Technologies and classroom configurations in gender-separated education in Saudi Arabia: An exploratory mixed methods study

by

Majd Alomar

B.S., University of East Anglia, United Kingdom, 2012
M.S., Kansas State University, Manhattan, KS, 2014

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Curriculum and Instruction
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2018

Abstract

The purpose of this study is to explore the classroom configurations and technologies used to mediate instruction to female students in gender-separated classrooms at Qassim University and Alfaisal University in Saudi Arabia. The study describes the methods used, evaluates and compares the effectiveness of the approaches, and describes the issues and challenges that female students and their male professors face in gender-separated classrooms. The study was conducted using a sequential exploratory mixed-methods design and contains two phases, a qualitative phase and a quantitative phase. Two theoretical frameworks, Community of Inquiry and Technology Acceptance model, were used to guide the data collection in the qualitative component of the study. The results of the qualitative component were then used to develop a survey instrument that was used to collect data from a larger sample of the population.

The qualitative phase focused on identifying the approaches used to mediate instruction to female students and explored the experiences of female students and male professors in gender-separated classrooms. A multiple case study design was used for collecting and analyzing the qualitative data. It included observations of five gender-separated classrooms that are equipped with different technologies and classroom configurations in Qassim and Alfaisal universities, focus groups made up of female students, and interviews with the male professors who taught those classes.

Based on the themes and findings from the qualitative study, a survey instrument was developed and distributed to a sample of female students and male faculty members who teach female classrooms at Qassim University. The quantitative data enabled the researcher to report findings reflective of a larger and more diverse sample of female students and male professors at Qassim University.

In conclusion, the qualitative phase of this study identified five different classroom configurations used in gender-separated classrooms: VCR, CCTV, and VC at Qassim University and Double deck and Partition at Alfaisal University. VCR was found to be the least effective classroom configuration due to the numerous technical problems associated with its use and limited instructional capabilities. CCTV was found to have fewer technical problems but also had limited instructional capabilities. VC also had fewer technical problems and advanced instructional capabilities, making it the most effective classroom configuration observed at Qassim University. At Alfaisal University, Partition classrooms appeared to be the most effective due to the enhanced educational experience provided by face-to-face instruction in the small sized classrooms. Double deck classrooms were found to be less effective. Students reported feeling isolated and disconnected in the classroom.

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Approved by:

Major Professor
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Acknowledgements

Praise, gratitude and all thanks are due to Almighty God for granting me the ability, courage and perseverance to complete this dissertation. This achievement would not have been possible without Allah's blessings.

In my journey towards this degree I have received guidance, support and encouragement from many people. First I would like to thank my major professor Dr. Jacqueline Spears for her valuable feedback, guidance, and contribution. She has been an inspiration and a pillar of support. She has given me the freedom to pursue this work while graciously ensuring that I do not lose focus or deviate from the topic. I am so grateful to have a knowledgeable, ethical, and caring mentor.

Many thanks are due to my committee members Dr. Kay Ann Taylor, Dr. Royce Ann Collins, and Dr. Be Stoney for their guidance, support, and helpful suggestions and for dedicating the time to serve on my committee. Thanks also to the participants in my study who kindly took time to share their opinions and experiences. Special thanks to the Professor of Economics and undergraduate student in Mathematics at Qassim University who contributed to the data collection and analysis and thanks to the Professor of Business Administration at Qassim University, who contributed to the instrument development and refinement. Many thanks to the President of Alfaisal University for allowing access to university facilities and to the undergraduate student coordinator at the College of Business at Alfaisal University for her help with recruiting participants.

Special thanks goes to my previous advisor Dr. Rosemary Talab, who opened doors for me, believed in me, and helped me believe in myself. I am grateful for her advice, support, and

will forever cherish her friendship. I would also like to thank Dr. Todd Goodson, head of department, for listening, caring and gracefully intervening at my times of need.

I would also like to thank my first teacher, my biggest supporter, and the best counselor I could ever wish for my mother Mona Alomar and the great educator who instilled in me discipline, dedication and the value of education, my father Dr. Ibrahim Alomar. Many thanks to my husband Adel Alhosan who kindly supported me in my academic endeavors and who gave me the final push I needed to complete this dissertation. Thanks also to my best friend, Asia Belhejja, for her tremendous support, encouragement and for being there for me in every step of this journey. Many thanks to my sisters, brothers, family members and friends, who have supported, encouraged and prayed for me to finish.

Thanks also to my sons; Abdullah, for patiently waiting for me to come home and for giving me something to look forward to with his adorable advice "to do the work of two days in one so we can be together sooner" and to "finish quickly because three months feels like six years"; and Khalid who through his pregnancy, birth, and death taught me that there is more to life than a doctoral dissertation.

