were also informed about how to report sexual harassment in LUMS. There were two questionnaires, one was pre- and other was post-session. This was to identify what improvement, learning and training affected our participants and whether they are willing to make big step against sexual harassment or not.

Procedure and data collection

Fig A represents the scenarios that we had for our Sexual Harrassment Training and it was selected by the team dealing with volunteers. Participants were not made to select options among these. They were shifted from one scenario to the other and were given the option to make decisions on the behalf of the victim.

Pre- and Post-Training Questionnaire

We conducted semi-structured interviews and the participants were asked questions before and after the session so we can evaluate our VR SH training. We basically asked them general questions about harassment and their personal experiences of being harassed or knowing someone who was harassed. The pre-Training questionnaire comprised of the following questions:

1. Have you ever experienced or observed sexual harrassment?
2. Did you face harassment in LUMS?
3. If yes, at which place?
4. What kind of harassment was it? (verbal, physical touch etc)
5. Were You able to recognize it at that time?
6. Did you take any step against it?
7. Do you know about about the LUMS Sexual harrassmnet policy or did you ever read it?
8. Do you know or have ever reported sexual harrassment in LUMS?
9. Did you face any difficulty or did you hesitate to do so? (If yes then why?)
10. Do you know LUMS facilities that might help if someone experiences sexual harrassment?
11. Were you ever unsure about if you faced harassment which led you to not reporting it?

12. Do you think that you need to know what sexual harrassment is or are you sure about it?

And in the post-training questionnaire, we asked them similar questions to see what effects of the session they had.

1. How did you feel?
2. What did you observe?
3. What kind of harassment it was i.e physical touch, stalking etc ? (for both scenarios)
4. Do you think that this kind of behavior comes under LUMS Sexual harrassment policy?
5. At which point you realized it was harassment?(for both scenarios)
6. Were you able to overcome your fear and make a decision on the behalf of the victim?
7. Do you think that you would be able to make the same decision on your behalf if you have experienced this VR training before? (How)
8. Are you confident that you can identify sexual harrassment and would be able to take a step forward against it ?
9. What improvements can be made in this VR SH Training?

Analysis and Results

We analyzed the interviews and chosen options in VR to derive both qualitative and quantitative results.

Quantitative Results

For quantitative data, we asked questions from participants and made graphs for better visualization. The questions were asked both before and after the session. The stats for both of the survey and questionnaire are below:

Pre-SH Training

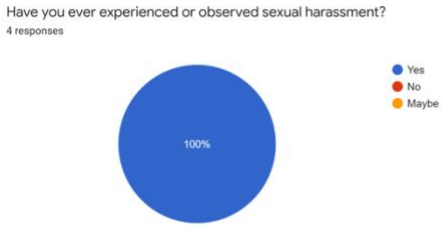

Figure 9

The question was to know whether the participant or his/her friend or someone that he/she knows has ever experienced Sexual harrasment. This was added to seperate the participants on the basis of experiencing sexual harassment because there is alot of difference in perception of sexual harassment ot the people who have experienced it and the people who havent. All of the participants have experienced or observed sexual harassment.

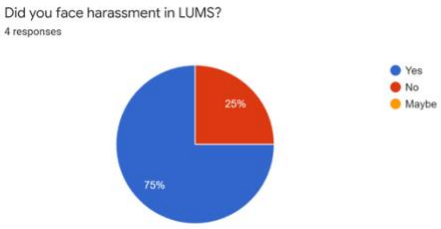

Figure 10

This question was added to know the context so we can relate it to our project that is in the context of LUMS. As the VR SH Training has the environment of LUMS, it was to whether participants can have adverse effects instead of learning. So, we kept all possible parameters in loop to make it safe and usable. 75 percent of the participants have faced or observed sexual harassment in LUMS while 25 percent of the participants have experienced or observed sexual harrassment, accoridng to the previous question, but not in LUMS.

