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SITUATING PRIVACY IN THE TECHNOLOGY SUPPORTED COLLABORATIVE PRACTICES OF THE SAUDI ARABIAN WORKPLACE: LESSONS ON SOCIO-TECHNICAL AND SOCIO-SPATIAL DESIGN

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ABSTRACT

Saudi Arabia can no longer depend on oil sales as its main economic powerhouse and must diversify its economy. Because of this, Saudi Arabia announced a future Vision for the year 2030. One focus of the Vision is to encourage greater workforce participation in the private sector, especially among women. Saudi women are a wasted resource as they make up only 21.4 percent of the Saudi national labor force and have an unemployment rate of 32.7 percent (GAS, 2017). While the Vision is depending on new partnerships with private companies to increase female employment, it is not addressing the main cause of low female participation in the private sector: workplaces are not designed to accommodate Saudi women. Unlike in the public sector, many workplaces in the private sector enact collaborative practices not in line with Saudi women's privacy values (i.e. mixed gender workspaces and interactions), which discourage them from applying for those roles (Ministry of Labor, 2016). Therefore, in order to increase female employment in the private sector, the focus should not only be on creating jobs, but also instituting culturally sensitive, privacy aware technology supported collaborative workplace practices.

Supporting collaborative practices in the workplace entails an understanding of the interplay between technology, people, and physical space. Researchers in the field of Computer Supported Cooperative Work (CSCW) have been studying socio-technical issues in collaborative work for decades, focusing on combining understandings of social psychology and organizational aspects of group work with collaborative software. Drawing from other fields of research that have also worked towards supporting collaborative practices, I take the position that the socially constructed meanings of space in human interaction (positions and physical distance) and in the physical world (configurations of architecture, furniture, and technology) significantly

impact technology supported collaborative practices, and should be considered alongside socio-technical issues.

To investigate these issues, I utilized the Value Sensitive Design framework to consider privacy values in every step of my research. I focused on people and the social systems that are affected by and effect technology. I extended the framework by also focusing on how spatial configuration supports or hinders privacy values and supplements technology. I went through three investigations: conceptual, empirical, and technical. Through the conceptual investigation, I was able to define what privacy meant within the Saudi Arabian context. I delved deeper in the empirical and technical investigations by conducting a case study of a local private sector company operating in Riyadh, Saudi Arabia. I used observations, interviews, and participatory design sessions to gather my data.

My findings indicate that in order to enact value sensitive collaborative practices, the company went through privacy negotiations whereby they adapted and optimized to find what works for the employees. When privacy concerns were met through the design of socio-technical support systems and socio-spatial configuration, the collaboration was optimized; otherwise, employees either felt marginalized, or overcrowded, thus they were unable to function as effectively. Through this research, I discuss privacy concerns and offer insight on socio-spatial configuration and socio-technical design of technology.

There are several contributions that I make through this study. First, I propose the extension of the Value Sensitive Design (VSD) framework to contribute more broadly to supporting collaborative activity by supplementing socio-technical design with understandings of socio-spatial configuration. I also contribute to the understandings of privacy in the Arab world. Finally, I provide researchers, technology designers, policy makers, and organizations insight on

value sensitive collaborative practices in the Saudi Arabian workplace. These considerations may increase participation in the private sector, diversify the country's income streams, and lead to economic prosperity.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

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CHAPTER 1

INTRODUCTION

Saudi women have the potential to greatly influence the Saudi economy; they are a wasted resource as they only make up 21.4 percent of the Saudi labor force, despite making up 49 percent of the total Saudi population above the age of 15 (GAS, 2017). As of 2017, the unemployment rate among Saudi females was 32.7 percent, despite the fact that 73.4 percent of unemployed females are holding university degrees (GAS, 2017). The country is depending on new partnerships with private sector entities to encourage greater participation among women in the labor force. The problem is that female participation in the private sector is currently very low not only because jobs don't exist, but also because women are not applying for private sector jobs. The Labor Market Report explains that women prefer the public sector as it offers a more women-friendly, gender-segregated environment. Women often feel discouraged to apply for roles in the private sector as many workplaces are not designed to accommodate their privacy needs, often requiring direct interaction with men in mixed workspaces, thereby violating their privacy values. Saudi women feel they cannot work in environments where their privacy is not considered and private sector companies have minimal guidelines to understand and support privacy values. In order to increase female participation in the private sector workforce, we must consider ways in which to support privacy values.

One way the Ministry of Labor and Social Development addressed this issue is by enforcing gender segregation in the private sector. This means women must have separate offices, entrances, restrooms, and in some cases, a security guard (Ministry of Labor, 2014). But, in a small to mid sized company, complete gender segregation is not an option. In the workplace setting, regardless of gender, employees in any given department or team typically communicate

and collaborate to finish a set task, thus this context is often referred to as "*partially*-gender segregated". There are physical barriers and social limitations that exist in this context and private sector companies have minimal guidelines or tactics to make collaboration work within the bounds of the culture. Providing them with guidance on culturally sensitive, privacy aware technology supported collaborative practices will help them function better and encourage more participation among Saudis who demand that their values be considered.

I use the term 'values' as defined in Value Sensitive Design (VSD) theory as, "what a person or a group of people consider important in life" (Friedman & Kahn Jr, 2000, p. 2). Throughout the beginning stages of the conceptual investigation, my objective was to continuously probe the conceptual point of view to anchor this project and to draw out a narrower, succinct, focus. During my investigation, many values emerged (see Chapter 2), all of which were abstracted to a socially constructed notion of privacy.

Many researchers also view privacy as a socially constructed concept (Altman, 1975, 1977; Harrison & Dourish, 1996; Palen & Dourish, 2003). In Privacy Regulation Theory, Altman describes privacy as a dialectic (based on experiences and expectations) and dynamic (requires continuous management) process of boundary regulation (Altman, 1977). Privacy varies depending on individual and cultural differences. It is also a temporal dynamic process, where a person's desired level of privacy continuously changes with time, depending on circumstance. According to Altman, people can function better in society if they achieve their desired level of privacy. In a collectivist culture, such as the Saudi culture, privacy is an individual value that also involves one's relationship to society. Privacy here is conceptualized as socially constructed, with religious and traditional underpinings. Unfortunately, little research contributes to understandings of privacy in the Arab Gulf (Abokhodair & Vieweg, 2016).

Although roots of privacy are in physical form, it is not the only way privacy is regulated today. Privacy, as a social and cultural construct should also be considered in technology design (Dourish & Anderson, 2006; Friedman et al., 2008; Johnson, Egelman, & Bellovin, 2012; Ur & Wang, 2013). Technology design has a tendency of undermining a users' privacy by assuming privacy is a universal value (Johnson, Egelman, & Bellovin, 2012). Therefore, understandings of privacy values need to be situated in the context of study (Friedman et al., 2018).

Supporting value sensitive collaborative practices in the workplace entails an understanding of the interplay between people, technology, and physical space. Researchers in CSCW have been studying socio-technical issues in collaboration for decades, focusing on users, their physical and social environments, and technology. Drawing from other fields of research that have also worked towards supporting collaborative practices, I argue that the socially constructed meanings of space in human interaction (positions and physical distance) and in the physical world (configurations of architecture, furniture, and technology) significantly impact collaborative practices, and should be considered alongside socio-technical issues.

Understandings of spatiality are not new to CSCW researchers. We configure space to meet our interaction needs. For example, if a person's office door is always opened, that means this person values interaction more than privacy; meanwhile, if their office is always closed, this means they value privacy over interaction. Thus, observing how people make meaning to space has helped CSCW system designers understand user's interaction needs. Spatial models have often been used as metaphors in designing remote interactive systems (e.g., Ciolfi & Bannon, 2007) or collaborative systems (e.g., Gaver et al., 1993). They have also been used to supplement co-located collaborative systems (e.g., Krogh et al., 2017). I take the perspective that understanding socio-spatial configuration can aid in designing for collaborative practices. Thus,

we must consider ways in which socio-spatial configuration supplements socio-technical design to make collaboration work.

The issues discussed motivate the following research questions:

RQ1: How is privacy conceptualized in the partially gender-segregated workplace?

RQ2: How is privacy regulated through physical workspace design, social interaction norms, and CSCW tool design?

RQ3: What are the design insights for socio-spatial configuration and socio-technical design to support value sensitive collaborative practices in the partially gender-segregated workplace?

To address these questions, I drew on three different theories. First, I drew on Altman's Privacy Regulation Theory to understand how privacy is regulated in the workplace. I also drew on Hall's proxemics to understand how notions of spatial configuration of people, architecture, interior elements, and CSCW tools, can support privacy values. Finally, Impression Management theory was an emergent theory that came to light during data analysis and was used to explain ways in which privacy is regulated through the control of language and behavior in social interaction.

I utilized the Value Sensitive Design approach by going through three types of investigations: conceptual, empirical, and technical (Friedman et al., 2006). In addition to focusing on socio-technical design, with values as a critical component of the design process, I also extended the approach by investigating how socio-spatial configuration supports or hinders values and technology effectiveness.

In the conceptual investigation, I looked to literature and governmental documentation to conceptualize specific values. From such conceptualizations, I was able to define clearly what I

meant by 'privacy', a value grounded religious and traditional expectations and built into relationships and interactions between people, architectural design, and is sometimes facilitated by technology.

In the empirical and technical investigations, I delved deeper by focusing on a case study of a Saudi Arabian company. This mid sized local company enacts partial gender-segregation. I conducted interviews and observations focusing on the value of privacy and it's impact on physical workspace design, social interaction, and CSCW tool design. As part of the technical investigation, I focused on how CSCW systems are used. The group characteristics, task, location, and form of interaction dictate the types of tools, and more specifically, features, that will be needed. Finally, I conducted several participatory design sessions to gain insight on employee's views on how socio-spatial configuration and socio-technical design can support their privacy values.

My findings indicate that in order to support collaborative practices within the bounds of the culture, the company adapted and optimized to find what works for them. When privacy concerns were met through the design of socio-technical support systems and socio-spatial configuration, the collaboration was optimized; otherwise, employees' either felt isolated or overcrowded, thereby they felt unable to work as effectively. In this dissertation, I discuss privacy concerns and offer design insight on socio-spatial configuration and socio-technical design.

There are several contributions that I make through this study. First, I propose the extension of the Value Sensitive Design (VSD) framework to contribute more broadly to collaborative activity by supplementing socio-technical design with understandings of socio-spatial configuration. I also contribute to the understandings of privacy in the Arab world. In

addition, my findings offer researchers insight on the socio-technical and socio-spatial practices within the partially gender-segregated workplace. Finally, through my detailed recollection of conducting research in this region, I offer researchers insight on navigating the complexity of running research in this understudied region.

From a practical standpoint, my research offers technology designers and organizations, specifically HR practices, insight on value sensitive collaborative practices. According to Altman, people function better and meet their role expectations when they meet their desired level of privacy. Thus, these considerations have the potential to increase productivity and work results in the partially gender-segregated workplaces. These considerations may also increase women's acceptability of the private workforce and decrease the societal stigma associated with it. Therefore, possibly increasing participation in the private sector, diversifying the country's income streams, and leading to economic prosperity.

1.1 Organization of Dissertation:

Chapter 2 – Study Context: In this chapter, I give an overview of the context and delve deeper into issues relevant to this project- cultural values and economy, labor and social development.

Chapter 3 – Literature Review: In this chapter, I introduce the field of CSCW, then delve deeper by discussing the importance of understanding the system interaction and the social context. I then review literature on spatiality, more specifically in reference to human interaction, workspace design, and CSCW system design. Finally, I review literature on privacy in HCI.

Chapter 4 – Methodology: In this chapter, I discuss research framework, research design, data collection procedures, participants, data analysis procedures, role of the researcher, and validity and credibility.

Chapter 5 – Findings: In this chapter, I present the findings of my study. I organize the findings into three themes, privacy conceptualization, privacy regulation in physical workspace, privacy regulation in social interaction, and privacy regulation in the use of CSCW tools.

Chapter 6 – Discussion: In this chapter, I discuss the implications for design, implications for HR practices, implications for theory, and implications for HCI methodology.

Chapter 7 – Conclusion: In this chapter, I conclude with expected contributions, limitations and future work.

CHAPTER 2

STUDY CONTEXT

In this Chapter, I provide a description of the Saudi Arabian context. Because of the nature of this study, it is important to familiarize the readers with the distinct intellectual and cultural concepts that differentiate Saudi Arabia from Western, and even other Arab-Islamic countries. Thus this chapter gives an overview of the context and delves deeper into issues relevant to this project- cultural values and economy, labor and social development. In accordance with the Value Sensitive Design framework (Friedman et al., 2006), this section represents the conceptual investigation, as I identify values and describe important stakeholders.

2.1 Overview of Context

Geographic Location

Saudi Arabia is the largest of the Gulf Cooperation Council (GCC) (Figure 2.1). Iraq, Jordan, Kuwait, Qatar, Bahrain, the United Arab Emirates, Oman, and Yemen surround Saudi Arabia. Its terrain mostly consists of desert and mountains.

Figure 2.1 Golf Cooperation Council (GCC) Map (Map of GCC, 2017)

Demographics

According to the General Authority for Statistics, the population count for Saudi Arabia is 32,612, 641 as of 2017, with Saudis making up 62.6 percent of the population and non-Saudis making up 37.4 percent (GAS, 2017). The population is rather young with Saudi youth between 20-29 years of age making up 31 percent of the total working age population (Ministry of Labor, 2016). The demographic dominance of a younger population is important to highlight in this study because they can greatly impact the workforce and the country must prepare for their highly anticipated entrance into the labor force, or face higher unemployment rates than ever.

Language: Arabic

Arabic is the native language of Saudi Arabians. As the language of the Holy Book of Islam, the Quran, it is maintained as the primary language by being taught in schools and used in official government processes. While classical Arabic (Quranic Arabic) and the literary language developed from classical Arabic (Modern Standard Arabic) is the same across all Arab regions, there are many different dialects spoken across Arab nations and even within Saudi Arabia, depending on region. English is widely used; it is taught in schools as a second language, and is considered the language of business.

Political System

Saudi Arabia is an absolute monarchy. It was founded in 1932 and ruled by the Al Saud family. The government practices Shari'a law (Islamic law).

Religion

Not only is Saudi Arabia the birthplace of Islam, it is also home to Islam's two holiest shrines in Mecca and Medina. Thus, Saudi Arabia's connection to Islam is particularly strong. Islam is practiced by all Saudis and dictates all matters of life- personal, political, legal, and

economic (Abu-Gazzeh, 1995). There are five pillars in Islam, Shahadah: reciting professions of faith, Salat: prayer five times a day, Zakat: charity, Sawm: fasting, and Hajj: pilgrimage to Mecca. To illustrate the way Islam shapes all aspects of life, let us look at an example. One of the duties of the Saudi Government is to support Islamic practices, thus in an effort to support ritual prayer and fasting, the Saudi government requires all businesses to close at the time of prayer for approximately 15 minutes. The government also sets shorter working hours during the month of Ramadan to support those who fast. With regards to human values, Islam plays great attention to the human right to privacy (Discussed under *Cultural Values* bellow).

2.2 Cultural Values

It is difficult to conceptualize the Saudi culture, mainly because culture is a dynamic concept, and Saudi Arabia is going through highly anticipated reforms that have and will continue to challenge the existing culture. This review is not meant to stereotype all Saudis, but rather provide an account of the distinct cultural concepts that differentiate Saudi Arabia from Western, and even other Arab-Islamic countries.

Privacy

Much of the teachings in Islam focus on privacy rights. The basis of these rights stem from the belief that the human being has essential greatness. Safeguarding human's dignity and greatness is dependent on the respect of one's own privacy and that of others. Islam prohibits investigation into people's private affairs, entering peoples home without permission, revealing secrets (that may lead to social corruption), fault finding from others, suspicion of others, gossiping about others, assaulting a person's reputation, talebearing, evesdropping, peeping, and

cursing and swearing. On this basis, Islam, and Sharia law, dictate strict regulations for violation of people's privacy.

Family Privacy

Family privacy consists of two parts: the first part is the prohibition of strangers' entrance and interference in a family privacy and the second is related to each family member's privacy (such as parents, spouses and children) toward each other.

Individual Privacy

The preservation of one's chastity is of great importance in Islam. Multiple verses in the Quran and Hadith describe the importance of individual privacy that is mainly concerned with the protection from the intrusion of others, particularly the protection of the intimate parts of one's body and in particular their awra. A women's awra differs depending the situation- whether in ritual prayer, in front of her husband, in front of close relatives (mahrams), or among other women. In front of unrelated men, a woman's awra is her entire body (for some Muslims, this excludes face and hands). Meanwhile, men's awra is always the same, from the navel to the knees. The protection and respect of one's awra is a personal responsibility, as well as that of society as a whole. For example, one must lower one's gaze when another's awra is exposed. Women have as much place in Islam as men, but their modesty is stressed to an even greater degree. Even speaking to or around unrelated men requires modesty. In the Quran, Allah states, {*O wives of the Prophet, you are not like anyone among women. If you fear Allaah, then do not be soft in speech [to men], lest he in whose heart is disease should covet, but speak with appropriate speech.*} (Quran 33:32). Many believe that this verse suggests a woman should lower her voice in the presence of men, as evidence of her modesty (Women's Voice in Islam,

2017). It is evident that a great amount of privacy is required for women, that which significantly governs all interactions with unrelated men.

The Saudi Government's Role in Enacting Privacy Values in Society

One of the significant duties of Islamic government is establishing public order and creating of social and personal security in a way that all individuals of an Islamic society live away from fear and anxiety with enough sense of security. Supporting of people's privacy (including privacies of house, family, workplace, possessions, communications and assistance in others' willful interference and violation) is of the government responsibilities. On this basis, the Islamic government must plan necessary protective strategies for safeguarding people's privacy. Privacy is not just an individual or religious affair; rather it is a right of the individual that has to be respected by the state and government.

Supporting Privacy Values through Dress Codes

Most women are expected to wear a head covering called a Hijab, a full black cloak called an Abaya, and a face veil called a Niqab when they go out or are around men. Dress codes vary by region; in Jeddah, many women go out with their faces uncovered, while Riyadh is more conservative, with the majority of women choosing to wear a face veil (Meijer, 2010).

Supporting Privacy Values through Gender Segregation

According to Meijer, gender segregation was not always enforced in Saudi Arabia, "it was actively promoted in the 1980s and 1990s by the state, the revivalist Sahwa movement, conservative ulama and the religious police, who enforce public moral behavior" (Meijer, 2018, p. 80). Since then, the government has strictly enforced gender segregation in government offices, schools, universities, some public hospitals, and other public spaces such as amusement parks (Meijer, 2018).

Ministry of Labor and Social Development holds the important role of maintaining the values of the culture within the workplace (Discussed bellow under Economy, Labor, and Social development).

Supporting Privacy Values in the Home

As mentioned earlier, the home is a place reserved for the privacy of the family. Thus, in supporting this value, the government guards the home with haq al-khososyah, a concept similar to property laws in the US.

Enactment of Privacy Values in the Digital Environment

It is speculated that cultural values of privacy extend to the digital environment. Studies have found that Arabs have developed tactics for maintaining their privacy and thus family honor, on social computing technologies. Such tactics include using a fake name, and women refraining from using profile photos. In his study on Facebook use in Saudi Arabia, Almakrami (2015) found that one of the biggest privacy concerns for Saudi users is people from their social network encountering personal content that is viewed as culturally inappropriate. The users fear social disapproval, societal stigma, and the damaging of their reputation. Similarly, in their study on social media users in Saudi Arabia and Qatar, Abokhodair and Vieweg concluded that notions of privacy bounded in honor, modesty and reputation affect how social media is used (Abokhodair & Vieweg, 2016). These issues result in users' preference for anonymity, to be able to seek more autonomy than what their culture permits (Abokhodair & Vieweg, 2016; Almakrami, 2015).