Dedication

To the fiery, passionate, and ambitious female students in Saudi universities and to the inspiring educators who jump through hoops to give them the education they deserve.

Prologue

I was on a visit to my hometown Buraydah, Saudi Arabia, when I overheard three college girls talking about their struggles. One of them was giving the others tips on how to survive a class taught by a male professor. I was aware that since the university's male and female campuses were separated, male professors use distance-learning technology to teach female students due to the lack of female faculty. The students grumbled that the technology breaks up and does not work. Even when the technology does work, some professors ignore the female students and seem to teach only to the male students. Their survivor tips were to look for educational sources elsewhere, including the Internet, classmates, and female faculty members.

I was intrigued. So I asked a male professor who has taught female university students using distance technology. He also played a leading administrative role in the university. He responded that this was one of the most impeding issues that they are trying to resolve. He had taught female students once before and shudders at the thought of doing it again. It was evident that the current arrangements are accompanied with a great deal of frustration and hindrances to education. So I had to ask:

What was the cause of frustration? What are the current arrangements? How do female students feel about them? And how do male faculty feel about them? I sensed that the university was facing a dilemma by trying to provide quality education to women while adhering to the local values, standards, and expectations. But what are those expectations?

Chapter One - History and Background

Introduction

The quality of higher education for females is problematic in the Kingdom of Saudi Arabia. This is due to the country's social and cultural norms, which prohibit men and women from meeting on a regular basis (with some exceptions such as hospitals and places of worship). Saudi universities address these socio-cultural restrictions in numerous ways. Most universities, including Qassim University, a public university in the Qassim region of Saudi Arabia, use network classrooms that enable male instructors to teach female students remotely on separate female-only campuses. Alfaisal University, a new private university in Riyadh, has built unique facilities utilizing partitions and a double deck system to accommodate male and female students on the same campus in a socially acceptable manner.

Some of the commonly used methods to facilitate instruction in gender-separated classrooms include Closed Circuit television (CCTV) and Internet and Ethernet based videoconferencing technology. There is a gap in the literature regarding technological methods and their effectiveness in a gender-separate educational context. Saudi universities need research that identifies what female students and male faculty members need and desire, whether the existing network classrooms and conventional classroom designs support the educational experience, and which of those are most effective. Accordingly, the researcher studied the perceived effectiveness of using network classrooms and/or conventional classrooms to provide instruction to female students. This study will enhance the literature on the use of strategies enabling male professors to provide instruction to female students in

culturally acceptable ways. The information should aid the decision making process of the university management and board at not only Qassim, but all Saudi universities.

This section provides a brief explanation of Islam's influence on social life in majority Muslim countries, specifically with regard to gender separation.

Islam: A social context

Many Muslims around the world view Islam as a way of life. Esposito and Mogahed (2007) explain that many of its adherents regard Islam "as a primary marker of identity, a source of meaning and guidance, consolation and community, and essential to their progress" (p. 6). They maintain that "Islam is not to its adherents what it might appear to outside observers: simply a restrictive shell of rules and punishments. To many Muslims, it is a spiritual mental map that offers a sense of meaning, guidance, purpose, and hope" (Esposito & Mogahed, 2007, p.6).

Esposito and Mogahed's (2007) extensive research, based on Gallup polls that surveyed tens of thousands of people in predominantly Muslim countries around the world, reveals that Muslims emphasize the importance of family values and are deeply concerned about issues of social morality. The majority of residents in predominantly Muslim countries believe their lives have an important purpose (91% of Saudis, 90% of Egyptians) (Esposito & Mogahed, 2007). "Having an enriched religious/spiritual life" is considered essential (Esposito & Mogahed, 2007, p.6). When asked what they admired most about the Islamic world, the most frequent response given by participants from Muslim countries around the world "as diverse as Turkey, Saudi Arabia, and Indonesia" (p. 6) was "people's sincere adherence to Islam" (Esposito & Mogahed, 2007, p.6).

The significance of Islam as a religion is reinforced by its social traditions and customs, which play a central role in people's lives in majority Muslim countries. When asked, "Are there traditions and customs that are important to you or not?" participants responded "yes" with significant frequency (Jordan, 96%; Saudi Arabia, 95%; Turkey, 90%; and Egypt, 87%).