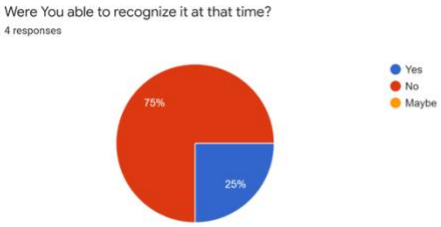

Figure 11

This question was added to know the participants' past experiences regarding sexual harrassment and whether they had the ability to identify harassment and making differnce between what is harassment and what is not which is one of our hypothesis that participants will be able to identify sexual harassment. 75% of the participants were not able to identify when they experienced sexula harassment.

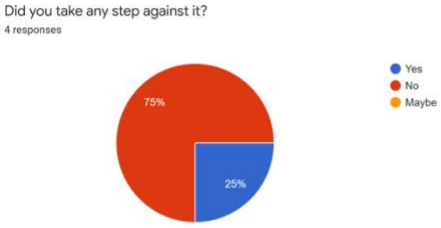

Figure 12

This question was again similar to the previous one and to identify whether the participants were able to take the measures that they should have taken and this is also relevant to our other hypothesis that participants will be

able to take a step against it. 75% of the participants were not able to identify the sexual harassment and they were not able to take step against it.

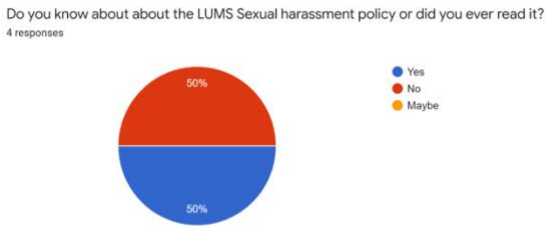

Figure 13

This is know to if the participants are aware of LUMS Sexual Harassment Policy or did they ever try to read it so they could have an idea what type of behaviors come under LUMS code of conduct. Only 50% of the participants were aware of that.

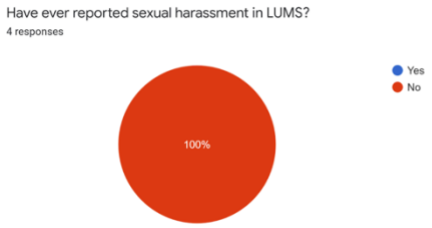

Figure 14

This question was added to identify how many of the participants have reported any kind of sexual harassment in LUMS and whether they are aware of the procedure of reporting it or not.

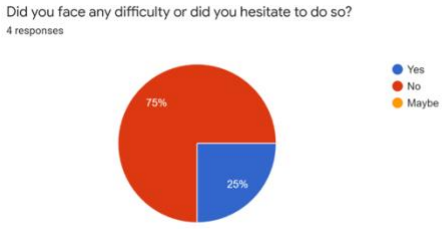

Figure 15

This question was to identify the problems existed in LUMS system that could not let people to report the sexual harassment or either due to some other reason.

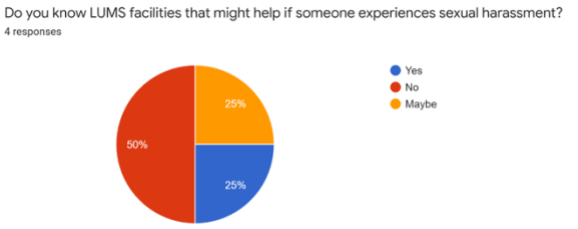

Figure 16

This question was to identify how many participants are aware of the facilities that LUMS provide for supporting people that might face sexual harassment. Only 25% of the participants were aware of that.

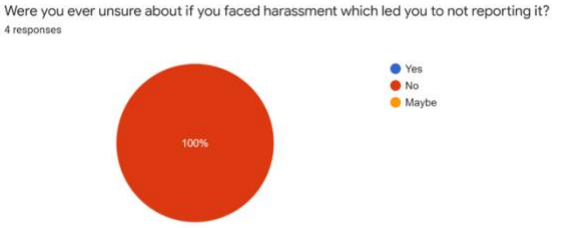

Figure 17

This question was added to identify if participants face difficulty to identify sexual harassment that might be the case for not reporting it but none of the partipants showed that they were unsure about the harassment they faced and from previous responses its evident they identified the harassment but not the time they faced.