Enactment of Privacy Values in through Architecture

As mentioned earlier, the home, is a private place for Muslim families, and is not to be

entered or seen without permission. Thus, religious and cultural values dictate the intentional

design of the space to provide privacy. Three elements of privacy are found to be enacted

through the architecture of the home: visual privacy (concealing members of the home),

acoustical privacy (controlling sound transmission from the outside and within the home), and

olfactory privacy (controlling orders within the home) (Othman et al., 2015).

Family

Family is an important social institution in Saudi Arabia, governing the behavior of its

members. In Islam, it is mandatory to maintain relationships with maternal family, by respecting

them, helping them, and keeping strong ties to them. Special attention is given to respect and

care for parents. In fact, disobeying parents is considered a great sin. Parents are also equally

responsible for caring for their children, and guarding their reputation and honor is just as

important as guarding their physical wellbeing (Almakrami, 2015). Such a strong tie to family

means that anything an individual does is reflected on the family's reputation and honor, thus

governing their behavior in face-to-face and digital environments (Abokhodair & Vieweg, 2016;

Almakrami, 2015). The strong ties to family are not only a result of Islamic teachings but also

Bedouin traditions of strong tribal ties.

Honor

Honor is an important value that drives cultural norms (Dodd, 1973). This value, which

originating in the Bedouin tradition, means protecting the family reputation and maintaining

good societal standing. One element of honor is chastity and modesty, which are highly valued

as a religious obligation as well. An example of chaste behavior is modesty in the way women

interact with unrelated men. For instance, if a women covers her awra (entire body from

unrelated men), in face-to-face and the digital environment (by invoking privacy settings).

Maintaining self and family reputation is an important value in structuring the Saudi society. This value is maintained through the protection of privacy. The value of privacy, and its underlying basis in religious and traditional concepts, can greatly impact interactions in the workplace, and may even extend to interactions in digital environments (Abokhodair & Vieweg, 2016).

2.3 Economy, Labor, and Social Development

In the past, Saudi Arabia has relied on oil sales for 80% of its state revenue, but as oil sales head in a downward spiral, the source of revenue will also head downwards permanently. Because the country can no longer depend on oil revenue as the main economic powerhouse, the country must make changes in its political and economic structure. Along with making non-oil investments, the country plans to make economic and social changes. On April 25th, 2016, Saudi Arabia announced a future vision for the year 2030. The "Vision for the Kingdom of Saudi Arabia" included plans for developmental, economic, social, and other programs. This document was part of the National Transformation Program (NTP), "which includes asset sales, tax increases, spending cuts, changes to the way the state manages its financial reserves, an efficiency drive, and a much bigger role for the private sector" (Vision 2030, 2016, p. 5). The Vision is built around three themes: a vibrant society, a thriving economy and an ambitious nation. One of the main focuses of the vision in terms of its goals to diversify the economy is to provide better opportunities for partnerships with the private sector, and to encourage greater workforce participation in the private sector, especially among women (Vision 2030, 2016).

Saudi Arabian women are currently a wasted resource making up only 9.2 percent of the total labor force 15 years and older, nationals and non-nationals (1,245,196 of 13,537,578) and

21.4 percent of the Saudi nationals in the labor force, 15 years and over (1,245,196 of 5,812,324); this is despite women making up 49% of the total population 15 years and over. As of 2017, the unemployment rate among the Saudi population was 32.7 for females as opposed to 7.4 for males (GAS, 2017). An unfortunate revelation, especially considering around three quarters of the unemployed Saudi females are holding university degrees with (73.4%) (GAS, 2017). If more women were to enter the workforce, this would significantly impacting the economy and long-term prosperity of the Saudi people. Surely, this is something the country is aware about, as the Ministry of Labor and Social Development has taken initiative to empower women and help them find work.

Initiatives to increase female employment

The Ministry of Labor and Social Development is concerned with the design and implementation of programs and projects that contribute to the employment of Saudi women. They are responsible for identifying the challenges women face in participating in national development and creating solutions to provide wider opportunities for women's work. They are concerned with developing an appropriate environment for working women in the private sector and setting regulations and requirements that support them in a document labeled, "a guide for women's work" (Ministry of Labor, 2014). They are also responsible for the designing and developing programs to encourage employment opportunities.

First, laws were set that state that women and men must not share the same workspace. This meant new offices, entrances, separate bathrooms, places for rest, places for prayer, and a security guard in businesses that work with the public (e.g., banks). This created a lack of an appropriate physical infrastructure to accommodate women, keeping companies from employing women all together (Hodges, 2017). In response, the government set a quota, requiring the

hiring of more Saudi women. To further encourage women to enter the workforce, the Ministry of Labor's steering committee began considering deep-rooted cultural barriers. They provided a document guiding employers on how to set up offices for women and ensuring their rights are met, such as sick leave for the woman (and in case her child is sick), maternity leave, death in the family, and appropriate working hours. In terms of spatial environment, the document that the workplace of a women must be one characterized by privacy. To further empower women, the Ministry even created legislation mandating equal pay for equal work.

In 2011, the Ministry of Labor launched a new employment program called, "Hafiz". This program introduced a monthly stipend for jobseekers to encourage both men and women to find work. This program showed that most female jobseekers were highly educated, in fact, 49% of them held graduate degrees.

In addition, they created more jobs in the retail sector by setting new quotas, leading to the entrance of 50,000 workers a year. But, change had to be incremental, and negotiated with the society. In fact, there was huge opposition with hiring female cashiers, which led to firing them within a week. It was only until the Ministry of Labor backed special "family sections" in supermarkets and stores that the society began to accept the idea.

Finally, in an effort to overcome the barriers that culture creates, the Ministry started a program that allowed women to work from home. This program is expected to create 141,000 jobs by 2020 (Toumi, 2017).

It is evident that cultural underpinnings of the Saudi society dictate how workplaces should be designed. To encourage women's participation in the workforce, one must consider their values; evidently, the initiatives taken to do so have lead to success, with the percentage of women working in the private sector raising from 12 precent in 2011 to 30 precent in 2017

(Toumi, 2017). While the Ministry's requirement that basic rights are met is a good start, they provide no account of what it means to support privacy values in all aspects of the workplace (social, and technological) not just through enforcing strict gender segregation in the physical environment.

Enforcing gender segregation in the private sector may be possible for large companies, where departments and teams may be male and female only, but in a small to mid sized company, complete gender segregation is not an option. Regardless of gender, employees in any given department or team typically communicate and collaborate to finish a set task, thus this context is often referred to as "*partially*-gender segregated". There are physical barriers and social limitations that exist in this context and private sector companies have minimal guidelines or tactics to make collaboration work within the bounds of the culture. Providing them with guidance on culturally sensitive, privacy aware technology supported collaborative practices will help them function better and encourage more participation among Saudis who demand that their values be considered.

2.4 Chapter Summary

This chapter provided background on the context of Saudi Arabia. In order to understand privacy beliefs and values in the Saudi context, it is important to consider cultural, religious, and social norms of the Saudi society. In the next chapter, I review relevant literature.

CHAPTER 3

LITERATURE REVIEW

In order to support privacy in the Saudi Arabian workplace, one must consider the interplay between people, spatiality, and technology. In this chapter, I introduce the field of CSCW, then delve deeper by discussing the importance of understanding the system interaction and the social context. I then review literature on spatiality, more specifically in reference to human interaction, workspace design, and CSCW system design. Finally, I review literature on privacy in HCI.

3.1 Introduction to CSCW

The field of Computer Supported Cooperative Work (CSCW) concerns the support of activities in which more than one person is involved. With globalization, businesses had a growing need for systems that support communication and collaboration both locally and remotely. While Human Computer Interaction (HCI) has historically focused on automated tools for single user systems, CSCW sought to address the needs of people working in groups to accomplish cooperative tasks.

Not only does CSCW focus on the technology, but it also encompasses the users and their physical and social environment. Thus, this field is rather interdisciplinary, with research covering varying fields, such as psychology, sociology, organization theory, and anthropology. In order to design appropriate tools, it is important to understand system interaction and social interaction.

Understanding System Interaction

To design systems, it is important to understand how the system will be used. Group characteristics, task, location, and form of interaction will dictate the types of tools that will be needed.

Group Characteristics

It is important to understand that collaborating users have an impact on what systems are required and how they are used. This calls for an understanding of user and group characteristics. Users may have different values, goals, status, feelings of comradeship, and organizational alliances. In addition, different work scenarios may determine whether a group has predetermined character, such as in project teams, or formed and disbanded spontaneously when need arises. This is known as the difference between a formal and informal group. Having a formal, or informal group, impacts the type of interaction that will be had.

Task

Understanding for what type of task and how the system will be used is important. While understanding specific elements of a task may be to narrow of a focus, elements of a task can be abstracted to where one can generalize across groups.

Location and form of interaction

The location of group members is an important aspect of group interaction. But, location in this sense does not necessarily mean physical proximity, but rather accessibility of users to each other. In the case of my study, users are in close physical proximity, but there exists barriers that impact accessibility. Computer support for these interactions is either remote, or collocated and asynchronous (at different times), or synchronous (at the same time). The form of interaction being supported depends on the task and location of the users. Sometimes, members of a group

will take on roles and work in an asynchronous manners, while other times, a task will require brainstorming and problem solving and thus must occur in synchronous form.

<u>Tools and Applications</u>

Within CSCW are tools and applications. These tools and applications, known by some researchers as groupware, are growing in numbers and often grouped differently in the field. In the case of my project I focus on investigating interactive systems for co-located activity. With regard to remote collaboration, I narrowed the scope of my research to focus on an important component of collaboration- communication. There's great opportunity for CMCs to help overcome the barriers caused by physical distance and social limitations.

<u>Interactive Systems</u>

In recent decades, there have been great advances in display and input technology that support co-located collaboration. This includes interactive digital displays, and digital tabletop systems (e.g., Deitz & Leigh, 2001; Wellner, 1993).

Large digital displays are often used to support co-located collaboration. These displays are often used for sharing of digital documents and data. Where one or more individuals are remote, displays can help a co-located group interact with the remote individuals through video conferencing systems. In the beginning, CSCW researchers focused on usability and interface design of these technologies, but as the technology became more pervasive in our lives, there were many complications that hindered the effectiveness of it. According to O'Hara et al., "traditional video conferencing set-ups often distort the shared spatial properties of action and communication due to screen and camera orientation disparities and other asymmetries" (O'Hara et al., 2011, p.1). Thus, many researchers exploited properties of architectural and social space to make collaboration work (e.g., Buxton, 2009). In his work on the concept of Blended Interaction

Spaces, O'hara makes the argument that interactive groupware must be spatially consistent with physical geometries of the video-media set-up (O'Hara et al., 2011). This concept aims to make interfaces appear as natural as possible.

Tabletop technology has offered a new understanding of the interaction of people, spatial arrangement, and interactive technology. In their study on building table top systems and applications, Soctt et al., presented guidelines for supporting co-located collaborative activity using tabletop systems (Soctt et al., 2003). The guidelines they present stress the importance of allowing collaborators to integrate tabletops seamlessly with their working environment. They also stressed the importance of designing tabletops to support their familiar work practices such as how they use the tables, the physical objects they use, and the positions they take when sitting around the table. The research examples I highlight evidently demonstrate the importance of understanding the socio-spatial context as supplementing co-located interactive systems in co-located collaboration.

Computer Mediated Communication (CMC)

Communication systems are the class of systems CSCW most widely uses (Baecker, 1993 ; Rodden, 1991). The way people communicate in professional, social, and educational settings varies depending on environment and method of communication. CMCs encompass tools such as instant messaging, email, chat rooms, online forums, and social networking services. The medium people choose to communicate affects their level of self-disclosure (Jiang, 2012). Interestingly, Jiang (2012) found that the extent to which people disclose personal information is higher in CMCs than face to face. This was tied to notions of CMCs reducing the concern of losing positive face. Furthermore, Raamirez, and Zhang (2007) found that CMCs allow for more closeness and attraction between two people than in face-to-face interaction.

Privacy concerns on CMCs depend on context and program being used. Many researchers believe the social and psychological notions of privacy should be considered alongside the technical.

Tools such as email are the simplest yet most effective asynchronous CSCW systems. Another form of remote communication happens through instant messaging: the integration of text-based messaging for instantaneous, lightweight, informal information exchange. Nardi, Whittaker, and Bradner (2000) studied instant messaging as a way to encourage more effective, instantaneous communication at work. After investigating the IM usage of 20 employees at a large telecommunication company, the researchers found IM to support negotiating availability, social connections, switching media, and retaining context in a workplace conversation.

Similarly, Zhao and Rosson's (2009) investigated the role that micro-blogging plays in informal communication at work through interviewing 11 participants from an IT company. The researchers showed an example of utilizing an existing informal tool, Twitter, to facilitate remote communication in a work setting. The researchers found that using an informal lightweight information-sharing medium encouraged quick communication, awareness, and connectivity among colleagues (Zhao & Rosson, 2009).

Understanding the Social Context

Social cues of norms vary by cultures, and these cultures can even vary between organizations, or countries. These social cues have organizational, and cultural boundaries. Computer-mediated interactions often develop into simplifications of the real world.

Effect of Culture

Relevant studies have highlighted the importance of studying how culture affects workplace practices and behaviors and also how technology is used in specific cultural contexts

(Grudin, J., 1994; Piecowye, J., 2003). This interest is driven by the growth of Computer Mediated Communication (CMC) use in countries around the world and the impact that a country's culture can have on CMCs.

Culture affects both workplace practices and behaviors and also how technology is used within the specific cultural context (Grudin, 1994; Weisinger and Trauth, 2002). Weisinger and Trauth conceptualized the Situating Culture approach and explained, "cultural understanding is locally situated, behavioral, and embedded in everyday, socially negotiated work practices" (Weisinger and Trauth, 2002, p.306). They illustrated how the local culture of a firm emerges from the mixture of industry, corporate, and national contexts. This results in unique locally situated work practices that impact behaviors in those settings. In terms of technology, Grudin explained, "due to shared language and culture, perhaps, several U.S. Technology companies have active research labs in England" (Grudin, 1994, p.1). But when discussing a different culture, the Japanese culture, for example, he warns, "one should avoid predicting the success of a groupware technology in a different culture too quickly. Cultural issues are very important, but also complex" (Grudin, 1994, p.1). In a study by Sun, Wiedenbeck, and Chintakovid on gender and computer mediated virtual environments, the researchers explained that because this study was conducted in the United States, it is likely that in other cultures, especially Asian cultures, the results of their study may differ (Sun, Wiedenbeck, & Chintakovid, 2007). Similarly, Heaton emphasized the importance of culture in technology design (Heaton, 1999). She also emphasized that CSCW systems reflect the context and society in which they are designed.

CSCW and HCI Studies in Saudi Arabia

In terms of the specific Saudi Arabian context, recent studies demonstrated the impact of culture on CMC use (Bulut & Rababah, 2007) and the impact of CMCs in the form of an

informal online community on a society in terms of behaviors and perceptions of the opposite gender (Al-Saggaf, 2004). There has been a recent recognition for the need for culturally sensitive IT design and the use of design approaches, such as Value Sensitive Design to derive insight on design recommendations that meet the needs of Arab individuals.

Bulut and Rabab'ah (2007) examined CMC use between Saudi students, women, and professors, men. It focused on a non-western gender segregated context where email was used to facilitate a communication. The difference between similar studies done in Western countries and this study is that due to cultural barriers, in the communication via email, the students, women, requested to set up face to face meetings with the professor and their relative rather than themselves to hand in work. The study also concluded that different language and socio-cultural contexts may lead to different levels of email use (Bulut & Rababah, 2007).

Al-Saggaf (2004) investigated the effect of online community on offline community in Saudi Arabia. The researcher focused on how email and chat online can affect how people act offline. The results concluded that while participants gained self-confidence, became more open minded, and became more aware and less reserved about the opposite gender, they also became less shy, became more confused about culture and religion, and neglected their family commitments. These results suggest the positive and negative outcomes of informal Internet communication on the Saudi Arabian society (Al-Saggaf, 2004).

While the previous study was focused on informal communication and technology usage, a study by Asiri et al., (2012) focused on variables that impact a more formal usage of a Learning Management System (LMS) and the attitudes of Saudi Arabian faculty members regarding using LMS. The system is used to help educators manage their courses, communicate with students, and evaluate students' progress and performance. The study concluded that the variables that

influence the faculty members' use of the Learning Management System include attitudes toward use of technology, pedagogical beliefs toward e-learning, competence level in using technology, external barriers, computer experience, gender, and training (Asiri et al., 2012).

These few studies demonstrate how Saudi culture plays a role on CMC use. Recent studies recognized the need for culturally sensitive IT design and the use of design approaches, such as Value Sensitive Design, to derive insight on design recommendations that meet the needs of Arab individuals.

Zakaria et al. (2003) discuss the theoretical integration of a framework for Middle Eastern culture values together with a model for understanding privacy and related issues (Information Boundary Theory, and Hall's High and Low Contextual Cues) that arise when personal information is shared or exchanged using information technology. This research argues for the need of culturally sensitive IT applications (Zakaria et al., 2003).

A study by Alsheikh et al., (2011) also recognizes the need for culturally sensitive IT as it uses a Value Sensitive Design approach to derive insight on design recommendations that meet the needs of Arab individuals. The researchers investigated the use of communication technologies to support the long distance relationships of 11 Arab individuals. They conduct a qualitative study and use a Value Sensitive Design framework, and an Islamic feminist model to derive insight on participants' communication practices. Alsheikh et al., (2011) discuss expectations of men and women in Arab cultures. Using value sensitive design and the theoretical frameworks, the researchers argued for allowing more agency and control for women on what kind and how much information is to be displayed in accordance with their Islamic and cultural values. They concluded with the remark that the systems must be designed to allow them to enact particular cultural roles.

Although many studies call for culturally sensitive IT-design in the Arab world, little studies investigate how people behave and interact in the Saudi Arabian workplace and how CSCW tools can be designed to support the values of the culture.

3.2 Spatiality

In this study, I focus on privacy as a cultural value highly influencing interaction and perceptions of what an appropriate workplace environment should look like. I focus on understanding how privacy is maintained in the workplace environment (social, technological, and spatial). Thus, the following sections are aimed at extending understandings on the importance of spatiality on human interaction, workspace design, and CSCW systems.

Spatiality in Human Interaction

The way we configure ourselves, with regards to objects and other people, influences interaction and behavior. Hall's conceptualization of space offers great insight on how physical distance that people maintain between each other calls for a specific type of interaction. Hall (1966) articulates that proxemics is the person's use of space as an elaboration of culture. It's how people spatially configure themselves to enact social relationships. This work has gained attention from architecture and CSCW researchers. At the heart of Hall's work is a consideration of proxemics zones, which has also been widely adopted in the HCI community. These four zones range from public, social, personal, and intimate. These zones are tied to actions. For example, what characterizes a public zones is that one needs to louden their voice, and be more articulate when gesturing (use something else). The next zone is the social zone, where one is part of a group. This is enacted in networking and mingling in social situations. In a personal zone, one engages more closely with discussions and is in close proximity. Finally, the intimate

27

zone is when you are very close to each other to the extent that you can feel each other's odor and touch skin. What is also important in Halls work is that this is also about sensory, not only about distance or proximity. Zones are not static, they are dynamic and change as a result of specific cultural and contextual situations.