Gender-separation in Islam

There are many verses in the Quran that address the interaction of men and women in social contexts. One of the most commonly quoted verses is the following:

> Tell the believing men to lower their gaze and to be mindful of their chastity: this will be most conducive to their purity - (and,) verily, Allah is aware of all that they do. And tell the believing women to lower their gaze and to be mindful of their chastity, and not to display their charms beyond what may be apparent thereof; hence let them draw their veils over their bosoms. Quran 24:30-31 (Translated by Muhammad Asad)

Another commonly quoted verse is the following:

> O Prophet, tell your wives and your daughters and the women of the believers to bring down over themselves [part] of their outer garments. That is more suitable that they will be known and not be abused. And ever is Allah Forgiving and Merciful. Quran 33:59 (Translated by Muhammad Asad)

These two verses are commonly cited to establish the moral civil code between men and women, including the requirement of the *hijab*. Another verse that is often cited in support of the *hijab* is Quran 33:53: "and when you ask them (the prophet's wives) for something ask them from behind a partition" (Translated by Muhammad Asad). Professor of comparative literature Abdelwahab Meddeb explains "this has to do with establishing a code of civility, with the partition, or 'veil,' separating private from public space. The text here is explicit. It cannot be read otherwise" (Kuntz & Meddeb, 2013, Appendix A). French professor of

philosophy Christian Jambet responds, "The matter is less one of legality than 'civility,' as you so nicely put it. It deals with knowing how to enter the home of the prophet of Islam, Muhammad, knowing which moral and physical precautions are to be taken" (Kuntz & Meddeb, 2013, Appendix A).

In accordance with the assertion of Quran 2:256 that "There is no compulsion in religion" (Translated by Muhammad Asad), official law in Saudi Arabia and the Gulf States does not in fact require that women wear a hijab or veil. Nevertheless, popular opinion in Saudi Arabia and many of the Gulf States supports gender-separation in all interaction between unrelated men and women, exempting only matters of necessity. This has affected the role that women have played in Saudi society and has created a unique "female domain." Even though many Muslim women hold positions of power as bankers, teachers, doctors, businesswomen, and even policy makers, they do so in women-only environments. Bullock (2002) describes this role of women in Saudi society as follows:

> Women's education expanded in the 1960s and a growing female-only employment sector developed. There are women-only banks and colleges/universities, and women run private businesses such as real estate, restaurants, hairdressing and beauty salons, and boutiques. (p. 113)

There is no shortage of debate surrounding the role of women in Muslim majority countries and the degree to which it is empowering or disempowering. Many critics would argue that the veil and separation of the sexes is oppressive and restrictive and needs to be abolished (Mernissi, 1987), but others would ascribe to the notion that wearing the veil and/or being in a female-only professional domain is ultimately a choice. As explained by Bullock (2002):

> The relationship between an individual's culture and his or her ability to choose is complex, for choice is always circumscribed by the range between what a culture considers acceptable and unacceptable. (Bullock, 2002, p. 215)

Gender separation in the Gulf region

Although some countries in the gulf region have co-educational private institutions in which women complete their studies, about 75% of students registered in accredited higher education in the United Arab Emirates (UAE) are in gender-separated institutions (Naaj, Nachouki, & Ankit, 2012). Naaj, Nachouki, and Ankit, educators at Ajman University for Science and Technology in the United Arab Emirates (UAE), one of the country's gender-separated private universities, explain that gender-separation is "so that women who prefer such type of education have the choice to achieve their goals" (Naaj et al., 2012). They acknowledge that there are economic challenges – such as the cost of duplication – to sustain gender-separated education (Naaj et al., 2012), but they point out that gender separation must be understood within the social convictions of that society which they describe as "a modern society that adheres to the traditional values" (Naaj et al., 2012, p.186). Weber (2010), a British educator who worked in higher education in Qatar, reflected,

> Gender segregation in the Gulf is not a trivial issue–Gulf inhabitants generally concur that gender separation is sanctioned by the Holy Qur'an, related to the principle of hijab in its extended symbolic sense of modesty and privacy beyond its more common meaning of veiling and covering (p. 4)

He continued,

> The fact remains that many Gulf families and women are more comfortable in a gender-separated environment. Many Gulf women cite such benefits of the practice as the continuity of traditional cultural norms, freedom from harassment, special banking

and postal areas and queues, and the unique female bonds and friendship system that develops. (p. 5).

History of Education in Saudi Arabia

The Kingdom of Saudi Arabia is the largest country in what is historically known as the Arabian Peninsula. The location of the Arabian Peninsula, lying between three continents, made it a hub for both land and sea trade. This has exposed Arab tribes to peoples and civilizations of such regions as Greece, Byzantine, Persia, and India. The Peninsula's location, along with its having the two holiest cities in Islam, Mecca and Madinah, and its hosting of the *Hajj* (Islamic pilgrimage to Mecca) have largely contributed to the diversity of its population. During the Ottoman Empire (1299-1920), the Arabian Peninsula, among other regions, was under the control of the Ottoman Caliphs and people were allowed to travel freely from one region to another throughout that vast territory (Althowaini, 2015).