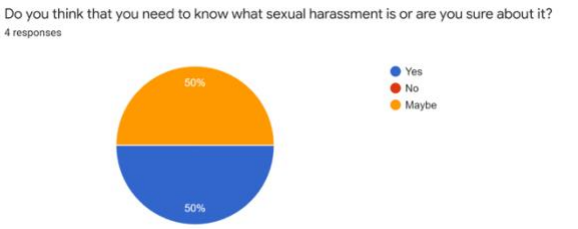

Figure 18

This question was added to know whether participants are aware of sexual harassment or they need to be educated about it and 50% of the participants said that they are aware of what sexual harassment is.

Post SH-Training

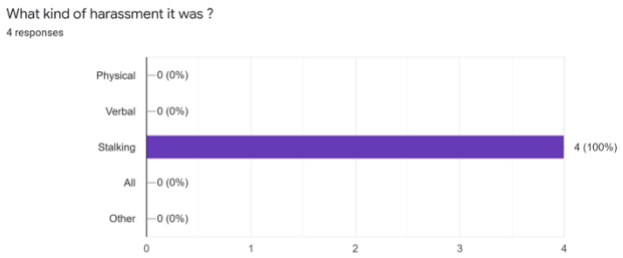

Figure 19

This question identified that the participants' perception of harassment and its type is correct and whether they picked the right choice for what has been shown in the VR session and all of the participants chose the right choice.

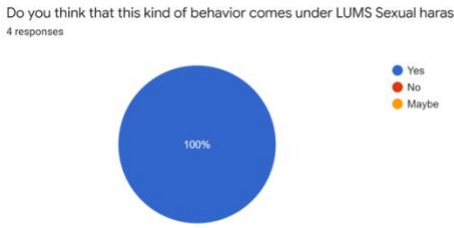

Figure 20

This question was added to check if participants were made aware of behavior that migh come in LUMS sexual harassment policy and whether the VR session also made participants to remember this and all of the participants gave positive responses.

Figure 21

This question was to identify whether participants faced any emotional stress or not and were they able to make the decision on the behalf of the victim which was one of our hypotheses to make the decision making process of participants faster in a sensitive situation and all of the participants were able to do that.

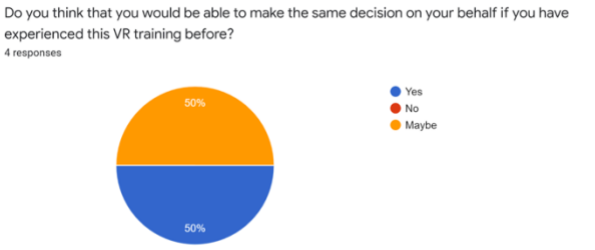

Figure 22

This was to know whether the participants would be able to make the same decision for themselves if they face a similar situation which was one of our key goals. 50% of the participants were confident that they would be able to make a decision for such a situation.

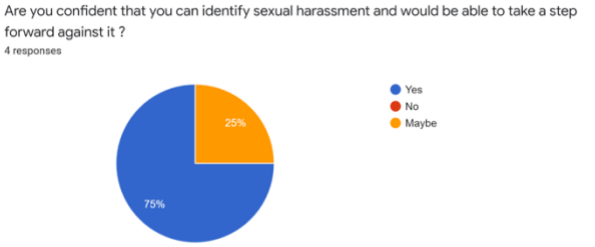

Figure 23

This question was to check the motivation of participants that if they woulf be able to identify and report the sexual harassment which was one the main purposes of our study. 75% of the participants said that they would be able to do that.

Qualitative Analysis and Results

We conducted semi-structured interviews to collect qualitative data. The interview type was semi-structured because the topic was sensitive and everyone had very different experiences. To keep the environment cool and healthy, we interacted with participants. The interview sessions were recorded and then transcribed for qualitative analysis.Here are some of the major findings that we got from interviews considering the effect of SH training in VR.