Interaction proxemics focuses on impact of technology on how we configure ourselves; how we use distance as a means for interacting with technology. Proxemics interaction on the other hand is on the relationship between people and technology. The way we configure ourselves spatially with regards to objects or other people essentially has underlying social meaning. How we behave and interpret interactions is essentially socially constructed. For example, in some cultures, standing very close to a person is considered socially acceptable, while in other cultures, it is considered a violation of their intimate zone, which is restricted to family only. To illustrate the socially understood nature of spatial configuration, Buxton (2009) suggests that we have an ingrained social understanding of positions of people relative to architectural space. For example, if we walk into a lecture hall, we will automatically know who the professor is and whom the student is based on where they are standing. The point of the above-mentioned examples is to illustrate the socially constructed meanings people make to physical space (distance and position) are used to interpret the context and how to behave in social interaction.

Spatiality in Physical Workspace Design

CSCW focuses on technology design supporting collaborative work practices, but other fields of research and design have also worked towards supporting collaborative work practices through the understanding of the relationship between spatiality and human interaction (e.g., Becker and Steele, 1995; Duffy, 1997). These researchers argue that the design of physical

spaces affects social elements of work practices. Different workspaces are designed to support

different practices (individual vs. collaborative) and the movement between them (Laing et al.

1998). Different architectural dimensions such as wall sizes, lighting, furniture configurations,

and information artifacts and technologies characterize these spaces. For example, tables can be

designed such that they affect proxemic arrangement of people to encourage collaboration.

Office layout can be designed to create a sense of openness to encourage collaborative

interaction. These examples are just a few of the ways spatial configuration (architecture,

furniture, and technology) can be designed to have a social effect.

Spatiality in CSCW

Socio-spatial configuration can complement socio-technical design in supporting

collaboration in the workplace. As O'Hara et al. explain, "different spaces are composed of

particular configurations of architecture, furniture, and technology, the interacting dimensions of

which profoundly affect the social, informational, and collaborative practices that can take place

within them along the lines of the arguments made by Hall (1966) and Kendon (1990)" (O'Hara

et al, p.6). Understanding socio-spatial configuration consists of an understanding of:

> Understanding spatiality in human interaction, or the socially constructed meanings
>
> people make to physical space (distance and position) to interpret the context and how to
>
> behave in social interaction.
>
> Understanding spatiality in the physical world, or the way configurations of architecture,
>
> furniture, and technology are designed to have a social effect.

Spatiality Aids in the Design of Remote Systems

The idea of spatiality is not new to HCI and CSCW (Dourish, 2006; Fitzpatrick, 2003;

Harrison & Dourish, 1996). "Space" is defined as the "the three-dimensional environment, in

which objects and events occur, and in which they have relative position and direction"
(Harrison & Dourish, 1996, p.2). Observing how people make meaning to space is very
important in designing CSCW tools. Often times, the same interaction needs we require from the
physical world translate to the virtual world. Spatial models have often been represented in the
design of remote interactive systems (e.g., Ciolfi & Bannon, 2007) or collaborative systems (e.g.,
Gaver et al., 1993).

An example of the way space is used as a metaphor in virtual systems is the Collaborative
Virtual Environment (CVE). This environment was conceptualized to re-place space by creating
a persona within the virtual world that replaces means of interacting and collaborating in person
(Dourish, 2006). CVEs attempted to capture aspects of everyday special organization within the
systems. While CVE researchers hoped to reproduce the spatially organized aspect of everyday
life, CVE technologies have not been and are yet to be a dominant means of interacting and
collaborating at a distance. Interestingly, CVEs appear in recent elements of game play.
Specifically, there has been an increase in reproducing spatially organized aspects of sociality in
Massive Multilayer Games (Dourish & Belloti, 1992).

Spatial Configuration Supplements Interactive Systems in Co-Located Activity

There has been a recent recognition to redefine what spatiality means in HCI design
thinking (Krogh et al., 2017), moving from the idea of spatiality as system input and towards the
idea that of spatiality as a socially constructed configuration of people, physical space and
interior design, and technology that can aid in supporting collaborative co-located activity. In
their work, Krogh et al. focus on how technology, people, and interior elements create socio-
spatial experiences. By drawing on Hall's proxemics and architectural studies on spatial sharing,
they argue that technology design has spatial agency and thus influences how people are

configured and how they enact social interactions. In one of their cases, they focus on planned

meetings with democratic control. They showed how the traditional meeting room display, at the

front of the room, impacts the configuration of people and hinders democratic control. They

argue for socio-spatial significance and call for more research in this area. In agreement with the

recent call for further research in the area, I argue that, rather than taking the perspective that

technology design has spatial agency that configures people thereby influencing their social

interaction, we should take the perspective that when designing for people in co-located spaces,

we need to consider their socio-spatial needs as supplementing the technology. In designing

technology to support co-located collaborative activity, we should consider working towards the

same goal. For example, if the goal of the collaborative system, we should take the perspective

that technology design and socio-spatial configuration should supplementing socio-technical

design to make co-located collaboration work.

3.3 Privacy in Human Computer Interaction (HCI)

Supporting an activity through socio-technical design and socio-spatial configuration

entails an understanding of the 'place' or a collectively held sense of appropriate behaviors and

expectations within the context. In the previous sections, we discussed the importance of

considering culture in the design of CSCW systems. The conceptual investigation (Chapter 2)

allowed me to synthesize the cultural phenomenon, or value, I will be investigating in this study-

privacy.

Many researchers view privacy as an important culturally constructed concept that affects

understandings of appropriate behavior in the physical space and in technology design (Altman,

1975, 1977; Harrison & Dourish, 1996; Palen & Dourish, 2003). In Privacy Regulation Theory,

Altman (1975) views privacy as a boundary regulation process. Privacy Regulation Theory explains why individuals some of the time lean toward remaining alone but other times like be included in social interactions. Altman (1975) views privacy as a dialectic and dynamic process. As a dialectic process, "privacy regulation is conditioned by our own expectations and experiences and by those of others with whom we interact." (Palen and Dourish, 2003 p.2). "As a dynamic process, "privacy is understood to be under continuous negotiation and management, with the boundary that distinguishes privacy and publicity refined according to circumstance." (Palen and Dourish, 2003 p. 2) Privacy varies depending on individual and cultural differences. It is also a temporal dynamic process, where a person's desired level of privacy continuously changes with time, depending on circumstance.

Altman views privacy regulation as a process of optimization. In the optimization process, an individual aims to match the desired level of privacy with the achieved one. For example, ones goal for optimization is to reach the ideal level of social interaction. When there is much more privacy then desired, one may feel isolated. When there is much less privacy then desired, one may feel uncomfortable or crowded. According to Altman, if a person effectively controls his/her openness and closedness, in response to desires and the environment, a person can function better in society. In order to manage privacy, a person needs to change things like behavior, spatial distance and arrangement. There are five properties in Altman's theory.

1. Temporal dynamic process of interpersonal boundary: changing how open and closed we are depends on internal and external conditions.

2. Desired and actual levels of privacy: the desired level of privacy is the amount of privacy preferred, to serve ones needs and roles. Actual level refers to the actual amount of privacy actually achieved.

3. Non-monotonic function of privacy: Privacy is a non-monotonic function in that too much privacy or too little privacy is not good. When there is much more privacy then desired, one may feel isolated. When there is much less privacy then desired, one may feel uncomfortable or crowded. In the optimization process, an individual aims to match the desired level of privacy with the achieved one.

4. Bi-directional nature of privacy: privacy involves input from others and output to others.

5. Two levels of privacy: privacy can be analyzed at the individual, and group level.

Researchers have stressed that privacy is a social and cultural construct that should be considered in technology design (Dourish & Anderson, 2006; Friedman et al., 2008; Johnson, Egelman, & Bellovin, 2012). IT design has a tendency of undermining a users' privacy by assuming privacy is a universal value (Johnson, Egelman, & Bellovin, 2012). Therefore, designing technology for privacy means we must understand what it privacy is to those who will use it. With regards to conceptualizing privacy and technology use in the Arab Gulf, research on social computing technologies evidently demonstrates that privacy is highly connected to culture and affects how social computing technologies (i.e. Facebook and Twitter) are used. In their study on social media users in Kuwait, Faisal and Alsumait (2011) stressed that privacy is an important value and violation of privacy "leads to shame and loss of face". Similarly, a study on social media users in Kuwait and Qatar concluded that notions of privacy are bounded in honor, modesty and reputation and affect how social media is used. Unfortunately, little research contributes to understandings of privacy in the Arab Gulf (Abokhodair & Vieweg, 2016).

3.4 Chapter Summary

In this chapter, I introduce the field of CSCW, then delve deeper by discussing the importance of understanding the system interaction and the social context. I then review literature on spatiality, more specifically in reference to human interaction, workspace design, and CSCW system design. Finally, I review literature on privacy in HCI.

CHAPTER 4

METHODOLOGY

In this chapter, I discuss the theoretical frameworks, methodological framework, research design, data collection procedures, participants, data analysis procedures, role of the researcher, and validity and credibility.

4.1 Theoretical Frameworks

To investigate the ways in which socio-spatial configuration can supplement socio-technical design of technology supported collaborative workplace practices, I drew on three different theories. Hall's proxemics and Altman's Privacy Regulation Theory served as theoretical foundations of the study. Hall's proxemics was used to understand how notions of physical and social spatial arrangement can support (or violate) privacy values. I also drew on Altman's Privacy Regulation Theory to understand how privacy is regulated in social interaction, spatial office configuration, and technology design. The final theory, Impression Management theory, emerged from data collection and was used to understand ways in which privacy is regulated through the control of language and behavior in social interaction.

4.2 Methodological Framework

Value Sensitive Design is an established methodology that accounts for human values throughout the process of design (Friedman et al., 2006). It focuses on identifying stakeholders and values (tangible and intangible notions people judge to be important), understanding the human context, and how the technology influences and is influenced by them. It employs an iterative tripartite methodology, which consists of conceptual, empirical, and technical

investigations (Friedman et al., 2006). I extended this framework by also focusing on how spatial configuration supports or hinders values.

The conceptual investigation is meant to define values and list stakeholders. Carefully working to conceptualize specific values helps to clarify the fundamental issues raised in a project. The conceptual investigation does not involve empirical analysis, only thoughtful consideration of how values impact stakeholders.

The empirical investigation aims at further refining the values within the context of study. It focuses on people and the large social systems that can effect or be affected by the technology. I also extended the approach by investigating how socially constructed meanings of space in human interaction (positions and physical distance) and in the physical world (configurations of architecture, furniture, and technology) support or hinder values.

Finally, the technical investigation is aimed at understanding how existing technologies and underlying mechanisms support or hinder values. As part of the technical investigation, I focused on how CSCW systems are used. The group characteristics, task, location, and form of interaction dictate the types of tools that will be needed.

Some aims of the technical investigation, particularly the part about understanding existing technologies and how underlying mechanisms support or hinder values, can be investigated through an empirical study, using qualitative methods. Some researchers choose to go one step beyond this by going through the proactive design and evaluation of technology systems, though this is not the case of my study.

In the case of my study, I take on an epistemological perspective that is interpretive. This approach is suitable for my study because it focuses on social and technical needs and results in a

situated description of the context and a set of design insights. The specific procedure I undertake is discussed in more detail in the *Research Design* section.

4.3 Research Design

I utilized the Value Sensitive Design approach by going through three types of investigations: conceptual, empirical, and technical (Friedman et al., 2006). In the conceptual investigation, I looked to literature, including religious books (i.e. the Quran), and governmental documentation to conceptualize specific values. From such conceptualizations, I was able to define clearly what I meant by 'privacy' as a cultural value. The definition in this case, is different from what other researchers have meant by the term. This definition gives privacy underlying religious and traditional expectations.

Conceptualizations are the first step, the second is to focus on the questions at hand and conduct an investigation of the human context- on the individuals, groups, or larger social systems.

In order to better understand this specific phenomenon, I went about this study in an inductive manner that allowed me to discover and interpret as I go. For this reason, my epistemological perspective is interpretive. According to Kaplan and Maxwell (2005), there is no dependent and independent variables in an interpretive research project, only a focus on human sense making as the situation emerges. For this reason, I believe the best way to address my research questions is to use qualitative methods.

I approached the empirical investigation by first conducting a pilot study (Appendix A) meant to help me overcome a challenge in my dissertation- the limited knowledge regarding the Saudi Arabian workplace context. The pilot study allowed me to understand the characteristics of

the different workplace environments that exist in practice in Saudi Arabia (mixed gender workplaces, partially gender-segregated, and strictly gender-segregated) and challenges that come with each. This allowed me to discover the challenges associated with the partially gender-segregated workplace. While the Ministry of Labor and Social Development requires gender segregation in the private sector, the number of employees in small to mid sized companies makes it so that complete gender segregation is not possible, as teams of collaborators often include both men and women, causing employees to work around the requirements to communicate and collaborate. The pilot study allowed me to identify an important issue and proceed confidently with my choice to study the case of the partially gender-segregated workplace.

I chose to conduct a case study because a major challenge in studying the social and technical aspects of workplaces is the variance in organizational cultures and practices, technologies utilized, and tasks undertaken. Conducting generalizable studies is difficult with all of these confounding external variables. One approach to mitigate this issue is to embrace the complexity of the phenomenon by studying one company's case individually. A descriptive case study tries to completely describe different characteristics of a phenomenon in its context (GAO 1990). Case studies have played a critical role in Computer Supported Cooperative Work (CSCW) research (Luff et al., 2000). This case study was comprised of observations, interviews, and participatory design sessions.

The case I chose was that of a partially gender-segregated private sector company operating in Riyadh, Saudi Arabia. To ensure anonymity, I will refer to the company by the pseudonym Closets & Co. This company is founded in Riyadh, Saudi Arabia in 1997. One reason this company was chosen was because it enacts partial gender-segregation. Closets & Co

employs about 30 Saudi women and 30 men in its Riyadh headquarters. It is small enough that I was able to observe many departments in one building, but big enough to have achieved enough success (opened in six countries across the GCC) to justify learning from.

I conducted observations, interviews, and participatory design sessions. I focused on how collaborative practices can be affected by people, the large social system, socially constructed meanings of spatiality in human interaction and workspace design, and technology. Specifically, I investigated how socially constructed meanings of spatiality made through distance in human interaction, and configurations of office layout and interior design, furniture, and technology, support or hinder values. As part of the technical investigation, I focused on how CSCW systems are used. The group characteristics, task, location, and form of interaction dictate the types of tools that will be needed. I focused on how the CSCW tools may support or hinder values, and how they contribute to collaborative practices. Furthermore, participatory design sessions were utilized in an effort to help the employees reflect on the challenges they've been facing and brainstorm design solutions for socio-spatial configuration and socio-technical design.

4.4 Data Collection Procedures

Before proceeding with data collection procedures, I received formal permission to conduct my research in Closets & Co (Appendix B). All of the data collection procedures were also approved by the Institutional Review Board (Appendix C).

For the empirical investigation, I conducted interviews and observations, and participatory design sessions. Interviewing was useful in conducting this investigation because it allowed me to talk to the stakeholders (employees and employers) directly. One fear I had about interviews is that the stakeholders may be influenced by my presence, as a researcher. One way

that I worked to overcome this issue is by including observations. Finally, I included participatory design sessions at the last stage of the research to engage employees in designing a solution.

Observations

Observations were very useful in that they allowed me to observe stakeholders in their natural setting without intervening in their work. I conducted one on one observations with 7 female employees that lasted 2 hours on average (Table 4.1). Due to the nature of the context, I was unable to conduct one on one observations with male participants (discussed under *Limitations*). In the one on one observation, I sat in a distance where I was able to view the computer screen of the employee I was observing. I also conducted an observation of the general workplace environment and interactions that occurred in the duration of 4 weeks (12 hours per week on average) from (August 14th to August 24th, and again from January 8th to January 17th.

Interviews

The interviews were conducted after the observations took place. This was done because the questions that were asked during the interviews may have made participants self-aware and thus influenced their actions.

I interviewed 14 participants (9 female, 5 male). The interviews ranged from 20 minutes to 40 minutes. Because it is assumed that Arabic is the participants' first language, they were given the option of either Arabic or English interviews. An unstructured interview style was used. A loose guide can be found in Appendix D. The non-directive style, using open-ended questions, allowed the participants the freedom to control the pacing and subject matter of the interview. In addition to hand written notes for observations and interviews, an audio recording was taken during the interviews. The interviews were conducted one on one, in a meeting room.

Because I am a female researcher, HR decided it was more appropriate for me to be accompanied by another female, Human Resource employee, in the one on one interviews with the male participants (discussed under *Limitations*).

Participatory Design Sessions

To gain design insights, I used participatory design sessions as a method. The participatory design sessions were informed by my observations and interviews. They were meant to help the participants reflect on some challenges that they faced in the workplace and come up with design related solutions. Specifically, they allowed me to elicit ideas on how privacy can be supported through the interplay between spatial configuration and interior design, technology, and people. As the facilitator, I used scenarios, informed by my observation and interviews, to help the participants reflect on some challenges that they faced. I also used sketching (Figure 4.1) as a co-design exercise to help generate ideas. The scenarios, along with sketches, allowed me to reach my goal of making sure all participants understood and agreed with the design parameters and specifying exactly what interactions the system must support and how.
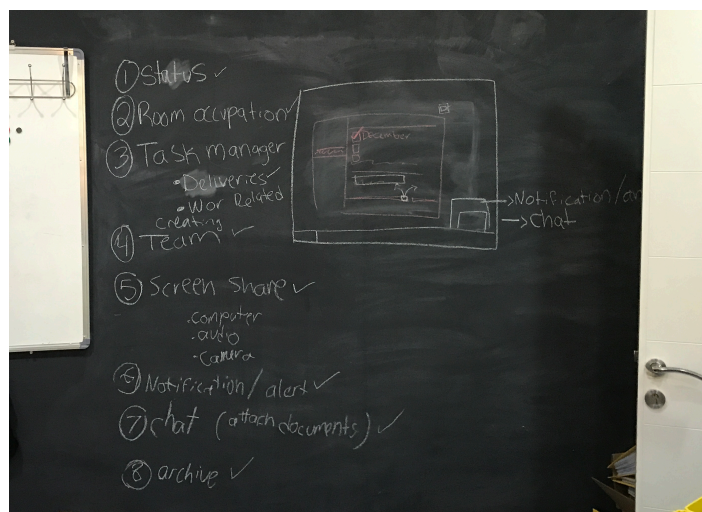
Figure 4.1: Sample Sketch from a Participatory Design Session

I conducted 4 participatory design sessions (lasting approximately 1 hour each) from January 8th to January 17th. The number of sessions I conducted was not predetermined. Instead, I arranged to have as many sessions as necessary to help the employees reach saturation, and satisfaction, with design related solutions. Because the female employees voiced to me that their participation in the design sessions with male employees might restrict their contribution, I decided to conduct the sessions as female only, and male only sessions, that build upon each other. First, I met with 5 female employees from a range of departments. After the first session, in order to encourage new ideas, I opened up the design session to 9 female employees from various departments. Once the participants felt they did enough design related brainstorming, I conducted the participatory design sessions with 4 employees from the male side. The male side added to the solutions that the female side posed and felt satisfied with the final design. I took the final design ideas back to the female side and conducted one more session with 5 female employees, where I received concluding remarks on the design.