This led to a rich multicultural exchange and the formation of people of diverse races and ethnicities in what is now known as Saudi Arabia (Althowaini, 2015). Although people of diverse races and ethnicities live together under the same flag in Saudi Arabia, this diversity is not reflected in government statistics. The official government census does not contain any questions related to race or ethnicity in the country, and Althowaini (2015) affirms that there is a scarcity of demographic data related to race and ethnicity in Saudi Arabia.

According to the 2016 census, the total population is estimated to be 31,742,308. The population is categorized by age group, gender, and nationality (Saudi/Non-Saudi). The total of the Saudi population (Saudi citizens) is 20,081,582 (63.3%) while Non-Saudis (Saudi non-citizens) is 11,660,998 (36.7%) (General Authority for Statistics, 2016). Althowaini (2015) categorized Saudi citizens as either: (1) natives who are part of nomadic tribes mainly from the Saudi region or (2) people who settled in the region before the establishment of the Kingdom

of Saudi Arabia. This second group is composed of people who came to the region as tradesmen or pilgrims and later ended up settling in the area. The majority of them are from the Islamic parts of East Asia and Africa (Althowaini, 2015).

Althowaini (2015) categorized the population (both Saudi and Non-Saudi) into three categories. The first type is the sedentary population, which are mainly city dwellers who often work as tradesmen, civil servants, and industrialists. The second type is villagers who mainly work as farmers and cultivators. The third type is Bedouins, mainly sheep and camel shepherds who live nomadically in the desert and do not settle in a specific region (Althowaini, 2015). The number of Bedouins has decreased drastically due to government settlement programs in the cities (Althowaini, 2015).

Ottoman education. Under Ottoman rule, attention was given only to the western region of the Arabian Peninsula, known as *Hijaz*, where Mecca and Medinah are located. The rest of the land was largely neglected. According to Alsalman (1999), the Ottomans built two modern schools in Hijaz using the Turkish language as the primary language of instruction, despite the fact that the people in the region spoke Arabic and had an Arabian culture largely influenced by Islamic teachings and tribal (Bedouin) traditions and customs. The use of the Turkish language reduced the schools' impact in the region. Locals regarded the schools as a threat to Arabic identity and a means of enrollment for the Turkish army (Abu Ali, 1988), so they sent their children to Arabic-speaking schools run by philanthropists called *katateeb*. The *katateeb* largely tended to young children ages 4-10. Girls and boys normally attended different sections with teachers of the same gender (Althowaini, 2015). Many Saudi educators agree that, in contrast with the Turkish schools, *katateeb* thrived because they used Arabic (Alsalloom, 1995; Alsalman, 1999; Alshamkh, 1985).

According to Althowaini (2015), additional Arabic-speaking schools were established by immigrant pilgrims. For example, the "Sawlati" school was established by a woman from India in 1874. Other schools in the region include the "Fakhria" school, founded in 1881, "Dar Al Faizeen" in 1886, and "Al Falah" in 1912. Abu Rass (1993) reports that by 1889 there were approximately six primary schools and nearly 50 *katateeb* in Mecca, while Medinah hosted 17 primary schools. In 1898, Medina added a middle school and in 1907, a teacher training center.

For the rest of the region, however, education was restricted to teaching reading and writing to children in their early ages through classes in the *katateeb* teachers' homes or at mosques in *halaquat.* The term *halaquat* literally means circle, as students tended to sit around in a circle. The subjects in these classes were largely restricted to the advanced structures of Arabic and religious studies. Participation was largely limited to boys and young men. The teachers were mainly volunteers but did receive gifts from the parents whenever their children mastered a particular skill. Attendance in these classes was optional and the hours were flexible depending on the teacher's schedule (Althowaini, 2015).

Saudi Arabian education. After the establishment of the Kingdom of Saudi Arabia in 1932 and the annexation of Hijaz into its provinces, King Abdul Aziz, the country's founder, decided to regulate and expand the modern education system in Hijaz into the other regions by establishing the directorate of education. Althowaini (2015) reflects:

> This expansion marked the centralization of education throughout the region, as the directorate of education, which was transformed into a Ministry of Education in 1953, has been solely responsible for the schools established since then. The Ministry finds the buildings for schools, assigns the principals, hires the teachers, designs the curriculum, and publishes and distributes the textbooks. (p. 10)

He continues that while centralization has ensured uniformity and quality in education, it has had a negative impact on decision-making, disregarding the experiences of educators working in the field and the diversity of the people in Saudi Arabia (Althowaini, 2015).