Sexual Harrasment Awareness

It was our first hypothesis that participants will be able to identify sexual harassment. According to the analysis of the results, it was observed participants became more confident to identify sexual harassment after VR Sexual Harassment training. When P1 was asked about the *"Were You able to recognize it at that time?"*, he said *"No"* as he was not able to define sexual harassment breifly and needed to be aware about it. But right after the VR session, he confidently replied to the question, *"Are you confident that you can*

identify sexual harrassment and would be able to take a step forward against it ?", that , *"Yes, would definitely try to do so"* which depicts that motivation to learn and be aware about sexual harassment increased and particpants identified the sexual harassment. Moreover, they were pretty confident that they would be able to identify sexual harassment in real life too as P1 said, *"VR enviroment is very near to the reality and if you have experienced that before it can definitely help you."* Similarly the P3 and P4 were also not able to recognize the sexual harassment they experienced and P2 said that the victims he know were able to recognize harassment that they faced but he wasnt sure because he didn't experience it. But after the session, there was a change in their perception. P2 said, *"I think so"*, in the reply of, *"Are you confident that you can identify sexual harrassment and would be able to take a step forward against it ?"*, while P3 was not sure and said, *"it depends on the situation"* and P4 said, *"if someone else is going through then yes and for myself no."* Maybe she said that because the scenarios we developed in VR were from third person perspective and she became confident about identfying sexula harassment from third person perspective but was not sure about herself because she didn't get trained from the first person perspective.

When participants were asked if they do you know about about the LUMS Sexual harrassmnet policy or did they ever read it? P1 and P2 said "No" while P3 and P4 said "Yes". But after the VR session when they were asked about the similar question related to the scenario they observed, *"Do you think that this kind of behavior comes under LUMS Sexual harrassment policy?"*, all of them said *"Yes"*. P2 more briefly described it as *"I think it does come because in the video it was being said that you can complain to this under LUMS code of conduct."* P2 was referring to the screen when participants were made aware about LUMS Sexual Harassment Policy and where they can complain about it. So, the participants identified sexual harassment correctly with the help of VR and they were also pretty confident ot try that out in their real lives too.

Motivation to take step against sexual harrasment

Overall participants motivation to report sexual harassment increased after VR session.This VR training was designed to make paticpiants confident so that they can do the things that feel difficult to do. When the participants were asked whether they or someone the know took a step against sexual harassment when they experienced it, P1 said, *"Asked them to confront"*, P2 said*,"No"*, P3 said,*" I wasnt able to recognize it but after recognizing I took.*", and P4 said, "Yes" but none of them reported it anywhere. After the session, when they were asked if they are confident ot stand against sexual harassment and take a step against it, they showed positive results. P1 said, *"Yes, would definitely try to do so"*, P2 said, "I think so", P3 said, *"I think it depends on the situation"*, and P4 said, *"if someone else is going through then yes and for myself no"*. The reason why P4 said for herself no is related to third person perspective in VR which we have discussed above.

Promoting Decisive Behavior

The VR Training was designed in such a way that it promotes decisive behavior among participants. The participants were made to decide on the behalf of the victim to confront the harasser or take help from a friend.

When the question was asked from the participants whether they were abe to take a step against sexual harassment that they expereinced and most of them said no and also most of them were not able to identify whether they experienced sexual harassment or not. But in the VR session, they were passed through a process and they had to make a decision for a sensitive situation. They were made to choose whether the victim should confront the harasser or should talk to a friend, P1, P2, P3 chosen "Confront him" while P4 chosen, "Talk to a friend" and during the post-session interview, P4 gave some reason for that, "yes, because its gives the option to talk to a friend which I found a convenient option so". So, it promoted decision making behavior. After the session, the participants were also asked the question relevant to it, *"Were you able to overcome your fear and make a decision on the behalf of the victim?",* and P1 said, *"Yes, I said confront and I said condidentitly that I'd ask the person why he is following me",* P2 said, *"Yes, I made the decision"* and, P3 and P4 also said, *"Yes"*. The purpose of this is to promote decision making bahavior even in sensitive an difficult situations so we can train people against sexual harassment. To check whether participants have the will to apply the same in real lives, we asked them, *"Do you think that you would be able to make the same decision on your behalf if you have experienced this VR training before?"* and in reply to that P1 said, *"definitely because VR environment is very near to the reality and if you have experienced that before it can definitely help you."* and P2 said, "It depends but I think it'll help if someone has a little experience. I think it'll help." P3 replied to this question with, *"Maybe, depends on the situation"* and P4 with, *"yes, because it gives the option to talk to a friend which I found a convenient option so"*. These answers depict that participants were pretty confident and hopeful to apply the same in their real lives.