4.5 Participants

The participants were chosen with the help of the Human Resources department to reflect a wide range of departments (Table 4.1). While I understand task related considerations must take place in any CSCW systems, I intentionally looked across departments so that I can abstract my findings to something applicable across all departments.

	Pseudonym	Gender	Job	One on One Observations	Interview	PDS *1	PDS 2	PDS 3	PDS4
1.	Lubna	Female	Human Resource Manager	Yes	Yes	Yes	Yes	No	Yes
2.	Maram	Female	Human Resource Manager	No	Yes	No	Yes	No	No
3.	Durrah	Female	IT Analyst	Yes	Yes	No	No	No	No
4.	Lama	Female	IT	No	No	No	Yes	No	Yes
5.	Lara	Female	IT	Yes	Yes	Yes	Yes	No	No
6.	Sarah	Female	Finance	Yes	Yes	No	No	No	No
7.	Rahaf	Female	Finance	Yes	Yes	No	No	No	No
8.	Hind	Female	Finance	Yes	Yes	Yes	Yes	No	Yes
9.	Iman	Female	Call Center	Yes	Yes	Yes	Yes	No	Yes
10.	Amal	Female	Designer	No	Yes	Yes	Yes	No	Yes
11.	Lubna	Female	Designer	No	No	No	Yes	No	No
12.	Dana	Female	Designer	No	No	No	Yes	No	No
13.	Raed	Male	IT Operations Manager	No	Yes	No	No	Yes	No
14.	Hussam	Male	Chain Logistics Manager	No	Yes	No	No	No	No
15.	Majed	Male	Director of Sales and Marketing	No	Yes	No	No	No	No
16.	Khaled	Male	Senior Product Development Supervisor	No	Yes	No	No	Yes	No
17.	Ibrahim	Male	HR Head	No	Yes	No	No	Yes	No
18.	Kareem	Male	Sales Supervisor	No	No	No	No	Yes	No

Table 4.1 Participants (*PDS: Participatory Design Sessions)

4.6 Data Analysis Procedures

I used *thematic analysis* by following guidelines from Boyatzis (1998). I began the data analysis process by transcribing the interviews. The first step is to get to know the data. I read and re-read the interview transcripts and observation notes several times and wrote down any impressions I got as I went through the data. I began generating high level concepts by identifying themes and patterns. Then, I read the transcripts with a focus on any mention of privacy regulation. I generated the codes emically and etically. I coded emically by judging the topic based on the informants point of view (Sandstrom, 2004). The emic themes emerged inductively. I coded etically by judging the topic based on my own criteria, by drawing on literature, conceptual, and contextual knowledge.

4.7 Role of Researcher

I, the principal investigator am a Saudi woman. I have come from the Saudi culture and understand the context. I have also lived in the United States for 15 years. Because I've lived in these two different countries and immersed myself in the two cultures, I believe I have a broad view of culture and socio-technical issues. I began this investigation with the intention of contributing a solution to a current socio-economic problem in Saudi Arabia by utilizing social science and design science methods. Because I, the researcher, am the instrument in this study, disclosing and reflecting on this information as I go through every step of the research process will add to the credibility of my work.

I approached this research from the standpoint of a social scientist and designer. From the perspective of a social scientist, I aimed to describe the social phenomena from the participants' perspective. To do that, I assumed the role of non-participant observer. In addition, from the perspective of a designer, I approached the study with an exploratory mindset, aimed at providing insights that may later be used to develop models and constructs.

4.8 Validity and Credibility

In this study, validity and credibility is determined through the use of strategies to check the accuracy of the findings. Specifically, I used triangulation, member checking, and reflexivity. The first strategy is triangulation, or multiple sources of data as evidence. In addition to the interviews, observations were conducted. In addition, theoretical perspectives were used to interpret the data. Also, member checking was conducted to determine the accuracy of the conclusions. A group of Saudi Arabian professionals were presented with the conclusions of the study, to which they responded to in agreement. Finally, reflexivity is another strategy that was

used to add to the validity and credibility of the findings. Reflexivity is firstly an act of disclosure, where I, as the researcher, disclose my position and background. Secondly, it is an iterative act of self-reflection, on my relationship with the field.

4.9 Chapter Summary

In this chapter, I review my methodology. In the next chapter, I present my findings.

CHAPTER 5

FINDINGS

In this chapter, I present the findings of my study. I organize the findings into three themes, privacy conceptualization, privacy regulation in physical workspace, privacy regulation in social interaction, privacy regulation in the use of CSCW tools.

5.1 Privacy Conceptualization

Privacy is Gendered

Throughout my observations and interviews, participants always made distinctions between genders in discussing privacy. This is because in Saudi Arabia, a greater amount of privacy and conservativeness is required for women than for men, especially in matters of behavior and dress and especially in interacting with unrelated men. One participant, Lara explained:

> *"Saudi guys, they know their boundaries. Sometimes if someone comes from elsewhere, they may not get it but the girl is the one who dictates her boundaries." (Lara, Female, IT)*

The participant here refers to her responsibility as a woman to create boundaries which men cannot cross. Another participant explained:

> *"We, as girls [colleagues] are open to each other, because we know that no one will misunderstand us or that no one might cross boundaries or take information and misuse it. The men here, I don't mean all of them, but a lot of them understand things differently. If he finds something out by coincidence, fine. (Amal, Female, Designer)*

In this quote, the participant makes a distinction between interacting with female and male colleagues. The participant explains her responsibility of protecting her privacy by controlling the information she shares with men. She refers to privacy as a concept of interpersonal boundary regulation in which she is protecting herself from judgment of the society, thereby

protecting her reputation. Finally, the participant explains these notions as a result of the gender-segregated nature of the Saudi society, whereby traditions make this kind of interaction seem very uncommon.

Privacy is Socially Constructed But Varies by Individual and Family Beliefs

Often, when participants refer to privacy, they make connections with traditions and societal expectations as affecting the way they behave. Specifically, notions of modesty affect interactions across gender. Amal explained:

> *"From our childhood, boys were separated from girls, even between family, regardless of religion, these traditions of our culture, boys shouldn't talk to girls, its shameful to talk to girls, and its shame to sit with girls and when you reach a certain age they segregate you. Maybe this is lesser now, but a couple years ago, when a women worked with a man the society was shocked, they commented on her reputation pointing to her being lost and un-modest and shameful."(Amal, Female, Designer)*

These traditional beliefs affect a person's perception of the communicator and lead to fear of misinterpretation. More than that, these interactions, which are not part of the tradition of the society, are viewed as "shameful". The participant also refers to societies views on reputation and modesty. She refers to how partaking in collaborative practices in the workplace was once seen as un-modest and shameful. She also refers to these judgments as temporal, because over time, these notions may be considered acceptable (discussed below under *Privacy is a Temporal Dynamic Process*). In agreement, Sarah explained:

> *"Now, its less than before, but there's still this notion that a man doesn't know how to interact with a woman because he's afraid of what she'll think. In fact, he'll talk to any women, but when it comes to Saudi women, he doesn't know how to interact with you." (Sarah, Female, Finance)*

The participant refers to how traditional beliefs affect a person's perceptions of the communicator. She explains that Saudi men fear that Saudi women will misunderstand their intentions. This may be due to the shared set of beliefs about women's privacy.

Participants also make the point that there are variations in beliefs about privacy that are due to individual differences and family beliefs. Hussam, explained:

> *"For a lot of people, yes, [culture does dictate the way you communicate with the opposite gender], because lets not lie, this is our history in Saudi Arabia. As I'm sure you know, there are differences where it varies from person to person, and the family he's in and their beliefs [liberal/conservative]. I think it varies."(Hussam, Male, Chain Logistics Manager)*

Views about privacy vary by individual and family beliefs. One participant referred to society and family as holding judgments about working in a mixed gender collaborative environment. She explained:

> *"Just because they are segregated it does not mean that the society accepts it. Some families will refuse work where any interaction with a man is happening. My family for example. They don't know about the specifics of my job, but they refuse to understand that it's okay. Its part of their tradition, and they've reached an age where I cant convince them, so I conceal it from them." (Dana, Female, Designer)*

Traditions play a role in how her family views her interaction. Even where physical segregation of offices is enforced, any interaction with men is viewed as unacceptable.

Privacy is a Temporal Dynamic Process

Participants often referred to privacy as a temporal dynamic process. Their experiences over time affect their privacy regulation behavior. In terms of experiences, Amal clarified:

> *"Girls who are more reserved or shy are probably unfamiliar with this workplace, my experience with working in mixed workplaces changed me, your personality grows, something that was strange to you becomes normal. You didn't know how to interact with these people or what they would think of you. In general, I think people [women] who've worked a lot do not have this type of shyness when interacting with men." (Amal, Female, Designer)*

The same idea is repeated with regards to how society views privacy. Over time, as mixed gender collaborative work places become more common, the society may change their views about privacy. Iman, who works in the call center explained:

> *"When I first entered the field there was a little [resistance] especially since I work in the*

call center, how do you communicate with men, how?! But then they [family and society] were convinced, it's something normal, its not sinful or shameful. People are becoming more open to this. Before, it was something not common and people were not used to it, don't talk to men, but it's not sinful so people started accepting the idea." (Iman, Female, Call Center)

In her explanation, the participant explains that her family, and even the society, slowly began to accept the type of interaction she is having with men.

Privacy is a Process of Optimization

Participants often referred to privacy a process of optimization, whereby their goal is to match their desired level of privacy to the actual level of privacy they achieve. If a person receives more privacy then desired, the person can feel isolated and unable to serve their role. Hind, a woman who works in finance explained:

"I would like to be more incorporated in the financial affairs. I feel like by doing this [separating offices] I am isolated now. If I was with them, this would be different. Maybe if we had more communication, more meetings." (Hind, Female, Finance)

There was an expectation that employees will either change their boundaries or through a process of optimization, find what works.

"If she is not comfortable with meeting, she should simply tell me. This is the point, honesty. With the types of women who are conservative, it's important to be honest, and be open to change, if it's comfortable enough for you. But if you are going to come to the meeting and be so uncomfortable that the meeting is useless to you, don't come. I would rather have a phone call, if that is going to be comfortable with you. Simply when I find an honest response, I will try to work on that, because lets be honest, the females are simply, just yet, getting introduced to the workplace of a cross gender setting, that is why we have to take this mentality to take honest feedback, slow down, and deal with each other. We are simply trying." (Kareem, Male, Sales Supervisor)

Here, the participant is referring to how a female employee desired more privacy, and in achieving less privacy then desired, was unable to meet her role requirement. When her desired level of privacy is met, she is able to function much better in her role. Effectively expressing desired level of privacy to others helps to achieve the optimum level of performance.

"In one persons experience, all women are open minded and everything is working fine, in my experience, its not quite working. The point is, reach the point of everything working fine." (Raed, Male, IT Operations Manager)

The participant here explains that people's views of privacy differ, some teams have groups of women who are more open minded, meaning not many social limitations hindered their ability to interact with men. While other teams had women who are more conservative, requiring more privacy. As long as an individual receives their desired level of privacy, the collaboration will work better (they will reach optimization).

5.2 Privacy Regulation in Physical Workspace Design

Socio-spatial configuration involves the interplay of people, technology, and office layout and interior design. My first observation on the regulation of privacy through the design of office layout is that in accordance with the Ministry of Labor and Social Development, the company has segregated women's and men's offices. This means, separate entrances, separate offices, separate rest areas, separate restrooms, and separate prayer areas. While this infrastructure requirement is meant to keep women and men separated, they are not completely separated in actual practice. One participant explained:

"The country is supposing that its regulation or its advice are copy pasted in the country but its different. The West, as per my experience, they have better work environments then this country, so some companies copy paste ideas from outside the country, outside of KSA [Kingdom of Saudi Arabia. Same as here, ladies are separated but during daily operations we have a mixed area, so we can sit together, maybe [female colleague] can take my office if I'm outside. We have a mixed area!" (Ibrahim, Male, HR Head)

The reality is that the Ministry has no control over what goes on during daily operations. The company therefore creates tactics to overcome the barriers created by the physical segregation and social limitations (discussed bellow).

Privacy concern: Exposing Awra

The women's section is completely restricted to men. This is because, in the women's

section, women are allowed to uncover their awra, therefore, if any man enters, it is considered a privacy violation. The men's section did not have the same risk of privacy violation, and is generally considered a mixed section.

Privacy concern: small spaces violate the intimate zone

There were areas in the men's section considered more women friendly, and other areas that posed a privacy violation thus were viewed as not women friendly- therefore restricted their access to male colleagues and to resources. One participant explained:

> *"My colleagues are upstairs, it would be nice if I could meet with them more often, but the meeting has to be downstairs in the meeting room. Its hard, I have to call them and we only make meetings for something formal. For small work discussions, it would be nice if there was a space close by, so I can just go directly and ask, something in person its better than digital. We cannot go upstairs." (Hind, Female, Finance)*

Here, the participant is signaling the importance of face-to-face interaction in informal discussion. Since the 'upstairs' area was restricted by posing a privacy violation (discussed bellow), her ability to interact in spontaneous informal discussions was hindered. Another participant explained restrictions to access to resources:

> *"One issue is that the IT stock room is upstairs, the one that has all laptops and items if we get a new employee we have to give it to him, some departments are upstairs, like procurement and such, and if I need something from upstairs, I cannot go up by myself. Its not allowed for women to go upstairs because the upstairs is full of men and its not okay for us to go up there. That's the problem, if I need something from the stockroom, I have to call my colleague to get it for me. If I need to send a document upstairs, I have to call someone. Usually its IT who has to get something from the stockroom, but for example if I want to send a document upstairs, I can ask the tea boy. But on this floor, its okay [no need to use a mediator] it doesn't feel like an enclosed office it feels open, if we want we can just go out." (Lara, Female, IT)*

In this case, restricting women's access to the second floor created a challenge in their ability to access resources, leading them to develop workarounds such as calling colleagues and sending papers with the 'tea boy' (a staff member who is responsible for taking care of hospitality needs such as providing tea).

One male employee explained he doesn't mind if a woman goes upstairs, but they themselves decided it was not appropriate. It was the design of the upstairs area, the intimacy associated with a confined space that made it a privacy violation.

> *"The smaller passages upstairs make it a very intimate space, so it's not comfortable"*
> *(Raed, Male, IT Operations Manager)*

The way the hallway is designed makes it so that people are always in an intimate zone. The intimate and personal zones are sensitive with regards to male/ female relations. The second floor also has small offices that are viewed as too intimate. In referring to participating in one-on-one meetings with her colleague, one participant explained:

> *"For me to sit next to him and chat about myself, it might be understood the wrong way, that I want to sit with him, that I have feelings for him because in our traditions its very uncommon." (Maram, Female, HR)*

Here, the participant refers to the distance between her and a male colleague, and information sharing, as pertaining a social meaning that is unacceptable.

Removing the intimacy of hallways and private meetings, making them public, means it is no longer a privacy violation. This is done in two ways; first, by inviting other women to a one on one meeting. Second, by creating spaces that are more transparent, and therefore, created the illusion of a more public interaction.

> *"As people who are working in the company, sometimes you need one to one meetings between different genders, and the meeting room it influences this. In a closed meeting room, maybe the female won't feel comfortable, if her manager or someone comes to collaborate, its not comfortable, sometimes they bring someone else even. So I think the other one [transparent] is more comfortable. [closed off meeting rooms] may be okay for larger groups." (Kareem, Male, Sales Supervisor)*

Male and female employees both stressed the importance of informal and face-to-face interaction. To workaround the physical barriers and social limitations, the company took some measures to ensure women felt comfortable moving between offices, and meeting with their

male colleagues in their offices or in meeting rooms. This was done by utilizing large hallways, strategically placing meeting rooms between men's and women's offices, and using transparent (glass) offices and meeting rooms. Unfortunately, this consideration was only made for the offices on the first floor, and not the second. The stark contrast between how women feel about the first and second floors and the closed and transparent meeting rooms supports the idea that physical workspace design does have a role in influencing women's collaboration with men.

5.3 Privacy Regulation In Social Interaction

The participants in this study worked in a setting where co-workers, men and women, were allowed to physically interact with each other. In these settings, a mixture of face-to-face collaboration and CMC tools were used to accomplish a shared project or task.

> *"I usually send an email first, then if I don't get a response, I go there myself." (Lubna,, Female, Human Resource Manager)*

> *"I feel that when you're in the same place, and not completely remote, if something comes up or if there's an emergency, you can go right then and there, the opposite is true in remote settings" (Hussam, Male, Chain Logistics Manager)*

Since physical proximity is not an issue, the employees did not have to completely rely on the technology. However, the nature of the face-to-face interaction is very different than what would be found in western countries. Women choose to enact their right to privacy through the way they behave and dress. Three main themes arose as influencing social interaction: voice and tone, dress, and formality.

Privacy Concern: Modesty of voice affects ability to contribute to collaborative activity

First, as a way to maintain modesty, some women felt the need to speak with a low tone and voice.

> *"Some [male employees] have the viewpoint that if your voice is low you do not*

contribute. As you know I was recently given a promotion, one of the reasons for my promotion, I was told, was that I had a loud voice. When I first started my job, they were going to let me go because I didn't have a voice." (Iman, Female, Call Center)

"I used to be a great presenter in college, they used to tell me I was very enthusiastic and loud. This was my first job, and in a gender segregated environment. I was the only woman in my team and it was hard for me to present in the same way. They often said I was shy and not confident, and I even felt the difference. This takes getting used to." (Lara, Female, IT)

"It doesn't have to do with contribution, I just want to show that I am respectful."

These women choose to maintain their privacy through their tone and voice. While they are working to create the impression that they are modest and respectful in their tone and voice, they often found themselves condemned by the organization as not contributing and lacking aggressiveness. Meanwhile, the organization rewarded those who could be heard. Ibrahim, the head of HR, explained:

"There are ladies who it doesn't matter to them, they will join you wherever you want, some open minded ladies. But we are flexible with all backgrounds, we have shy ladies, we have aggressive ladies, we have open minded ladies, which are the most preferable." (Ibrahim, Male, HR Head)

This issue signals confounding values in the organization- values of the society vs. values of the management.

Privacy Concern: Modesty of dress affects perceptions of contribution to collaborative activities

Women enact privacy in the way they dress by covering their awra, in accordance with Islam. This means that they wear clothing that covers their entire body. Furthermore, most women in conservative areas of the country, such as in this case study, also cover their faces. Some participants explained that deciding to enact privacy in the way they dressed impacted the way they were perceived. They explained:

"A lot of people tie your job and contribution to whether or not your are veiled. They consider women who are veiled isolated and shy, they assume this girl doesn't work, doesn't travel, doesn't accept leadership tasks. I don't know why it's often tied together.

Many even say in all honesty that the person they are looking for to fill a position is one that should be in a hijab not a veil. I don't know what made them tie these together." (Amal, Female, Designer)

"Many consider the veil to be a barrier [that represents a woman's conservativeness] this women is veiled, I should not chat with her and laugh with her and I should keep work very formal because she may misunderstand me." (Lara, Female, IT)

Privacy Concern: intimate and personal distances violate privacy and are socially unacceptable

Maintaining distance when communicating is very important to ensure privacy in cross gender social interactions. I observed that when the employees had meetings, women sat on one side of the large meeting room table, and men sat on the other side. In a one on one meeting scenario, one participant explained:

"For me to sit next to him and chat about myself, it might be understood the wrong way, that I want to sit with him, that I have feelings for him because in our traditions its very uncommon." (Maram, Female, HR)

Here, the participant signals that sitting in close proximity with her college is socially unacceptable.