The first schools the directorate of education established were met with dismay and resistance. Alamry (1997), who was one of the leaders in the directorate of education during its first years, reports that the first schools did not have high attendance and were unwelcomed by the local population. He also noted that the schools often failed because the instructors did not share the same backgrounds and values as the children's families. He describes the experience of the town of Buraydah, the hometown of Qassim University. The first principal appointed to the Buraydah school was an educated man from Mecca named Moussa Al Attar, described as:

> A very competent principle [sic] with administrative skills. However, this skill could not be fully used due to the unwelcoming/uncooperative natives. For this reason this school did not progress during the two years of his appointment. At the same time, the first teacher under his supervision was also from Mecca and was estranged because of his inability to adapt and understand the regional culture. This uncooperative attitude consisted in different forms of boycott, from the refusal to send the children to these schools, to the unwillingness to sell goods for the clerks and the educational team. (Alamry, 1997, p. 170-171)

Meanwhile in Riyadh, the capital of Saudi Arabia, the opening of the first school was delayed for 11 years due to hostility and national resistance. In Al Qatif (a majority Shiaa population), the Al Qatif School was also met with rejection and remained closed for 10 years. Likewise, the opening of the Shaqra School was delayed for three years. To overcome the native hostility towards these schools, Alamry (1997) recalls that the government made many

attempts, one of which was to offer the *katateeb* teachers an opportunity to teach in the new modern schools. Alamry, who was amongst the proponents of this attempt, reports "this strategy allowed [those in the directorate] to gradually decrease the impact of the *katateeb* while recruiting an increasing number of students annually. Thus, the role of the *katateeb* began to dwindle year after year" (Alamry, 1997, p.204). Consequently, Saudi government schools for boys under the directorate of education rapidly spread throughout the country.

Saudi Arabian female education. In 1953, King Saud began the efforts to establish the first female school, but it was actually King Faisal's diplomatic efforts that managed to convince tribal leaders of the importance of formal schooling for women. In 1956, Iffat Al Thunayan, King Faisal's wife, who pushed enthusiastically for formal education for girls, launched the first female academy *Dar Al Hannan* (House of Affection) in Jeddah (Althowaini, 2015). However, girls' formal education was met with even greater resistance than boys' formal education. In September of 1963, the government had to send special forces to break up demonstrations in Buraydah, where much of the opposition took place (Lacey, 1981 as cited in Hamdan, 2005).

In the years between 1953 and the late 1970s, the directorate of education (responsible for boys' education) was changed to the ministry of education and was moved from Mecca to Riyadh. The directorate of girls' education was established in 1960 under the scrutiny of religious clergy. In 2002 it was merged into the ministry of education (Ministry development, 2016). The social resistance eventually succumbed. As the threat of conflict faded and the population sensed stability, people's trust in the educational system began to grow (Althowaini, 2015). Alkhweter (2002), who served as a Minister of Education from 1975 until 1996, described the social attitude towards Saudi schools during that time as follows:

> The demand for education in the Kingdom of Saudi Arabia became huge during this period which did not require the government to pass laws to make it compulsory to send one's children to schools, as it is the case in other countries. The ministry of education was trying its utmost to provide for the needs of the local population to build schools in their neighborhoods and villages to reach a point when the government opened a school every two days. (Alkhweter, 2002, p.43)

During this period, the ministry's goal was to make quality education obtainable and accessible to the entire population (Althowaini, 2015). In this new form, the ministry supervised all forms of education from pre-primary to university, as well as adult and special education. It set a unified curriculum, provided textbooks, and established teacher-training institutions. Both girls' and boys' education from pre-school to college level thrived during this period. Education was free for all and was promoted as a tool to bridge the gap between social classes and eliminate faulty ancestral beliefs (Althowaini, 2015).

Pathways for Female Higher Education

Contrary to Althowaini (2015), Dr. Ahmed Alesa, a Pennsylvania State University alumnus who was appointed the minister of education by King Salman in December 2015, is far more critical of Saudi education during this period. In his book about the philosophy and identity of Saudi higher education, he described the weight of what he called the difficult beginnings of female higher education:

> Despite the great efforts that were exerted by government leaders from King Abdulaziz to King Abdullah to support women's education, and despite overcoming obstacles to open schools, universities and institutions explicitly for girls and correcting the view of those apprehensive of girls' education, under the pretext of gender mixing, and the

deterioration of moral values. Yet these beginnings, even if we try to bypass them in this book, rear their head from time to time." (Alesa, 2011, p.49)

Alesa (2011) characterized these beginnings in terms of the following tracks or pathways that were offered by the Saudi education system at the time.