4- LIMITATIONS

The limitations of our study comprise of less scenarios as we wanted to see how sexual harassment in third person affect the participants. The scenarios could have been made in first person view aswell like P3 replied to a question, *"Are you confident that you can identify sexual harrassment and would be able to take a step forward against it ?"* that "if someone else is going through then yes and for myself no" because the scenarios were in third person view and she thought that she could do that in the way she was trained in VR but for herself she was unsure. But there was a high probability that first person view could

trigger past experiences of the participants or make them uncomfortable and unstable as proved in the literature. Another limitation was that there were some quality issues while adjusting VR. P1 said that "*Everything was fine, just characters were blurry, they should have been more focussed" and P2 said " I think quality should have been good and scenarios should have been more detailed.*"

5- FUTURE WORK

The future work could be to make more scenarios and every type of scenarios so the participants would be trained one by one on the increasing level which can help them to deal with sexual harassment in real life as this training was helpful and motivated participants to take a step against sexual harassment. The future studies can also see how participants can be trained in first person view without triggering the past experiences of the participants. Also a comparison can be conducted between the impact of the 2D and VR version of the game and a better understanding can be achieved as to which mode of gamification makes a more substantial, longer-lasting impact for the education and awareness of sensitive topics.

6- CONCLUSION

We presented a unique qualitative and quantitative study of LUMS students regarding the harassment awareness through a medium-fidelity prototype. Given these qualitative results and the design, we discuss several areas of improvement and directions future research in this field.

ACKNOWLEDGMENTS

We thank our point of contacts in universities who helped arranged valuable interviews with students. We also thank our instructor Dr Suleman Shahid and our fellow course mates who provided valuable input throughout the study which helped us improve in all areas.

REFERENCES

[1] ACM. 1998. How to Classify Works Using ACM's Computing Classification System. (1998). http://www.acm.org/class/how_to_use.html.

[2] R. E. Anderson. 1992. Social Impacts of Computing: Codes of Professional Ethics. *Social Science Computer Review December* 10, 4 (1992), 453–469. DOI: http://dx.doi.org/10.1177/089443939201000402

[3] Anna Cavender, Shari Trewin, and Vicki Hanson. 2014. Accessible Writing Guide. (2014). http://www.sigaccess.org/welcome- to- sigaccess/ resources/accessible- writing- guide/.

[4] @_CHINOSAUR. 2014. "VENUE IS TOO COLD" #BINGO #CHI2014. Tweet. (1 May 2014). Retrieved Febuary 2, 2015 from https: //twitter.com/_CHINOSAUR/status/461864317415989248.

[5] Morton L. Heilig. 1962. Sensorama Simulator. U.S. Patent 3,050,870. (28 August 1962). Filed Februrary 22, 1962.

[6] Jofish Kaye and Paul Dourish. 2014. Special issue on science fiction and ubiquitous computing. *Personal and Ubiquitous Computing* 18, 4 (2014), 765–766. DOI: http://dx.doi.org/10.1007/s00779- 014- 0773- 4

[7] Scott R. Klemmer, Michael Thomsen, Ethan Phelps-Goodman, Robert Lee, and James A. Landay. 2002. Where Do Web Sites Come from?: Capturing and Interacting with Design History. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '02)*. ACM, New York, NY, USA, 1–8. DOI: http://dx.doi.org/10.1145/503376.503378

[8] Nintendo R&D1 and Intelligent Systems. 1994. *Super Metroid*. Game [SNES]. (18 April 1994). Nintendo, Kyoto, Japan. Played August 2011.

[9] Psy. 2012. Gangnam Style. Video. (15 July 2012). Retrieved August 22, 2014 from https://www.youtube.com/watch?v=9bZkp7q19f0.

[10] Marilyn Schwartz. 1995. *Guidelines for Bias-Free Writing*. ERIC, Bloomington, IN, USA.

[11] Ivan E. Sutherland. 1963. *Sketchpad, a Man-Machine Graphical Communication System*. Ph.D. Dissertation. Massachusetts Institute of Technology, Cambridge, MA.

[12] Langdon Winner. 1999. *The Social Shaping of Technology* (2nd ed.). Open University Press, UK, Chapter Do artifacts have politics?, 28–40.