Privacy Concern: informal language may lead to the wrong impression

Controlling language was used as an impression management tool. Women also used formal language as a way to demand respect. One participant explained:

"Respect is the most important, the way someone says something and their tone has to be classy and formal, especially in interacting with men. It's not that once we worked together for two years the situation is more open, no, there must be boundaries and respect and they [the male employees] are respectful of these concepts." (Iman, Female, Call Center)

In this quote, the participant also expressed the use of language to create boundaries. Similarly, another participant explained:

"Sometimes men see that I decided to uncover my face and misunderstand that as my being open minded in the sense that I want to chat about my personal life. I don't. I felt very uncomfortable when I noticed men becoming informal around me and asking me about my personal life. So I have to draw the line by being very formal, by talking

formally." (Maram, Female, HR)

In my observations, I noticed that women often used different language and tone when communicating with each other as opposed to their male colleagues. While in the female section, they joked and laugh, but as soon as they pick up the phone to speak to their male colleagues, I only heard, a formal tone and task related language. Interestingly women will be very sociable in the women's side, as soon as they exit those doors, they put on a new face, one that is very formal in tone.

Privacy Concern: disclosing personal information may lead to the wrong impression

Personal information is also considered very private, and is not typically shared between male and female colleagues. One participant explained:

> *"We don't know much about their [the male employees'] personal lives. Sometimes, once a year, I'll over hear something about someone's life." (Lara, Female, IT)*

In interacting with her female colleagues, another participant explained:

> *"I don't like to get into the details of my life, I just give the necessary information." (Amal, Female, Designer)*

Naturally, as with any workplace, circumstances require employees to disclose personal information. One participant explained:

> *"Sometimes, you have to tell your boss about something personal, like one time I had to take a vacation to get surgery and I had to tell him so it doesn't affect my future at this job." (Iman, Female, Call Center)*

Even though it seems like a normal procedure, it was a sensitive subject for the participant.

5.4 Privacy Regulation In CSCW tools

In the partially gender segregated workplace the specific task at hand calls for a certain type of interaction and CSCW tool. For some tasks, members of a group will take on roles and

work in an asynchronous manner. This means that they split up the task, relying heavily on CMCs to communicate as they work through it individually. When a task requires brainstorming and problem solving it often occurs in synchronous form. In this case, the team chooses the richest medium for collaboration, face-to-face interaction. Usually the team will meet in a shared space, in which they use an interactive display to aid their collaboration.

5.5 Privacy regulation in CMC design

Due to the physical segregation and social limitations, employees often cooperate to accomplish a task. They will take on roles and work in an asynchronous manner, relying heavily on CMCs to communicate as their work through their task individually. In referring to working with colleagues who are women, one participant explained:

> *"We don't have many problems in our communication. Now, there is technology that can help us. I usually use email, if they don't reply, then I call. Or sometimes I send an email then I call and ask if they received it." (Majed, Male, Director of Sales and Marketing)*

As in with another business in the world, email serves a vital role in communication. But, in this case, sometimes synchronous is needed. Thus, employees resort to using phone as it is a richer medium then email or even Instant Messaging. Other participants explained:

> *"Sometimes, if I don't understand something, I will call him [male colleague] to explain it to me. Using email or IM wouldn't get the point across. It's much easier for him to explain and much easier for me to understand. Especially because if he uses email and IM he has to use English but if we're using the phone he explains in both English and Arabic."* (Amal, Female, Designer)

> *"Sometimes the situation is so small that it's not worth sending an email and waiting for a response and having that person take time to type a response. Sometimes I just pick up the phone, even though emails record things in the system, telephone is faster than email… or Skype is faster than email but not faster or better than telephone." (Hussam, Male, Chain Logistics Manager)*

Telephone is widely known as a media rich medium. The affordances of telephone are that it is

instantaneous and adds the ease of different language integration which may aid employees in

understanding something. Using email would require an employee to use English as it is the

language of the business.

> "I don't think anything will ever replace phone. If you see the people here, they explain something in Arabic on the phone. But, if they email something, or even send it as an IM, they have to use English because that's the language we're supposed to use." (Hind, Female, Finance)

Some departments also use instant messaging as a quick and lightweight tool. While the

management recommends using Skype for business for instant messaging, not all of the

employees utilize the tool, resulting in their use of a widely used instant messaging phone app,

Whatsapp.

> *"I do everything on whatsapp, even send documents." (Hussam, Male, Chain Logistics Manager)*

> "*We know that everyone has Whatsapp on their phone, that's why we use it. We can reach them faster. They'll reply faster"* (Lara, Female, IT)

The instantaneous features of Whatsapp are not the only thing that makes it preferred, also the

mobility of it. One participant explained:

> *"Whatsapp is especially useful if we're trying to contact a colleague in the showroom. Without Whatsapp, we'd have to wait for him to come back."* (Maram, Female, HR)

> *"With regards to communicating with my team, I've had no problem, the guys because they're in separate offices, if they for example have to go to an exhibition or factory he lets us know, I'm going to the factory and ill be back at this time. We have each other's phones and we talk by Whatsapp, its fine, we even had a group on Whatsapp where we communicated…" (Lara, Female, IT)*

Privacy Concern: using instant messaging tools commonly used for social relationships outside

of work causes privacy breach

Generally speaking Whatsapp has had a huge role in mediating communication, but it is

not without its limitations. The main limitation being that it is generally an informal tool used

outside of work. One participant explained:

> "I don't like to share my number with anyone. It's private, and I don't like that once they have it they can reach me anytime, even at home. Sometimes, I will write things in the status. Personal things, its just for my friends and family, I don't want my [male] colleagues to read it." (Lara, Female, IT)

Because Whatsapp is not designed for the workplace it crosses privacy boundaries as it is commonly used for social relationships outside of work. Another participant explained:

> "I don't like that they can reach me at home. My phone is always in my hand, they know that I use Whatsapp and if I open a message by accident they'll know and I have to reply." (Amal, Female, Designer)

The home is considered a private place for an individual and their family, as the participant explained, using Whatsapp may breach the boundary of personal space. Another participant explained:

> "Before I was married, they would message me all the time after work. Once I got married, as soon as it hits 4:01 [end of work] if its an emergency, he'll ask me for permission first to talk. Ever since I got married, they haven't given me work to finish at home. I think because I have a husband, they wanted to give me personal space at home." (Lara, Female, IT)

Thus, Whatsapp in its inherent ability to reach someone anywhere, is not designed to maintain personal boundaries between home and work. Only the individual sending the message can decide if sending a message outside of work is a personal boundary violation.

In my observations, I noticed that women favored using CMCs when addressing confrontational issues. This was illustrated in two recollections. The first recollection by participant 1, had to do with a resignation:

> "When I was about to send my resignation letter, I spent a long time writing the email. When they talked to me on the phone, they tried to convince me to stay. They held a meeting in person and tried to convince me and I kept explaining my point. Then, I just emailed them." (Rahaf, Female, Finance)

The second recollection by a participant had to do with being pressured into extending a business

trip:

> *"There was one time when I was at a business trip. My boss called me and asked me to extend it. I was alone, the only girl with all guys. I told them that's not what we agreed to. I have to get back to my family. And he kept pressuring me. I couldn't say no so when I closed the phone, I just sent him a Whatsapp and said I am not doing it." (Maram, Female, HR)*

CMCs empowered them to get their words out without being overstepped by men due to their value of modesty of tone and voice. It is evident that CMCs play a vital role in mediating communication, and empowering women. Privacy is also enacted in CMCs in various other means.

Privacy Concern: Informality may be misunderstood

Interestingly, many of the same privacy regulation themes found the physical and social context also apply here. For example, using formal tone. One participant explained:

> *"I am very formal on Whatsapp, so no one gets the wrong idea. I am only using it for work." (Maram, Female, HR)*

Privacy Concern: Private conversations on Instant Messaging give a sense of Intimacy

Another participant referenced the idea of private vs. public interaction. She explained:

> *"Usually we have groups for our team. If it's part of a group, it's fine." (Amal, Female, Designer)*

Privacy Concern: Personal Information should be concealed

One participant referred to the idea of sharing of personal information. She explained:

> *"...Sometimes, I will write things in the status. Personal things, its just for my friends and family, I don't want my [male] colleagues to read it." (Lara, Female, IT)*

Another participant referred to the idea of maintaining her privacy on Whatsapp by not using the personal photo feature. She chooses to conceal her face in the same way as she does in the physical world.

> *"I don't put my picture on Whatsapp. I wear a veil, I can't do that. No one does." (Lara,*

Female, IT)

It is evident that much can be gained from understanding the social and physical context as privacy values often extend to the digital environment.

5.6 Privacy in Interactive Systems Design

In the company, there were two main meeting rooms where most large meetings were held. In the meeting rooms, there was one display screen and one telephone. During meetings, the employees would plug their laptops into the display screen and control the display through the laptop. Depending on the reason for their meeting, they often used PowerPoint or excel to present material. When there was a training session, they demonstrated the software using the laptop connected to the screen.

Privacy concern: socio-spatial arrangement affects women's ability to contribute in a collaborative activity

The rectangular shape of the table allowed the employees to sit comfortably, spaced apart, with women and men across from each other. According to the participants, this was the most comfortable seating arrangement. There were times when the number of men far exceeded the number of women, which caused women to sit behind men or in the corner, making them feel marginalized. One participant explained:

> *"I get frustrated when I attend a meeting and the number of men is very large, larger than women. Sometimes I am the only woman in the meeting. When this happens, we just end up in the back, or in a corner. This really does make us feel marginalized. Also, the screen then becomes very far, we can't see it, and if I have a comment, I can't say it because I am far." (Rahaf, Female, Finance)*

Due to being cast aside, the screen feels far, and there is no equality in contributing to the discussion. In this case, the dimensions of the table become an important resource in the spatial

configuration of people, significantly impacting their contribution in a collaborative interaction.

Another important point is the proximity at which the participants are interacting. Due to the size of the meeting room, the interactions between the participants were in the personal zone, allowing participants to have more collaborative interaction. But they are configured in a way such that they were facing the display, rather than each other, making it difficult to draw attention to each other when a point needed to be made in the middle of a presentation. The space between the employees and the presentation content is also important.

> *"When there's a presentation, they plug the laptop to the screen, and only the person in front of the laptop can control it. It's hard to have any control with the way we are arranged. For example, if we want to point to something using the cursor. The screen is too far and we are too far to get up to the screen." (Sarah, Female, Finance)*

Gesturing and talking are both important in collaborative interaction. As the participant suggested pointing can be hindered by distance. If the controlling mechanism is not accessible to the employees, and the screen is too far, then the transaction cost is too high for them to participate in the collaborative activity. As illustrated, the way people, objects, and technology are configured plays a great role in collaborative interaction.

5.7 Chapter Summary

My findings indicate that in order to support collaborative practices within the bounds of the culture, the company adapted and optimized to find what works for them. Since privacy is gendered, everything I discuss is in regards to cross gender interaction and ways to work around the social and physical limitations of cross gender interaction. I found that employees in my study went through privacy negotiations with their collaborative teams to find what works for each individual, depending on their privacy needs and role requirement. When privacy concerns were met through the design of socio-technical support systems and socio-spatial configuration,

the collaboration was optimized; otherwise, employees' either felt isolated or overcrowded, thereby they were unable to function as effectively. Face to face interaction is valued at a high rate, especially for spontaneous meetings or synchronous problem solving situations. In this case, allowing women to feel comfortable moving from their private area to a more collaborative environment with male colleagues was very important. To overcome the social and physical limitations of this context, tactical spatial practices were taken. First, transparency of office and meeting spaces helped make the interaction appear public, rather than intimate. Second, the size of spaces, such as hallways, allowed women to move through them without violating their intimate zone. In the social realm, impression management was used to create a respectable and modest persona. Women acted and dressed a certain way, based on individual and social influences. They used formal language to avoid setting the wrong impression. Finally, they refrained from disclosing personal information. In the workplace the specific task at hand calls for a certain type of interaction and CSCW tool. For some tasks, members of a group would take on roles and work in an asynchronous manner. This means that they split up the task, relying heavily on CMCs to communicate as they work through it individually. When a task requires brainstorming and problem solving it often occurred in synchronous form. In this case, the team chose the richest medium for collaboration, face-to-face interaction. The team often met in a shared space and used an interactive display to aid their collaboration. The same notions of privacy found in the physical world were extended to the digital environment. For example, women refrained from concealing personal information and used formal language in communicating via CMCs. With regard to co-located collaborative activity, the way people and objects were configured played a great role in ability to contribute. CSCW systems should be design in a way such that all individuals have an equal opportunity to contribute.

CHAPTER 6

DISCUSSION

In this chapter, I discuss the implications for design, implications for HR practices, implications for theory, and implications for HCI methodology.

6.1 Implications for Design

My findings highlight how privacy values are regulated in the workplace, and the many privacy concerns women have on a day-to-day basis. Privacy values are not normally understood, or taken into consideration by researchers on technology supported collaborative practices. Thus, I believe this study will help organizations, researchers, and designers reduce cultural bias and produce collaborative environments and technologies that are inclusive and empower their users by addressing their value tensions. I present the following design insights to shed light on ways in which socio-spatial configuration and socio-technical design can help overcome privacy concerns in technology supported collaborative practices.

Design a 'backstage' area for women

Women value privacy at a high rate in the partially gender segregated workplace. They value their right to uncover in the female side, socialize, and be comfortable. The female side can be understood from the perspective of Impression Management Theory, as a 'backstage' where women can be themselves. Meanwhile, when they leave this section, they take on a role, the bearer of family honor. They must speak, dress, and behave to convey a certain impression, modesty and formality. Thus, having a 'backstage' was very important for my participants. Because employees usually divide tasks, this spatial arrangement is appropriate for remote collaborative activity.

Encourage interaction through open spaces

Because face-to-face interaction is the richest medium, and informal spontaneous communication is valued, having team members be in close proximity is very important. This can be done through the strategic placement of male and female co-workers in their respective offices, in a close enough distance that women getting up and going to the male colleagues office will have low transaction cost and will not hinder informal spontaneous communication.

Synchronicity was necessary for brainstorming and problem solving tasks. Since participants are in close proximity to one another, face-to-face interaction should be utilized, as it is the richest medium. To ensure women feel comfortable moving from their section, to their colleague's offices and or meeting rooms. This can be done by creating large corridors and shared meeting spaces that are transparent. This removes the intimacy associated with these spaces and creates an impression that the interaction is public, therefore more appropriate. Such designs encourage women to interact in a face to face manner rather than through computer mediated means.

Create more equal opportunities for contribution through inclusive table and interactive systems

Inclusive table dimension and shape

With regards to spatiality within the meeting rooms, there are several insights that were gained from the study. First, tables in meeting rooms should accommodate all employees. When spaces are too small, women choose to sit further from men so as not to breach their intimate zone. This causes them to feel cast aside, and marginalized, thus hindering their ability to contribute. The rectangular shape and dimensions of a table can be created such that it allows the employees to sit in comfortable distance from one another, with female employees on one side and male employees on the other side.

Second, all employees should have equal access to display material, controlling mechanism, and pointing tool. When the laptop displaying the material is facing the men's side, they have an advantage over women in that they can control the content, and use the controlling mechanism to point to material. The distance from the women and the display means that getting up and pointing to the material on the display creates too much of a transaction cost, causing them to withdraw from contributing instead. As a way to mitigate this issue, women should be given an ability to view the display material from where they are seated, access controlling mechanism, and pointing tools. This can be done, for example, through the utilization of mobile devices for view and the control of content or external pointers.

Computer Mediated Communication (CMC) tools should be designed to support privacy values

It is evident that CMCs play a vital role in mediating communication, and even empowering women (discussed under *Future Research*). Privacy is also enacted in CMCs in various other means, such as through using formal language, refraining from sharing personal information, and including others in a group conversation in an effort to remove intimacy of one on one conversation. My findings cannot be represented in design features directly. But, insight can be drawn in the form of design implications from the way in which women regulate their privacy through these tools. The following are design insights inspired from my participants:

Promote Awareness

By promoting awareness, the CMCs allow women to work within their enclosed office. Three main features of awareness promote privacy values: status, feedback, and notification.

Status

Because the male and female offices are segregated, the status function becomes very beneficial. When a team makes use of a tool that has a status feature, they are much more aware of each other. There are instances when a colleague will be out of the office, or on a leave, and there is no way to know. To illustrate the importance of the status, take for instance when a female employee emailed her male employee about a problem she is having and her work was halted while waiting for his response. In thinking he is working on the response, the employee continued to wait. Meanwhile, he was out of town.

Feedback

The problem with using email is that employees don't know if their colleague saw their email or if he is unaware. Thus, in most cases, if they don't receive a quick response, they call their colleague to tell them that the email has been sent. Giving users feedback to know their message is viewed helps with awareness.

Notifications

On occasion, a need arises where a male employee must enter the female section. In this case, the female employees will walk through the section and make sure all women are notified so as not to invade their privacy. Adding a notification feature allows users to receive information on their device.

Promote Control

By allowing women to have control over their boundaries, the CMC empowers women to enact their right to privacy. The two main themes with regards to boundary control include: control of work boundaries, and control of personal information.

Control work boundaries

A CMC tool designed for use in the workplace should be used in the workplace context only. Having the ability to reach someone in their home violates their right to privacy. Thus, email is an appropriate form of interaction, whereby both parties have equal rights to privacy and may access the tool at their will. An Instant messaging tool, such as Whatsapp, is problematic. It is used in the home, it is connected to a person's phone number and cannot be exited from, and it displays when a person has opened the app and whether or not they saw the message. This creates an invasion of privacy. In the workplace, such functionality is appropriate and creates awareness, especially among remote colleagues. Thus, using a tool with the same features, that is designed for workplace interaction, and can be accessed within the workplace and exited once you leave is very valuable. This can include, for example, Skype for business, which has many of the same Instant Messaging features as Whatsapp. But in order for Skype for business to be utilized, it should be installed by all users on their computers and mobile devices. If one team member is not utilizing this tool, then the entire team has to resort to an other, less preferred method, such as utilizing a tool that is made for personal use (Whatsapp).

Control personal information

The CMC should allow women to control their personal information disclosure. For example, setting a photo and including information such as status should not be required.

Promote Communication

Communication was valued at a high rate in the workplace. According to our participants allowing women to use the communication medium that aligns with their privacy desires allows them to function better. This differs from person to person, but it is clear that CMCs have played a great role in mediating communication and offering women a mode of communication where

they felt secure. For some, using email allowed them to have their say without being marginalized, for others, the same is true for instant messaging. There are tactics that are used to regulate privacy in CMCs through social distancing and formality.

<u>Promote Social Distancing and Formality</u>

The women in my study focused on social distancing in interacting with their male colleagues in the physical world by behaving and dressing in a way that conveys a formal image. Interestingly the same value for social distancing extends to the digital world, but in CMCs, all of the cues discussed previously can no longer be used to promote a more formal image. Employees often utilize CMCs designed for the western world, where the main goal of the tool is to make people feel closer. One way the women in my study adapted these tools to promote more social distancing is by carefully constructing the avatar to represent how they want to be viewed by colleagues, the avatar here serves as a social cue. Another approach is making an interaction on CMCs, such as Whatsapp, public, as opposed to private by using group chat to remove the intimacy and the fear of misconception that is associated with one on one interaction. Thus, group chat, is a very powerful tool whereby a team can feel their interaction is work appropriate as it is in the public zone of proximity. An interesting design space to consider is promoting social distancing by creating a more nuanced messaging system altogether that would, on request, allow a person to present a more formal and modest version of themselves.