First track: Teacher preparation

The first track for female higher education was under the jurisdiction of the directorate of girls' education, which founded teacher-training institutes due to the urgent need to provide female teachers for girls' elementary, middle, and high schools. These institutes later developed into teacher training colleges, which later developed into Colleges of Education, Humanities, and Social Sciences and were spread all over the regions in the country, eventually exceeding eighty colleges for girls (Alesa, 2011). Alesa (2011) rationalized the widespread increase of these colleges as a product of the social pressure to open colleges in all areas due to the difficulty of transportation for Saudi women. Prior to June 2018, women were not allowed to drive in Saudi Arabia and public transportation had been limited to main cities. Many Saudis frown upon women traveling alone or living away from the family unless accompanied by other women or a male relative, neither of which is always feasible. This created the social pressure to open colleges for girls all over the country.

Despite their limited resources, these colleges provided programs in postgraduate studies including masters and doctoral degrees in a number of scholarly disciplines including but not limited to Islamic studies, linguistic studies, foreign languages, and social sciences (Alesa, 2011). Alesa (2011) remarked that these colleges became "an integrated system associated with the directorate of girls' education, not only through administrative association but also through educational thought and philosophy that the directorate of girls' education adopted at that time" (Alesa, 2011, p.49). According to Alesa (2011), examples of this

philosophy are highlighted in the directorate's rigid standards for girls' education, surrounding the schools' buildings with high walls, no classes or activities outside the schools' walls, and no participation from community organizations or job sectors. Great importance was placed on the content of instruction and even more importance on the graduation certificate, "which permitted female graduates to line up in a long line of applicants for teaching positions; with the hope of getting a teaching job even if it were hundreds of kilometers away from the home, family, husband, and kids." (Alesa, 2011, p. 50).

After the directorate of education was abolished in 2002, according to the Ministry of Education's website (Ministry development, 2016), the administration of girls' schools was merged with boys' schools and put under the jurisdiction of the Ministry of Education (Alesa, 2011). Women's colleges around the country were put under the jurisdiction of the Ministry of Higher Education. After two years of discussion, the first university for women was established in Riyadh. It conjoined all of the women's colleges in the Riyadh region and was named the Riyadh University for Girls (Alesa, 2011). Four years later the name was changed to Princess Norah bint Abdurahman University (named after King Abdulaziz's sister who legendarily supported her brother's mission to establish Saudi Arabia). The University was endowed with the "largest university campus for women in the world" (Alesa, 2011, p. 50). Other women's colleges around the country were annexed into the nearest university. This led to a significant increase in female enrollment in higher education. However, it also led to rising criticism regarding the need for so many female education graduates (Alesa, 2011).

The annexation of women's colleges created new challenges for universities around the country. When the colleges were under the directorate of girls' education, they were subjected to different rules and policies and had different academic standards for quality and

accreditation. The great challenge for Saudi universities was to recondition these colleges into a completely different and new learning environment.

Second track: Disciplines other than teaching

The second track traditionally available for Saudi women was through Saudi public universities and is concurrent with the beginning of higher education for women in Saudi Arabia. According to Alesa (2011), the universities were "compelled" (p. 51) to open departments for women due to the rising need to prepare women in disciplines such as health and the social sciences. King Saud University began accepting students under a system called Entesab in 1961 (Alesa, 2011). Only four female students were enrolled in the first year; however, that number rose to 20 the following year.

The Entesab system permitted women to complete programs at the university without requiring attendance at regular classes. The female students were required to show up at the end of the semester for final exams taken under the supervision of a female employee (Alaulamie, 2014). According to Alaulamie (2014), a version of Entesab was applied recently in many universities. The newer version integrates technology and online learning to facilitate learning and enhance education. This system, however, has recently been abolished and all Entesab students have been transferred to the Saudi Electronic University to take their lessons via distance education (Alaulamie, 2014).

Alesa (2011) suggested that the approval of the Entesab program at the time was due to the absence of separate facilities for female students at these universities as well as the lack of female faculty. It was not until 1970 that King Abdulaziz University enrolled 21 female students in regular class sessions in the College of Humanities (Alesa, 2011). Many universities followed the example of King Abdulaziz University and successively established departments specifically for women. In 1975 King Saud University established the Center for

Girls' University Education, a model adopted by other Saudi universities. By the 2008/2009 academic year, the number of female students in Saudi universities had grown to 410,595 females compared to 256,067 males (Alesa, 2011).