6.2 Implications for HR Practices

In addition to the previously discussed points, HR practices can benefit from the following insights.

Encourage a more formal instantaneous communication medium

The biggest fear women have with using CMCs arises due to the fact that the CMC they utilized was not made for the business setting. Employees should use business tools, which should be preinstalled on all users computers/ mobile devices. If one team member is not utilizing this tool, then they have to resort to other, less preferred methods, such as utilizing a tool that is for personal use (Whatsapp).

Encourage women to communicate their desired level of privacy

In my study, more conservative women feared being marginalized. No where in my data did a conservative woman say she did not want to work with men, they just want to work within the bounds of their culture. Thus they should be given the same collaborative responsibility as everyone else, but it is important to offer them the flexibility to partake in collaborative practices that meet their desired level of privacy (collaborate via computer mediated means vs. in person) as this will allow them to function better.

As demonstrated in my study, individual, cultural, and organizational concerns about privacy and the approaches to tackling these problems are neither static nor absolute. Thus, while my results and design implications offer inspirational insights, the nature and scope of the solutions discussed may vary in other contexts.

6.3 Implications for Theory

One of the primary aims of this study is to add to the empirical base of research that has focused on culturally sensitive, privacy aware technology supported collaborative work practices. By applying impression management, proxemics, and privacy regulation theory under

qualitatively different conditions than has previously been demonstrated, I make a contextual contribution to theory.

Modesty and Self Presentation in Impression Management Theory

In my data, many times, modesty and privacy were used together. While modesty and privacy are related, modesty is much more about self-presentation than protection. Drawing on Impression Management theory, I looked to understand ways in which privacy is regulated through the control of language and behavior in social interaction. Impression management is a process whereby people work to influence the perception of other people about them, other people, an object, or an event. This act can be conscious or subconscious. Goffman set the standard for how we think about impression management. Like Shakespear, Goffman used the metaphor of drama. In life, there is a front stage and a back stage. The front stage is a performance in a social setting, and the backstage is where a person can be himself or herself. The tool used to make a person presentable is called Impression Management. There are different situations that require different scripts from the person as an actor, so there are many 'front stages' and this person must play a different role every time. Culture, organizational and national, play a role in the image a person chooses to project and the identity that person creates. In the case of this study, women were "backstage" when they were in the female only section, and "front stage" when they were in the mixed gender spaces. While we can apply this understanding to face-to-face communication, it can also be expanded to computer mediated communication. Women were careful in structuring their online persona to reflect a certain image, especially in interacting with male colleagues.

Social, Physical, and Digital Distancing in Proxemics

During data analysis, I found the notion of formality to be interesting, in that it is

linked to social distancing, both in the physical and digital world. In the physical world, physical distance between people, transparency of office and meeting spaces, and the size of spaces, such as hallways, allowed women to interact with their male colleagues without violating their intimate zone of proximity. Understanding social distancing through the lens of proxemics allowed me to link notions of public and intimate interaction from the physical world to that of the digital world. Much like in the physical world, women preferred to keep a distance in interacting digitally with their male colleagues, as not to violate their privacy values.

Contextualization of Privacy

Privacy is an evolving term that used to strictly mean protection. When discussing privacy in HCI and CSCW, researchers often refer to an individualistic need to protect information. I focus, instead, on a social psychology notion of privacy. While there are many research studies on the social psychology of privacy, much of these studies focus on the individual's control over interpersonal boundaries, paying little attention to alternative interpretations of privacy that are non-individualistic and culturally bound. In this study, privacy is about maintaining modesty, self-presentation, and family honor.

6.4 Implications for HCI Methodology

Through my study, I was able to demonstrate that Value Sensitive Design (VSD) can be used as a framework to more broadly contribute to understanding value sensitive collaborative practice. The conceptual investigation helped to define values and list stakeholders. In the empirical investigation I worked to further understand the value of privacy within the context of study. I focus on people and the large social systems that can effect or be affected by the technology. I also extended the approach by investigating how socially constructed meanings of

space in human interaction (positions and physical distance) and in the physical world

(configurations of architecture, furniture, and technology) support or hinder values. Finally, as

part of the technical investigation, I focused on how CSCW systems are used.

6.5 Chapter Summary

In this chapter, I discussed the implications for design, implications for HR practices,

implications for theory, and implications for HCI methodology.

CHAPTER 7

CONCLUSION

In order to contribute to culturally sensitive, privacy aware technology supported collaborative practices in the partially gender segregated workplace environment, I focused on the interplay between the social, physical, and technological. In addition to conducting a conceptual investigation, I conducted an empirical investigation where I observed and interviewed employees in their context of work. This allowed me to understand what privacy meant to them, what their roles and tasks required, and what collaborative constraints existed. In addition, through the observations, interviews, and participatory design sessions, I was able to gain insight on the types of tactics the management and the employees can use to help them reach their desired level of privacy and function better. I explained how socio-technical design supplements socio-spatial configuration in supporting values and enhancing collaborative practices. Specifically, I was able to shed light on how privacy can be regulated through spatial configuration in human interaction (distance in social interaction) and in the physical workspace (architecture, furniture, and technology) to help women gain their desired level of privacy, thereby functioning better in collaborative practices. In addition, I provided insight on how CSCW technologies can be designed to support privacy values and integrated and coupled together to enhance collaboration in the workplace.

7.1 Expected Contribution

There are several contributions that I make through this study. First, I propose the extension of the Value Sensitive Design (VSD) framework to contribute more broadly to collaborative activity by supplementing socio-technical design with understandings of socio-

spatial configuration. I also contribute to the understandings of privacy in the Arab world. In addition, my findings offer researchers insight on the socio-technical and socio-spatial practices within the partially gender-segregated workplace. Finally, through my detailed recollection of conducting research in this region, I offer researchers insight on navigating the complexity of running research in this understudied region.

From a practical standpoint, my research offers technology designers and organizations, specifically HR practices, insight on value sensitive collaborative practices. According to Altman, people function better and meet their role expectations when they meet their desired level of privacy. Thus, these considerations have the potential to increase productivity and work results in the partially gender-segregated workplaces. These considerations may also increase women's acceptability of the private workforce and decrease the societal stigma associated with it. Therefore, possibly increasing participation in the private sector, diversifying the country's income streams, and leading to economic prosperity.

7.2 Limitations and Future Work

Limitations: Interviewer Gender Effect

I am confident that for the larger part of my study, interviewer effect was not an issue. But, it is important to recognize the role of gender, especially in such a conservative culture, in influencing research procedures. For example, because I am a female researcher, HR decided it was more appropriate for me to be accompanied by another female, Human Resource employee, in the one on one interviews with the male participants. In addition, because the male and female offices were mostly segregated, I was unable to conduct one on one observations with the male

participants. That being said, in the future, I believe collaborating with a male researcher will allow me to overcome these limitations.

Future Work

In the future, I hope to continue work in this area. In this regard, I hope to implement the ideas generated and evaluate their effect on collaborative practices in the partially gender-segregated context. In addition, it was evident through my study that by allowing women to enact their right to privacy, technology empowered them. In the future, I hope to delve deeper in understanding how technology can be used to empower women in the workplace and outside of the workplace.

References

Abokhodair, N. (2017). *Transnational Saudi Arabian Youth and Facebook: Enacting Privacy and Identity* (Doctoral dissertation).

Abokhodair, N., & Vieweg, S. (2016, June). Privacy & social media in the context of the Arab Gulf. In *Proceedings of the 2016 ACM Conference on Designing Interactive Systems* (pp. 672-683). ACM.

Abu-Gazzeh, T. (1995). Privacy as the basis of architectural planning in the Islamic culture of Saudi Arabia.

Al-Saggaf, Y. (2004). The effect of online community on offline community in Saudi Arabia. The Electronic Journal of Information Systems in Developing Countries, 16.

Almakrami, H. A. A. (2015). Online self-disclosure across cultures: A study of Facebook use in Saudi Arabia and Australia (Doctoral dissertation, Queensland University of Technology).

Alsheikh, T., Rode, J. A., & Lindley, S. E. (2011, March). (Whose) value-sensitive design: a study of long-distance relationships in an Arabic cultural context. In Proceedings of the ACM 2011 conference on Computer supported cooperative work (pp. 75-84). ACM.

Altman, I. (1977). Privacy regulation: culturally universal or culturally specific? *Journal of Social Issues, 33*(3), 66-84.

Altman, Irwin. (1975). *The Environment and Social Behavior: Privacy, Personal Space, Territory, and Crowding.* Brooks/Cole Publishing Company, Monterey, California 93940.

Asiri, M. J. S., bt Mahmud, R., Bakar, K. A., & bin Mohd Ayub, A. F. (2012). Factors influencing the use of learning management system in Saudi Arabian higher education: A

theoretical framework. *Higher Education Studies*, *2*(2), 125.

Becker, F. And steele, F. 1995. Workplace by Design: Mapping the High Performance
Workscape. Jossey-Bass, San Francisco.

Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code
development*: Sage.

Bulut, D., & Rababah, G. (2007). Pragmatics of e-mail communication between Saudi female
students and male professors. The JALT CALL Journal, 3(3), 49-73.

Buxton, B. (2009). Mediaspace–meaningspace–meetingspace. In *Media space 20+ years of
mediated life* (pp. 217-231). Springer, London.

Ciolfi, L., & Bannon, L. J. (2007). Designing hybrid places: merging interaction design,
ubiquitous technologies and geographies of the museum space. *Codesign*, *3*(3), 159-180.

Deitz, P. And Leigh, D. (200 I). Diamondtouch: A Multi-User Touch Technology. In
Proceedings ofthe ACM Symposium 011 User lnterface Software and Technology
(UTSI) 2000, pp. 219- 226.

Dourish, P. (2006, November). Re-space-ing place: place and space ten years on. In Proceedings
of the 2006 20th anniversary conference on Computer supported cooperative work (pp.
299-308). ACM.

Dourish, p. 2001. Where the Action Is: The Foundations of Embodied Interaction. MIT Press,
Cambridge, MA. Dourish, p. 2006. Re-Space-ing place: Place and space ten years on. In
Proceedings of the ACM Conference on Computer-Supported Cooperative Work
(CSCW'06). 299–308.

Dourish, P., & Anderson, K. (2006). Collective information practice: emploring privacy and
security as social and cultural phenomena. *Human-computer interaction*, *21*(3), 319-342.

Dourish, P., & Bellotti, V. (1992, December). Awareness and coordination in shared workspaces. In Proceedings of the 1992 ACM conference on Computer-supported cooperative work (pp. 107-114). ACM.

Dourish, p., adler, a., bellotti, v., and henderson, a. 1996. Your place or mine? Learning from long-term use of audio-video communication. Comput.-support. Coop. Work 5, 1, 33–62.

Duffy, f. 1997. The new office, conran octopus, london.

Faisal, m., & alsumait, a. (2011, december). Social network privacy and trust concerns. In *proceedings of the 13th international conference on information integration and web-based applications and services* (pp. 416-419). Acm.

Fitzpatrick, g. 2003. The locales framework: understanding and designing for wicked problems. Kluwer Academic Publishers.

Friedman, B., Hook, K., Gill, B., Eidmar, L., Prien, C., & Severson, R. (2008). Personlig Integritet: A Comparative Study of Perceptions of Privacy in Public Places in Sweden and the United States. *2008 nordichi: Using Bridges Conference (nordichi 2008),* 2008 nordichi: Using Bridges Conference (nordichi 2008).

Friedman, B., Kahn, P. H., Jr., and Borning, A. (2006). Value Sensitive Design and information systems. In P. Zhang and D. Galletta (eds.)*, Human-computer interaction in management information systems: Foundations*, 348-372. Armonk, New York; London, England

Friedman, B., Kahn, P., & Borning, A. (2002). Value sensitive design: Theory and methods. *University of Washington technical report*, 02-12.

GAS (General Authority for Statistics) (2017). Retrieved from https://www.stats.gov.sa/en

Gaver, w., sellen, a., heath, c., and luff, P. 1993. One is not enough: Multiple views in a media space. In Proceedings of the ACM Conference on Human Factors in Computing Systems

(INTERCHI'93). 335–341.

General Accounting Office. (1990). Case study evaluations (GAO/PEMD-91 10.1.9).
Washington, DC: GAO Programme Evaluation and Methodology Division.

Goffman, Erving. 1959. The Presentation of Self in Everyday Life. Garden City, NY: Doubleday
Anchor

Goffman, Erving. 1967. Interaction Ritual. Garden City, NY: Doubleday Anchor.

Grudin, J. (1994). Computer-supported cooperative work: History and focus. Computer, (5), 19-
26.

Hall, e. T. 1966. The hidden dimension. Doubleday, new york

Harrison, s., & dourish, p. (1996, november). Re-place-ing space: the roles of place and space in
collaborative systems. In *proceedings of the 1996 ACM conference on Computer
supported cooperative work* (pp. 67-76). ACM.

Heaton, L. (1999). Preserving communication context: Virtual workspace and interpersonal
space in Japanese CSCW. *AI & SOCIETY*, *13*(4), 357-376.

Hodges, J. (2017) 'Cracking the walls of leadership : women in Saudi Arabia.', Gender in
management : an International journal., 32 (1). Pp. 34-46.

Johnson, M., Egelman, S., & Bellovin, S. (2012). Facebook and privacy: It's complicated.
Proceedings of the Eighth Symposium on Usable Privacy and Security, 1-15.

Kaplan, B., & Maxwell, J. A. (2005). Qualitative research methods for evaluating computer
information systems. In *Evaluating the organizational impact of healthcare information
systems* (pp. 30-55). Springer New York.

Kendon, A. (1990). *Conducting interaction: Patterns of behavior in focused encounters* (Vol. 7).
CUP Archive.

Krogh, P. G., Petersen, M. G., O'Hara, K., & Groenbaek, J. E. (2017, May). Sensitizing concepts for socio-spatial literacy in hci. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (pp. 6449-6460). ACM.

Laing, a., duffy, f., jaunzens, d., and willis, s. 1998. New environments for Working: The Re-Design of Offices and Environmental Systems for New Ways of Working. Construction Research Communications.

Luff, P., Hindmarsh, J., & Heath, C. (2000). *Workplace studies: Recovering work practice and informing system design*. Cambridge university press.

Map of GCC (2017). Retrieved December 09, 2017, from https://www.mapsofworld.com

Meijer, R. (2010). Reform in Saudi Arabia: The gender‐segregation debate. *Middle East Policy*, *17*(4), 80-100.

Ministry of Labor. 2014. Guide to Women's Work in the Private Sector.

Ministry of Labor. 2016. Saudi Labor Market Report G20. Retrieved September 12, 2016, from http://saudilabormarketreport.org/

Nardi, B. A., Whittaker, S., & Bradner, E. (2000, December). Interaction and outeraction: instant messaging in action. In Proceedings of the 2000 ACM conference on Computer supported cooperative work (pp. 79-88). ACM.

O'hara, K., Kjeldskov, J., & Paay, J. (2011). Blended interaction spaces for distributed team collaboration. *ACM Transactions on Computer-Human Interaction (TOCHI)*, *18*(1), 3.

Ozyurek, A. (2000). The influence of addressee location on spatial language and representational gestures of direction. In D. Mcniell (Ed.) Language and Gesture. Cambridge University Press.

Ozyurek, A. (2002). Do speakers design their cospeech gestures for their addressees? The effects

of addressee location on representational gestures. Journal of Memory and Language. 46. Pp. 688—704.

Palen, L., & Dourish, P. (2003, April). Unpacking privacy for a networked world. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 129-136). ACM.

Piecowye, J. (2003). Habitus in Transition? CMC use and impacts among young women in the United Arab Emirates. Journal of Computer–Mediated Communication, 8(2).

Ramirez Jr., A., & Wang, Z. (2008). When online meets offline: An expectancy violations theory perspective on modality switching. *Journal of Communication*, **58**, 20–39. Doi: 10.1111/j.1460-2466.2007.00372.x

Rexroth, P., Seitz, P., Steinmetz, R., Steinmetz, R., and Steinmetz, R. (1999). I-LAND: An interactive Landscape for Creativitiy and Innovation. In Proceedings of the the ACM Conference on humanfactorsin Computing Systems (clfi) '99, pp. 120-127 .

Rodden, T., & Blair, G. (1991). CSCW and distributed systems: The problem of control. In *Proceedings of the Second European Conference on Computer-Supported Cooperative Work ECSCW'91* (pp. 49-64). Springer, Dordrecht.

Rodden, T., & Blair, G. (1991). CSCW and distributed systems: The problem of control. In Proceedings of the Second European Conference on Computer-Supported Cooperative Work ECSCW'91 (pp. 49-64). Springer Netherlands.

Sandstrom, P. E. (2004). Anthropological Approaches to Information Systems and Behavior. *Bulletin of the American Society for Information Science and Technology, 30*(3), 12-16. Doi:10.1002/bult.311

Scott, S. D., Grant, K. D., & Mandryk, R. L. (2003). System guidelines for co-located,

collaborative work on a tabletop display. In *ECSCW 2003* (pp. 159-178). Springer, Dordrecht.

Sommer, R. (1969). Personal space: The behaviour basis of design . Prentice-Hall, Englewood Cliffs, N.J

Streitz, N.A., geij3ler,J., Holmer, T., Konomi, S., Miiller-Tomfelde, C ., Reischl, W.,

Sun, X., Wiedenbeck, S., Chintakovid, T., & Zhang, Q. (2007). The effect of gender on trust perception and performance in computer–mediated virtual environments. Proceedings of the American Society for Information Science and Technology, 44(1), 1-14.

Toumi, H. (2017, March 26). Saudi women make huge leaps in private sector. *Gulf News* Retrieved January 2, 2018, from http://gulfnews.com/news/gulf/saudi-arabia/saudi-women-make-huge-leaps-in-private-sector-1.2000458

Ur, B., & Wang, Y. (2013, May). A cross-cultural framework for protecting user privacy in online social media. In *Proceedings of the 22nd International Conference on World Wide Web* (pp. 755-762). ACM.

Vision 2030. 2016. Retrieved September 12, 2016, from http://vision2030.gov.sa/en/foreword

Weisinger, J. Y., & Trauth, E. M. (2002). Situating culture in the global information sector. Information Technology & People, 15(4), 306-320.

Wellner, P. (1993). Interacting with Paper on the digitaidesk. Communications of the ACM, 36(7), pp. 86-96.

Women's Voice in Islam (2017). Retrieved from http://www.islamweb.net/emainpage/index.php?Page=showfatwa&Option=fatwaid&Id=263791

Zakaria, N., Stanton, J. M., & Sarkar-Barney, S. T. (2003). Designing and implementing

culturally-sensitive IT applications: The interaction of culture values and privacy issues in the Middle East. Information Technology & People, 16(1), 49-75.

Zhao, D., & Rosson, M. B. (2009, May). How and why people Twitter: the role that micro-blogging plays in informal communication at work. In Proceedings of the ACM 2009 international conference on Supporting group work (pp. 243-252). ACM.

Impact of Gender Segregation on Communication, Collaboration, and CMC use in Saudi

Arabian Workplaces

Abstract

There has been little research in the HCI and CSCW communities on the influence of cultural values on communication and collaboration in Arabic countries in the Middle East. In this pilot study, I focused on the impact of gender segregation on communication, collaboration, and computer-mediated communication (CMC) technology use in the Saudi Arabian workplace. In this study, I used an online questionnaire and follow-up interviews to collected data from 41 participants (15 women, 26 men). Based on my analysis, I identified three different types of workplaces in Saudi Arabia: segregated, partially-segregated, and non-segregated. I described the different workplaces and discussed the challenges that women and men face in collaborating with each other. I then discuss the gender differences in CMC use, the social construction of gender roles that create challenges in collaboration and communication, and the implications of gender segregation on perceptions of communicators. I conclude with design implications for CMC tools in Saudi Arabian workplaces.

INTRODUCTION

Researchers in Human-Computer Interaction (HCI) and Computer Supported Cooperative Work (CSCW) have long been interested in a variety of social and technical issues concerning collaboration. In particular, there is growing interest in culturally related topics in this area. Studies have not only highlighted how culture affects workplace practices and behaviors but also how technology is used in specific cultural contexts (Grudin, 1994; Piecowye,

2003). This interest is driven by the growth of computer-mediated communication (CMC) tool use in countries around the world and the impact that a country's culture can have on CMCs. One important part of a country's culture that can impact collaboration are the gender expectations. In particular, the issues of how gender affects the interaction between co-workers whether in face-to-face and/or remote settings (Yates, 1997). Although researchers have been studying cultural issues related to HCI outside of Western countries for a number of years, most studies have focused on Asian countries (Clemmensen & Roese, 2010). There has been little research on understanding what role cultural norms play on issues such as gender's impact on communication and collaboration in Arabic countries in the Middle East.

We focus on a specific Middle Eastern country, Saudi Arabia. In particular, we examine the impact of gender perceptions on collaboration and CMC use in the Saudi Arabian workplace. Saudi Arabia is unique among Middle Eastern countries because of its significant gender related norms and regulations. For example, in Saudi Arabia, gender segregation is very common in education and workplaces, such as government offices and some hospitals, as well as in some recreational areas such as malls and amusement parks (Meijer, 2010). Consequently, gender perceptions in Saudi Arabia affect men and women's workplace interactions in ways that are not common in western countries and even other Middle Eastern countries. Most Saudi Arabian public workplaces (i.e. government offices, and public schools) enforce strict gender segregation, while private workplaces are not required to enforce gender segregation as strongly.

Women constitute only 20% of the workforce in Saudi Arabia as of 2014 (Ministry of Labor, 2014). According to the Central Department of Statistics and Information (CDSI), the lack of jobs in the private sector offering separate working areas for women was noted by women as one of the main reasons behind the low employment rate (Ministry of Labor, 2014). The majority of

the women work in the public sector, especially in education, where strict gender segregated rules are enforced. According to Reidy, "employment that would take women away from their families or put them in close contact with unknown men is not suitable for the majority of Saudi women" (Reidy, 2013, p.8). Reidy explained, "the focus not just on creating jobs, but jobs "appropriate for women", continues to be an issue" (Reidy, 2013, p.8). While workplaces in the public sector are regulated and enforced in terms of gender segregation, workplaces in the private sector are not regulated; however, because of the social norms, gender segregation does still exist in the private sector although at a much lower rate than in the public sector. Also, in order to increase women's participation in the private sector, companies have to develop workspaces that respect the desire of many women to be separated from men. One way to support these workspaces and deal with the barriers created by the gender segregation is to develop appropriate computer-mediated communication (CMC) tools.

Consequently, in this paper, we describe the role of gender on communication, collaboration, and the use of CMCs in workplace environments in Saudi Arabia. To do this, we conducted a questionnaire and interview-based research study of Saudi Arabian men and women professionals. Since most CMC technologies have been designed in western cultures that view professional gender relationships in a different light than in Saudi Arabia and other Middle Eastern countries, we need to consider ways to adapt these technologies to those countries and their cultural norms.

The paper is structured as follows: in the next section, we provide a brief overview of relevant cultural research, the role of gender on CMC use, and CMC research specifically in the Saudi Arabian context. Next, we present our research methodology. We then present our study

findings. In the following section, we discuss the role of gender in the Saudi Arabian workplace. Finally, we conclude with some implications for design.

RELATED WORK

Cultural Perspective

Culture affects both workplace practices and behaviors and also how technology is used within the specific cultural context (Grudin, 1994; Weisinger & Trauth, 2002). Weisinger and Trauth (2002) conceptualized the Situating Culture approach and explained, "cultural understanding is locally situated, behavioral, and embedded in everyday, socially negotiated work practices" (Weisinger & Trauth, 2002, p.306). They illustrated how the local culture of a firm emerges from the mixture of industry, corporate, and national contexts. This results in unique locally situated work practices that impact behaviors in those settings. In terms of technology, Grudin explained, "due to shared language and culture, perhaps, several U.S. Technology companies have active research labs in England" (Grudin, 1994, p.1). But when discussing a different culture, the Japanese culture, for example, he warns, "one should avoid predicting the success of a groupware technology in a different culture too quickly. Cultural issues are very important, but also complex" (Grudin, 1994, p.1). In a study by Sun, Wiedenbeck, and Chintakovid (2007) on gender and computer mediated virtual environments, the researchers explained that because this study was conducted in the United States, it is likely that in other cultures, especially Asian cultures, the results of their study may differ (Sun, Wiedenbeck, & Chintakovid, 2007). Thus, culture and gender interaction issues should be considered within the specific cultural context. Similarly, Heaton emphasized the importance of

culture in technology design (Heaton, 1999). She also emphasized that CSCW systems reflect

the context and society in which they are designed.

Gender and CMC

In addition to cultural differences in the use of CMCs, researchers have shown that there

are gender differences in the use of CMCs. A study by Sun, Wiedenbeck, and Chintakovid

(2007) discussed the influence of gender on expectations and perceptions of communicators

(Sun, Wiedenbeck, & Chintakovid, 2007). Interestingly, the results showed that male pairs were

more aggressive, decisive, and competitive and perceived lower levels of initial interpersonal

trust which affects their ability to collaborate effectively on work related tasks. Also, the results

highlighted that men in mixed gender pairs had lower levels of trust than women. According to

Sun, "females in remote work teams might help constrain the males' over-competitiveness and

achieve higher levels of initial trust, ultimately leading to higher information sharing and

cooperation" (Sun, 2008, p.79). The study also concluded that gender diversity leads to high

performance outcomes in mixed pairs.

Another study by Hiltz and Johnson (1990) on CMCs and gender revealed that women

favored CMCs more than men (Hiltz & Johnson, 1990). The researchers considered that women

might prefer CMCs because it gives them the opportunity to have their say and not be shut out by

dominant men. Similarly, Allen (1995) showed that, "females perceived email to be easier to use,

more efficient, and more effective than males" (p.557).

CMC Studies in Saudi Arabia

Al-Saggaf (2004) investigated the effect of online community on offline community in

Saudi Arabia. The researcher focused on how email and chat online can affect how people act

offline. The results concluded that while participants gained self-confidence, became more open

minded, and became more aware and less reserved about the opposite gender, they also became less shy, became more confused about culture and religion, and neglected their family commitments (Al-Saggaf, 2004). These results suggest the positive and negative outcomes of Internet communication on the Saudi Arabian society.

While the previous study was focused on informal communication and technology usage, a study by Asiri, Mahmud, Bakar, and Ayub (2012) focused on variables that impact a more formal usage of a Learning Management System (LMS) and the attitudes of Saudi Arabian faculty members regarding using LMS. The system is used to help educators manage their courses, communicate with students, and evaluate students' progress and performance. The study concluded that the variables that influence the faculty members' use of the Learning Management System include attitudes toward use of technology, pedagogical beliefs toward e-learning, competence level in using technology, external barriers, computer experience, gender, and training.

Another study by Bulut and Rabab'ah (2007) examined CMC use between Saudi students, women, and professors, men. It focused on a non-western gender segregated context where email was used to facilitate a communication. The difference between similar studies done in Western countries and this study is that due to cultural barriers, in the communication via email, the students, women, requested to set up face to face meetings with the professor and their relative rather than themselves to hand in work. The study also concluded "different sociocultural and linguistic contexts may lead to different levels of e-mail use." (Bulut & Rababah, 2007, p.70). Despite these few studies, overall, there has been little research on CMC use in the Saudi Arabian workplace.

METHODOLOGY

Saudi Arabian Context

Saudi Arabia has distinct intellectual and cultural traditions very different from Western and Asian countries. Furthermore, it's culture and social system differs from even other Middle Eastern countries. Not only is Saudi Arabia the birthplace of Islam, it is also home to Islam's two holiest shrines in Mecca and Medina. Thus, Saudi Arabia's connection to Islam is particularly strong. Saudi Arabia, unlike other Muslim countries has a special religious police force to enforce Sharia law. The religious police officers patrol the streets to enforce religious edicts such as dress codes and separation of genders. Most women are expected to wear a head covering called a Hijab, a full black cloak called an Abaya, and a face veil called a Niqab when they go out or are around men. Dress codes vary by region; in Jeddah, many women go out with their faces uncovered, while Riyadh is more conservative, with the majority of women choosing to wear a face veil. According to Meijer (2010), gender segregation was not always enforced in Saudi Arabia, "it was actively promoted in the 1980s and 1990s by the state, the revivalist Sahwa movement, conservative ulama and the religious police, who enforce public moral behavior" (Meijer, 2010, p.80). Since then, the government has strictly enforced gender segregation in government offices, schools, universities, some public hospitals, and other public spaces such as amusement parks (Meijer, 2010). However, because private businesses are not the responsibility of the government, they are not required by law to segregate by gender.

Participants

I used social media outlets such as Twitter and Facebook to recruit participants. I did so by sending private messages to different Facebook/Twitter pages of interest (i.e., Saudis in business, Saudis in medical fields) and by reaching out to a few Saudis within these pages of

interest who fit the selection criteria. The selection criteria for inclusion were employees that work in Saudi Arabia and identified themselves as Saudi Arabian nationals. Participation was completely voluntary (no compensation was given). Although 200 participants began the on-line questionnaire, only 41 participants (15 women, 26 men) completed the questionnaire (Table 1). I also conducted follow-up interviews with 6 participants (2 women, 4 men).

Procedure

I collected the data through an on-line questionnaire and follow-up interviews. Online questionnaires were used to obtain the initial data and then chat (instant messaging) was used for the follow-up interview. Because Arabic was often the participants' first language, they were given the option of either Arabic or English questionnaires or interviews.

The online questionnaires were provided to all of the participants as a link using Survey Monkey, an online survey website. The types of questions included in the questionnaires were first used to gain information on the participants' identity (gender, age, job). Then the questionnaires were split into two parts. Part one asked general questions on the types of collaboration and communication and the challenges associated with them in the workplace, technology used to facilitate the type of collaboration and communication and their advantages, disadvantages, and limitations.

	Pseudonym	Gender	Age	Job	Job Context	Language	Questionnaire/Interview
1.	Afnan	Female	23	Programmer	Partially Segregated	Arabic	Questionnaire
2.	Siba	Female	26	Teacher's Assistant	Partially Segregated	Arabic	Questionnaire
3.	Dalal	Female	24	Teacher's Assistant	Partially Segregated	Arabic	Questionnaire
4.	Iman	Female	25	Computer Teacher	Partially Segregated	Arabic	Questionnaire
5.	Haya	Female	29	Administrator	Partially Segregated	Arabic	Questionnaire
6.	Saif	Male	26	Language Teacher	Segregated	Arabic	Questionnaire
7.	Laila	Female	28	Psychologist	Non-Segregated	Arabic	Questionnaire
8.	Hamad	Male	29	Teacher's Assistant	Segregated	Arabic	Questionnaire
9.	Hassan	Male	23	Optics Technician	Partially Segregated	Arabic	Questionnaire/ Interview (Whatsapp, Written)
10.	Saleh	Male	34	Commercial Sales Manager	Partially Segregated	Arabic	Questionnaire
11.	Turki	Male	29	Director of Patient Relation	Non-Segregated	Arabic	Questionnaire
12.	Mahmoud	Male	25	Teacher	Segregated	Arabic	Questionnaire
13.	Mariam	Female	26	Teacher	Segregated	Arabic	Questionnaire
14.	Hussien	Male	32	Private Sector	Partially Segregated	Arabic	Questionnaire
15.	Fahim	Male	27	Engineer	Non-Segregated	Arabic	Questionnaire
16.	Fuad	Male	28	Credit Analyst	Segregated	Arabic	Questionnaire
17.	Omar	Male	43	Social Researcher	Partially Segregated	Arabic	Questionnaire/ Interview (Whatsapp chat, Written)
18.	Saad	Male	38	Administrative Director	Segregated	Arabic	Questionnaire
19.	Nouf	Female	33	Health Educator	Segregated	English	Questionnaire
20.	Noura	Female	45	IT Consultant/ Professor of Computer Science	Non-Segregated	English	Questionnaire/ Interview (Twitter chat, Written)
21.	Shahad	Female	26	Recruitment	Non-Segregated	English	Questionnaire
22.	Muath	Male	32	Physician	Non-Segregated	English	Questionnaire
23.	Reem	Female	24	Lawyer	Partially Segregated	English	Questionnaire
24.	Waleed	Male	28	Engineer	Segregated	English	Questionnaire
25.	Bader	Male	26	Engineer	Segregated	English	Questionnaire
26.	Raed	Male	31	PR Specialist	Partially Segregated	English	Questionnaire
27.	Salman	Male	29	Lecturer	Segregated	English	Questionnaire
28.	Maha	Female	25	HR Specialist	Non-Segregated	English	Questionnaire/ Interview (Whatsapp, Written/ Audio)
29.	Bandar	Male	27	Account Manager	Non-Segregated	English	Questionnaire/ Interview (Whatsapp, Written)
30.	Saud	Male	24	Administrative Secretary	Segregated	English	Questionnaire
31.	Fahad	Male	27	Teacher's Assistant	Partially Segregated	English	Questionnaire
32.	Sulaiman	Male	28	Management Consultant	Segregated	English	Questionnaire
33.	Faisal	Male	33	Lecturer	Partially Segregated	English	Questionnaire
34.	Mohammed	Male	26	Electrical Engineer	Partially Segregated	English	Questionnaire
35.	Ahmad	Male	56	Senior, Government	Segregated	English	Questionnaire
36.	Sarah	Female	25	University Teacher	Segregated	English	Questionnaire
37.	Khalid	Male	28	Pharmacist	Non-Segregated	English	Questionnaire
38.	Amal	Female	37	Academic Advisor	Segregated	English	Questionnaire
39.	Yousef	Male	24	Teacher	Segregated	English	Questionnaire
40.	Yara	Female	34	Lecturer	Segregated	English	Questionnaire
41.	Ibrahim	Male	41	Administrator	Non-Segregated	English	Questionnaire/ Interview (Whatsapp, Written)

Table 1. Participant Demographic

The second part of the questionnaire focused on the gender interaction context (extent of

workplace segregation), type of collaboration and communication with the opposite gender and

challenges associated with it, technologies used to facilitate this type of collaboration/ communication and their advantages, disadvantages, and limitations.

Once the participants completed the questionnaires, they were asked to provide contact information for a 30-45 minute follow up interview. A follow-up interview was scheduled when clarification was needed. The participants were assigned pseudonyms, which were used throughout the paper. Since the researcher was a Saudi Arabian woman, she could not meet face-to-face with participants who are men; so chat (instant messaging) interviews were conducted based on the participants' preference on their preferred platform which was noted in the survey when contact information was taken (Table 1). For the chat session, both handwritten notes and chat logs (where applicable) were captured.

Data Analysis

I used the thematic analysis process. First, I transcribed the notes and logs and organized it into a spreadsheet. Then, I read and re-read the text several times and wrote down any impressions I had as we went through the data. Second, I focused on the analysis by organizing the data by questions asked and looking across the data for patterns. The third step is to categorize information by identifying themes and organizing them into categories. Fourth, I identified connections within and between the categories. In the fifth and last step, I interpreted the data. I used the themes and connections to explain the findings.

FINDINGS

Saudi Arabia has a set of norms and regulations that govern gender interactions in the workplace. However, there was not one single type of workplace setting; rather, we identified three different types of workplaces based on gender segregation: (1) Strictly segregated

workplaces where men and women do not interact at all, (2) partially segregated workplaces that allow remote communication/collaboration between men and women, (3) non-segregated workplaces where men and women can interact with each other face-to-face.

Because my interest is on how men and women interact in the workplace (remotely or face to face), I will focus on partially segregated and non-segregated workplaces.

Partially Segregated Workplaces

Participants who worked in partially segregated workplace settings explained that while their workplace was gender segregated (i.e. men and women could not be in the same physical proximity), they could communicate with the opposite gender through CMCs/phone for work-related activities. When referring to working with colleagues who are women, Hassan, an optics technician explained:

> *"Separated workspace. We use phone or email. Sometimes there is a delayed response to emails. If they do not reply within 24 hours, we use phone."* (Hassan, Interview)

In partially segregated work environments, employees must rely heavily on CMCs to complete their shared tasks. However, a number of challenges arose in utilizing these technologies.

First, while men usually have little problem informally communicating with men coworkers, this changes when they communicate with women coworkers because of the potential for misunderstanding. Many participants listed email and phone as the primary means of communication, but a significant number of participants also listed a popular, yet informal, instant messaging phone application, Whatsapp, as an important tool because it warrants a faster response than email. When asked what tools he uses to communicate, Mohammad, an Electric Engineer, explained:

> *"Mostly emails but whatsup [Whatsapp] is a rival"* (Mohammed, Questionnaire)

Some of the participants clarified that the use of Whatsapp was seen as informal. Although

Maha, an HR specialist, worked in a non-segregated workplace, her view was one that was

shared by those who also worked in partially segregated workplaces.

> *"Men here try to flirt with women as much as they can. So using whatsapp will make them feel intimate little bit. But I must be sharp with them. By using emails only. Straight to the point"* (Maha, Interview)

Maha stresses the importance of formality at work. She explained that because men might act

inappropriately (by flirting) she has to be cautious and use formal emails only.

Another participant, Khalid, explained:

> *"It [Emails] usually eliminates any kind of limitations since it is used in formal way"* (Khalid, Questionnaire)

Khalid also used email to facilitate the collaboration with women coworkers because it allows

the communication to be formal.

Another challenge was that some CMC features could not be used. Not only do the

traditional, cultural, and religious gender related beliefs create social interaction challenges, but

they also limit technological features. Bandar, an Account Manager, explained:

> *"We deployed video units in both men and women's building (of course we take off the "camera" in the units that go to the women's buildings). Believe it or not, they reported much better productivity, and much better work results, not to mention the remote training they receive at the same time."* (Bandar, Interview)

Because women are expected to cover their body/head and some choose to cover their faces,

around men, segregated women only workplaces act as a safe place where they can uncover.

Therefore, features on tools that are used for communication and collaboration such as video are

left unused. While companies try to remedy the technology issue by using western technology to

facilitate remote collaboration, this technology is not used to its fullest potential.

Non-Segregated Workplaces

Some of the participants worked in private organizations where co-workers, men and women, were allowed to physically interact with each other. In these settings, a mixture of face-to-face collaboration and CMC tools were used to accomplish a shared project or task

> *"I worked in mixed environments. I am a short temper person. I send emails as it's documented. Then I call. After that, I go to them by myself. I communicate with them via email but face to face is easier for me and faster"* (Maha, Interview)

Since physical proximity is not an issue, the employees did not have to completely rely on the technology. However, the nature of the face-to-face interaction is very different than what would be found in western countries.

First, because working in physical proximity with men is not the norm in Saudi Arabia, women often acted "reserved" around colleagues who are men. By reserved, we mean that women did not always feel comfortable contributing fully and openly when discussing things with their colleagues who are men. This hindered their ability to contribute fully in their workplace.