Although this track increased the number of female students in higher education to a level that exceeds males, Alesa (2011) questioned the quality of the services provided:

> Although higher education for girls through this track was a little better in terms of diversity of disciplines, institutional flexibility, and quality of teaching, yet university departments for girls always remained at a second class; in term of the scientific level. Saudi universities – due to religious sensitiveness – relied on teaching via distance; by using closed circuit television to teach when there are no female faculty available, with the exception of medical schools which were able to escape this cycle. As to the level of services provided, when public universities constructed new university campuses for males, they turned their old university buildings into departments for girls, which lacked the most basic elements of an appropriate learning environment for research and teaching, and due to the expansion in accepting female students year after year, the solutions – also – were random by renting buildings and turning them into lecture halls, laboratories and administrative offices. (Alesa, 2011, p. 51-52)

Third track: Private colleges and universities

The third track that was available for females in higher education began in 1999 through private colleges and private universities in some of the major cities. The founders of these colleges and universities realized that women in Saudi Arabia were most in need of higher education, due to many social and economical factors (Alesa, 2011). As a result, many colleges and universities were established exclusively for females, such as Iffat University and the House of Wisdom College, both of which are located in Jeddah (Alesa, 2011). Other

private colleges and universities were also keen to open sections for girls, due to the growing demand for disciplines in which women could participate that were not available in public universities.

According to Alesa (2011), private colleges and universities tried to give "special consideration" (p. 53) to girls' departments by diversifying disciplines and providing new possibilities and opportunities. For example, they eliminated some of the restrictive policies in academic programs and girls were encouraged to participate in social activities. There was also more support for women's participation in decision-making in these institutions (Alesa, 2011). Alesa (2011) stressed that private colleges and universities "realized the importance of this phase, and sensed the importance of having an interest from most segments of society towards teaching their daughters in new disciplines that were not provided in public universities" (Alesa, 2011, p. 53).

All in all, the identity of female higher education is in a far worse situation than that of male higher education as Alesa (2011) explained:

> Under the shadow of the culture of seclusion which prevailed for a long time, educational thought for males was developing continuously; as a result of scholarships [sending students abroad to study] and collaborating with international experiences. However, educational thought for females was reproducing itself and going around in circles; as most female faculty members in public universities, especially in the colleges of education and humanities, which used to be under the directorate of girls' education, have graduated from the same institution that they work in, therefore they did not go through the experiences of a scholarship abroad, and were not acquainted with the educational environment beyond [Saudi] borders; this has resulted in the continuation of traditional practices in teaching and scholarly research, and the absence of open

scholarly discussions, and the prevalence of cultural activities that are limited to memorization and indoctrination. (Alesa, 2011, p. 53)

Current Practices

According to the most recent United Nations International Children's Emergency Fund (UNICEF) statistics from 2008-2012, the literacy rate for females in Saudi Arabia aged 15-24 years is 97% (UNICEF, 2013). The enrollment ratios for female students in primary schools are 96.5% compared to 96.6% for male students (UNICEF, 2013). Education is free to all members of the Saudi population from pre-school to PhD, though it is not compulsory at any level. From the years 1990-99, the number of women graduating from university grew at an average rate that was 2.5 times larger than that of male graduates (Cordesman, 2003). However, some argue that the education that women are receiving maintains societal expectations and imposes limitations on women (Baki, 2004). Cordesman (2003) speculates that the social and professional restrictions on women enable them to stay in school longer than men and to exceed men in receiving higher degrees.

Intermixing between genders in education

The Ministry of Education prohibits the intermixing of genders in education. According to Article 155 of the Educational Policy of Saudi Arabia, intermixing between genders is impermissible at all levels of education, except in pre-school (Ministry of Education, 1969). However, there are exceptions. For example, medical education is exempted from this law as intermixing between genders in healthcare is the norm. According to Mirza (2008):

> When it comes to healthcare college education, male and female students complete the majority of their studies in segregated programs. However, face-to-face instruction between male instructors and female students is much more acceptable. Additionally, during their internship programs, students are finally exposed to training which

involves a great level of interaction with other interns and physicians of the opposite gender on a daily basis. (Mirza, 2008, p.4)

King Abdullah University for Science and Technology (KAUST), founded in 2009 and protected by a royal decree, is also exempted from this law. The king's vision was that KAUST would become Saudi Arabia's gateway to the world. Saudi students make up only 15% of the student body, while the remaining 85% are international students. The majority of faculty and staff members are also international. The subjects taught are secular and entirely in English. The purpose of KAUST, according to the vice president of Aramco, the Saudi oil company in charge of the establishment of KAUST, is as follows:

> KAUST was established to be an international, global university, not just for Saudi students.... its purpose wasn't to get graduate students, it was to get scientists and minds, researchers that can transfer and translate those great innovations and inventions and research base to feed the economy. It was to drive and be driven by the economy's needs. (Nolan, 2011, p. 179)

KAUST has become a model for higher education institutions in Saudi Arabia. Inspired by KAUST, other Saudi colleges and universities are opening their doors to more international students, forming partnerships with universities abroad, and establishing international advisory boards with domestic and international members.