When asked about the problems he faced communicating and collaborating with his women coworkers Faisal, a Lecturer, explained:

> *"Shyness, lack of aggressiveness."* (Faisal, Questionnaire)

Faisal's quote highlights the underlying cultural context that affects how women behave in the workplace. Culturally, women in Saudi Arabia may feel they are not supposed to be "aggressive" or forward in how they interact with men. This is also reflected in the workplace. Raed a PR Specialist explained:

> *"The majority of female colleagues are extremely shy to take part in such collaborative meeting unless the issue is discussed via emails... where they tend to be more open to collaborate."* (Raed, Questionnaire)

Even though the environment is not segregated, some women still preferred to interact through email. Another participant, Ibrahim, an Administrator, explained:

> *"I had two female coworker who refused to conduct a 5 minutes presentation in front of staff; they were shy to do that."* (Ibrahim, Interview)

> *"Cultural factors is and could be a major player here."* (Ibrahim, Interview)

In addition to the men co-workers who noted women's "reserved" behavior, women also noted they themselves are reserved when collaborating with the opposite gender. For instance, when asked about the challenges of collaborating with the opposite gender, Dalal, a Teacher's Assistant explained:

> *"I'm shy and I do not know how to collaborate comfortably"* (Dalal, Questionnaire)

When asked why women may feel shy or "reserved" when interacting with the opposite gender, Noura, an IT Consultant and Professor of Computer Science, explained:

> "*Beacause it [interacting with the opposite gender] is not normal in their culture. Sometimes they don't even have mixed family gatherings."* (Noura, Interview)

> *"Also some times women are worried that if they laugh or joke or say anything it may affect their image as flirting w men & be misunderstood"* (Noura, Interview)

Second, when women are working with men in the same physical proximity, they must wear clothing that covers their entire body. Furthermore, most women in conservative areas of the country also cover their faces. Many participants stated that the clothing that women wore impacted communication. Body language (i.e. gestures and facial expressions) can play a vital role in communication. When asked what affects his communication with women colleagues, Ibrahim, an Administrator explained:

> *"They can not use other body gestures (using their hands while trying not to show them)."* (Ibrahim, Interview)

Bandar, an Account Manager, explained how this impacts his interaction with women colleagues:

> *"I really cannot tell the facial expression, which makes it hard for me to really understand the situation quickly and effectively. You know what I mean? I have absolutely nothing against covering faces, but the communication just got a minor barrier."* (Bandar, Interview)

Although no participant advocated for women to dress differently than they currently are, there clearly was an acknowledgement that the inability to pick up non-verbal cues affected communication between men and women colleagues.

DISCUSSION

In this section, we discuss gender differences in CMC use, the social construction of gender roles, and the implications of gender segregation on perceptions of communicators. Finally, we discuss the design implications.

Gender and CMC Use

In this study, women prefer to use CMCs over face-to-face interaction with colleagues who are men. This outcome has been found elsewhere across the world (Hiltz & Johnson, 1990), but the reason it exists differs slightly because the impact of gender is closely connected to the culture of the society. In our study, women were more reserved around men because of the cultural and religious constraints regarding a woman's image. For this reason, women prefer to use email over face-to-face interaction. Interestingly, this same result has been found in a study conducted in workplaces in the West. Hiltz and Johnson (1990) found that women preferred CMCs to men. The authors explained that women "may appreciate the opportunity to have their say in a medium where ether cannot be shut out of active roles by dominant males in a group decision" (Hiltz & Johnson, 1990, p.760). In the Saudi culture, the reason women prefer to use email

is not just to overcome issues of dominance, but also to overcome the cultural constraints on their interactions with men in the workplace. Using technology, such as email, to communicate allows women a safe, formal, and therefore culturally acceptable way to contribute and share ideas openly. In both Western and Saudi Arabian cultures, the outcome is the same; women use CMCs because it helps them "have their say".

Social Construction of Gender Roles

Our findings highlight the challenges that men and women co-workers face in face-to-face and remote collaboration in Saudi Arabia. These challenges arise not only because of the physical segregation in the workplace itself but also because of the gender expectations that have been instilled in Saudi Arabian women and men since childhood.

Accepted Behavior

Our findings indicate that in communicating and collaborating with men, women often feel reserved. We use the term "reserved" to encompass the various cultural constraints regarding a women's image, and how women are expected to behave and interact with men. Many participants mentioned that women feel "shy". One participant, a man, even mentioned that they lack aggressiveness. But this reserved behavior may be due to the cultural constraints on a woman's image. Gender roles in the Islamic countries are different than in Western countries. A greater amount of privacy and conservativeness is required for women than for men, especially in matters of behavior and dress (Abu-Gazzeh, 1995). As one participant, a woman, explained, women are cautious when interacting with men because they do not want to tarnish their image by appearing "flirty".

Dress Code

Because women are expected to cover their bodies and some even chose to cover their faces, their body language is completely lost as part of the communication. Body language, which can include, but is not limited to, gesture and facial expressions is pivotal in communication. As Kurien explained, "a better understanding of right body language brings success at workplace and contributes to the growth of the organization. It also opens more avenues of growth at personal and professional front, for the employees of the organization" (Kurien, 2010, p.29). The implications of the lost body language are great as they may slow the communication and even lead to misunderstandings and in turn affect the productivity of the organization.

Formality

Organizational culture and social behavior differ in this context than in western contexts. Formality in this context is emphasized, especially when it comes to interacting with the opposite gender. Both men and women are very cautious when it comes to interacting with the opposite gender. In this context, interaction is accepted, only when it is formal. For example, men and women coworkers can send formal emails, but it would be socially unacceptable for them to engage in social conversation or even use an informal tool for communication. However, in a non-Arab context some levels of informality are acceptable. In fact, informal face-to-face communication in the workplace is found to be valuable (Whittaker et al., 1994).

Implications of Gender Segregation on Perceptions of Communicators

One interesting aspect of the study is the lack of trust that is created by gender segregation. The typical Saudi has experienced gender segregation for the majority of his or her life. This is why it is not surprising that when the time comes that they must work with the

opposite gender, there is a lack of trust. Individual history influences gender related beliefs and comfort. Ridgeway and Smith-Lovin (1999) explain that same sex network connections begin at an early age, when children learn to choose their playmates. They also explain that gendered divisions increase misunderstandings between men and women (Ridgeway & Smith-Lovin, 1999). Because most Saudi men and women are not accustomed to interacting with the opposite gender from childhood, they feel uncomfortable and may even misunderstand each other at times. This lack of trust in turn impacts CMC use in the workplace.

Impact on CMC use

Our findings indicate that email is a formal CMC technology that is widely used to facilitate communication and collaboration, but because email responses are often delayed and sometimes misunderstood, participants use phones and an informal CMC tool, Whatsapp. However, Whatsapp as participants noted, may not be appropriate to use with the opposite gender, because it encourages informal communication. Nardi, Whittaker, and Bradner (1999) have discussed that although Instant Messaging is widely used for supporting communication, it is informal and lightweight and may not support the development of trust. Because there is a lack of trust, women prefer to use a more formal tool such as email to communicate with men. Similarly, some men noted that they do not use, or have stopped using Whatsapp to communicate with women because their communication is sometimes misunderstood. Consequently, gender segregation influences the perceptions of communicators in the workplace. Similarly, Sun, Wiedenbeck, and Chintakovid's (2007) found that in computer mediated virtual environments gender influences expectations and perceptions of communicators.

Design Implications

The goal of this paper is not to argue for a change in the social values of another culture but rather to start to identify approaches to facilitate and support the communication and workplace practices while taking into consideration those cultural values. One way to do this is through the use of the Value Sensitive Design approach. Value Sensitive Design is an approach to designing technology that takes into account human (stakeholder) values throughout the design process (Friedman et al., 2013). Engaging in this theoretically grounded approach entails an iterative process of conceptual, empirical, and technical investigations. Such an approach would be useful in the Saudi Arabian workplace because examining workplace tasks and employee values will help in designing a tailored CMC system to facilitate the synchronous and asynchronous communications and collaborations within that particular set of cultural norms. These tools should incorporate important components of CMCs, such as communication and awareness, while at the same time maintaining the values of the stakeholders. In this setting, these values may include privacy and formality. Privacy may impact the design of a conferencing system, for example, in which the video camera function should be turned off in the women's offices to ensure the comfort and privacy of the women employees. Formality may impact the design of a messaging system, for example, tailored for use in a formal, non-social, workplace environment. Designing such a solution has the potential to increase women's participation in the workforce and increase productivity and work results in partially segregated work place settings.

Limitations

One main limitation in our research study is related to the participant sample. The recruitment medium used, social media, suggests that the participants might have been exposed

to Western media and thinking styles, which may affect the sample in terms of internationalization and how they think about gender relationships. However, we believe that we were still able to get a detailed understanding of the gender interactions in the Saudi Arabian workplace with these participants.

CONCLUSION

Through this study, we hope to open a previously understudied cultural context, the Middle East, to the HCI and CSCW communities. Since most CMC technologies have been designed in cultures that view professional gender relationships in a different light than in Saudi Arabia and other Middle Eastern countries, we need to consider ways to adapt these technologies to those countries and their culture. This understanding, in turn, has implications for future research in Value Sensitive Design to support the development or modification of CMC tools for use in Saudi Arabia and other Arabic countries.

REFERENCES

Abu-Gaueh, T. (1995). Privacy as the basis of architectural planning in the Islamic culture of Saudi Arabia.

Al-Saggaf, Y. (2004). The effect of online community on offline community in Saudi Arabia. *The Electronic Journal of Information Systems in Developing Countries*, *16*.

Allen, B. J. (1995). Gender and computer-mediated communication. Sex Roles, 32(7-8), 557-563.

Asiri, M. J., Mahmud, R., Bakar, K. A., & Ayub, A. F. (2012). Factors influencing the use of learning management system in Saudi Arabian Higher Education: A theoretical
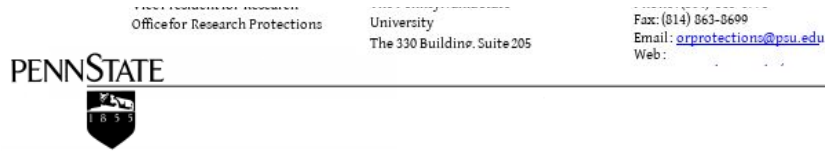
framework. *Higher Education Studies*, *2*(2), p125.

Bulut, D., & Rabab'ah, G. (2007). Pragmatics of e-mail communication between Saudi female

students and male professors. *The JALT CALL Journal*, *3*(3), 49-73.

Clemmensen, T., & Roese, K. (2010). An overview of a decade of journal publications about

Culture and Human-Computer Interaction (HCI). In Human Work Interaction Design: Usability

in Social, Cultural and Organizational Contexts (pp. 98-112). Springer Berlin Heidelberg.

Friedman, B., Kahn Jr, P. H., Borning, A., & Huldtgren, A. (2013). Value sensitive design and

information systems. In Early engagement and new technologies: Opening up the

laboratory (pp. 55-95). Springer Netherlands.

Grudin, J. (1994). Computer-supported cooperative work: History and focus. Computer, (5), 19-

26.

Heaton, L. (1999). Preserving communication context: Virtual workspace and interpersonal

space in Japanese CSCW. AI & SOCIETY, 13(4), 357-376.

Hiltz, S. R., & Johnson, K. (1990). User satisfaction with computer-mediated communication

systems. Management Science, 36(6), 739-764.

Kurien, D. N. (2010). Body language: Silent communicator at the workplace

Meijer, R. (2010). Reform in Saudi Arabia: The gender‐segregation debate.*Middle East Policy*,

17(4), 80-100.

Nardi, B. A., Whittaker, S., & Bradner, E. (2000, December). Interaction and outeraction: instant

messaging in action. In Proceedings of the 2000 ACM conference on Computer

supported cooperative work (pp. 79-88). ACM.

Piecowye, J. (2003). Habitus in Transition? CMC use and impacts among young women in the

United Arab Emirates. Journal of Computer‐Mediated Communication, 8(2).

Reddy, M. C., & Jansen, B. J. (2008). A model for understanding collaborative information

    behavior in context: A study of two healthcare teams. Information Processing &

    Management, 44(1), 256-273.

Ridgeway, C. L., & Smith-Lovin, L. (1999). The gender system and interaction. Annual review

    of sociology, 191-216.

Sun, X. (2008). Why gender matters in CMC: gender differences in remote trust and

    performance with initial social activities (Doctoral dissertation, Drexel University).

Sun, X., Wiedenbeck, S., Chintakovid, T., & Zhang, Q. (2007). The effect of gender on trust

    perception and performance in computer-mediated virtual environments. Proceedings of

    the American Society for Information Science and Technology, 44(1), 1-14.

Weisinger, J. Y., & Trauth, E. M. (2002). Situating culture in the global information sector.

    Information Technology & People, 15(4), 306-320.

Yates, S. J. (1997). Gender, identity and CMC. Journal of Computer Assisted Learning, 13(4),

    281-290.

Ref: 191117_hs_001

To Whom It May Concern:

I am writing this letter to indicate that Ms. Sarah Almoaiqel, a PhD candidate at Pennsylvania State University, has been given permission to conduct her dissertation research at our company, ███████████, in our head office in Riyadh, Saudi Arabia.

Sincerely,

APPENDIX C: IRB Approval

Date:	May 30, 2014
From:	The Office for Research Protections - FWA#: FWA00001534
	Courtney A. Whetzel, Compliance Coordinator
To:	Sarah Almoaiqel
Re:	Determination of Exemption

IRB Protocol ID:	45765
Follow-up Date:	May 29, 2019
Title of Protocol:	The use of Collaborative tools to Facilitate Remote Collaboration in the Saudi Arabian Workplace

The Office for Research Protections (ORP) has received and reviewed the above referenced eSubmission application. It has been determined that your research is exempt from IRB initial and ongoing review, as currently described in the application. You may begin your research. The category within the federal regulations under which your research is exempt is:

45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Given that the IRB is not involved in the initial and ongoing review of this research, it is the investigator's responsibility to review IRB Policy III "Exempt Review Process and Determination" which outlines:
- What it means to be exempt and how determinations are made
- What changes to the research protocol are and are not required to be reported to the ORP
- Ongoing actions post-exemption determination including addressing problems and complaints, reporting closed research to the ORP and research audits
- What occurs at the time of follow-up

Please do not hesitate to contact the Office for Research Protections (ORP) if you have any questions or concerns. Thank you for your continued efforts in protecting human participants in research.

This correspondence should be maintained with your research records.

APPENDIX D: Loose Interview Guide

Employees
Contextualization
Q1: Do you work with women or men to accomplish a task or project?
Q2: Are all of the group members co-located?
Q3: Do any of the group members work with you online or by telephone?
Q4: What are some problems that you faced when collaborating on a task with your coworker?
Q5: Why do you perceive these problems exist?

Empirical Investigation
Q1: How does your culture/religion influence the way you behave in the workplace?
Q2: How do national/ workplace policies influence the way you behave in the workplace?
Q3: What do you as an individual value most in the workplace interaction context?
Q4: How do you prioritize confounding values?
Q5: Has there ever been a time when you felt that your values were compromised?
Q6: Has there ever been a time when you felt you could have gone further in your job had you compromised your values?

Technical Investigation
Q1: What tools do you use to facilitate this type of communication/ collaboration?
Q2: How are these tools being adapted to support communication/ collaboration?
Q3: What are some advantages and disadvantages of these tools?
Q4: What are some features not available on this tool that you believe might be beneficial?
Q5: How do these tools support your values?
Q6: Has there been a time when these tools compromised your values?

Other Stakeholders (Management/HR)
Q1: What do you value as an organization?
Q2: How do you consider individual values of employees?
Q3: In what ways might employee values be in agreement with, or conflicting with organizational values?
Q4: What value considerations do you make in the design of workplace policies and procedures?
Q5: What value considerations do you make in the choice of technology used by employees?
Q6: What are organization's motivations?
Q7: What is the organization's method of training?
Q8: What are some reward structures, if any?
Q9: What is the economic incentive involved?

VITA: Sarah Almoaiqel

EDUCATION

The Pennsylvania State University, University Park, PA
Ph.D. in Information Sciences and Technology: Human Computer Interaction   May, 2018
M.S. in Information Sciences and Technology: Human Computer Interaction   May, 2015
B.S. in Information Sciences and Technology: Integration and Application   May, 2013
B.S. in Security and Risk Analysis: Information and Cyber Security   May, 2013

EMPLOYMENT

Faculty Member, King Saud University, Riyadh, Saudi Arabia   September 2014- Present
Intern: Application Development, Surge Business Development, State College, PA   January 2012- January 2013
Kindergarten and First Grade Teacher, Weekend Islamic School, State College, PA   August 2011- May 2012

UNIVERSITY AND PROFESSIONAL SERVICE

KSU's Itkan (Institutional Accreditation) Committee, King Saud University   2015-16
CCIS's External Participation and Partnership Activation Committees, King Saud University   2015-16
SWE Department's Scientific Research, PR, and Industrial Partnerships Committees, King Saud University   2015-16
Cyber Arabia Event, King Saud University   2016
Research in Serving Society Conference, Prince Sultan University   2016
Arduino Workshop, King Saud University   2015
IBM Bluemix Workshop and Hackathon, King Saud University   2015

UNIVERSITY TEACHING EXPERIENCE

Software Engineering I, Software Engineering II, and Computer Programming I, King Saud University   2015-2016

PRESENTATIONS

Almoaiqel, S. (2018). *Technological and Educational Landscape in Saudi Arabia*, panel participant for the Education for a Human Right module, Learning Design and Technology Program, Pennsylvania State University.
Almoaiqel, S. (2017). *Information Technology and Socio-Economic Development in Saudi Arabia*, invited talk given to faculty and staff of the College of Information Sciences and Technology, Pennsylvania State University.
Almoaiqel, S. (2017). *Gender, Information Technology, and Socio-Economic Development in Saudi Arabia*, invited guest lecture presented to IST 235: Gender and the Global IT Sector, Pennsylvania State University.
Almoaiqel, S. (2015). *Information and Communications Technology Adoption in Saudi Girls' Public Schools*, invited seminar presented in SKERG Seminar Series, King Saud University.
Almoaiqel, S. (2015). On *Socio-Technical Perspectives,* presented to SKERG Journal Club, King Saud University.
Almoaiqel, S. Alomar N. Alfayez R (2015). *IBM Bluemix*, workshop to undergraduates, King Saud University.

RESEARCH EXPERIENCE

Master's Thesis
Almoaiqel, S. S. (2015). *A Study of the Socio-Technical Influence on Information and Communications Technology in Girls' Schools in Saudi Arabia* (Masters thesis, The Pennsylvania State University).
Ongoing Research
Fostering Healthy Behaviors in College Students Through Self-Monitoring Data Collection and Reflection, with Dr. Eun Kyoung Choe, Haining Zhu, Frank Materia, Jiawei Chen, and Natalie Cope, 2016- present
Encouraging Voluntary Works through the Design of Volunteering Platforms, with Dr. John Carroll, Dr. Ben Hanrahan, and Yeonhwa Oh, 2016- present
Culture Matters: A Study of Privacy Risks and Information Disclosure Behaviors in Online Gaming, with Dr. Mansour Alsaleh and Dr. Abdulrahman Alarifi, 2016- present

MEDIA COVERAGE

LaMarca, Katie. (2017, August 3). IST doctoral student (Sarah Almoaiqel) aims to empower Saudi women through technology. *Penn State News*.

AWARDS

Academic Achievement Scholarship Award, Saudi Arabian Cultural Mission   2010-2016
1st Place M-Health Challenge, Pennsylvania State University   2014