Current practices in female education

In K-12 education, the number of female instructors available to teach female students is sufficient due to the widespread availability of female teacher preparation colleges. There are no male faculty or staff members except for male bus drivers and security guards, who are not permitted inside the female campus. The educational gender-separation policy requires all staff, administrative, and supervisory positions in female schools to be filled by female

educators. Due to the scarcity of female technicians and maintenance workers, the males who fill these positions work out of school hours when needed.

At the post-secondary level there is a shortage of available female faculty members. To accommodate female students, some higher education institutions have incorporated network classrooms to deliver education to female students by male instructors (Mirza, 2008). Examples of the network classrooms used to teach students in gender-separated environments include closed-circuit television (CCTV), Ethernet based videoconferencing (VCR) and Internet based videoconferencing. Most of these technologies are widely used for distance education around the world. In Saudi Arabia and many Arab Gulf States, these distance technologies are being used to enable male professors to educate female students while adhering to social gender-separation standards.

Statement of the Problem

Relatively little is known about the classroom configurations and communication technologies used in Saudi universities to teach female students due to gender separation and the lack of female faculty. Moreover, little is known about their effectiveness in transmitting instruction from male professors to female students. The increasing emphasis on preparing students for an information-based economy that relies on creativity and teamwork along with international engagement makes it increasingly important that Saudi Arabian universities monitor the effectiveness of current educational practices in gender-separated classrooms.

Purpose of the Study

The purpose of this study was to explore the classroom configurations and technologies used to mediate instruction to female students in gender-separated classrooms at Qassim University and Alfaisal University in Saudi Arabia. The study describes the methods used, evaluates and compares the effectiveness of the approaches, and identifies the issues and

challenges that female students and their male instructors face in gender-separated classrooms. Qassim University's interest in improving their female educational facilities and both Qassim and Alfaisal Universities' willingness to participate in this study provides fertile grounds for conducting this research.

Research Questions

The research questions are:

1) What classroom configurations and/or technologies are used by male professors to teach female students in gender-separated classrooms?
2) To what extent are the classroom configurations and/or technologies currently used in gender-separated classrooms seen to be effective from the perspective of the users?
    a) Effective in facilitating instruction.
    b) Effective in supporting the educational experience.
3) What issues and challenges do female students and male professors report in gender-separated classrooms?

The research questions were answered by using a combination of qualitative and quantitative methods.

Description of the Study

This study was conducted in two phases using a sequential exploratory mixed methods approach. Mixed methodology merges qualitative and quantitative data to corroborate meaning and provide a deeper understanding of the subject at hand (Creswell, 2013). In this study, the results of the qualitative phase were used to inform the quantitative phase of the study. The qualitative phase focused on collecting information about the experiences of the female students and male professors in gender-separated classrooms. It included observations of five gender-separated classrooms that are equipped with different technologies and facilities

in Qassim and Alfaisal universities, focus groups made up of female students, and interviews with the male faculty members who teach those classes. Informal interviews with teaching assistants who supervise those classrooms, administrative assistants and university leaders were also conducted. Pictures were collected to provide a fuller understanding of the use of facilities and technologies in each setting. The data was coded and themes were identified across the cases. The qualitative data collection and analysis was bound by the theoretical framework used in this study: the Community of Inquiry (Garrison, Anderson, & Archer, 1999) and the Technology Acceptance Model (Davis, 1989).

Based on the themes and findings from the qualitative study, a survey instrument was developed and distributed to a sample of female students and male faculty members who teach female classrooms at Qassim University. The administration of Alfaisal University refused to cooperate in distributing the surveys to female students and male faculty members. The quantitative phase of the study evaluated and compared the effectiveness (as defined by the Community of Inquiry and Technology Acceptance Model) of the technologies and classroom configurations based on the perspectives of female students and male faculty members. The qualitative data provided an in-depth description of the issues in gender-separated classrooms and the quantitative data provided more generalizable results.

Significance of the Study

Female higher education in Saudi Arabia is rapidly changing due to the educational reforms that the country has undertaken in the last decade (Alesa, 2011). With regard to gender-separated network classrooms taught remotely through the use of communication technology by male educators, little is known about the effectiveness of the technologies or their effect on the quality of education. Furthermore, there is little information on the experiences of the female students and their male professors. Given the advancement of

technology and rapid change in Saudi higher education, understanding the perceived effectiveness and educational preferences of the use of network or conventional classroom designs in providing education to females is important to future educational policy decisions affecting the education of women in Saudi Arabian universities.

The study contributes to the literature in three disciplines: Saudi Arabian higher education, education technology, and gender education. This study has implications for Saudi university policy makers and Saudi educators. It provides policy makers with information that is deficient in the existing literature about challenges that female students and their male instructors face in Saudi classrooms. It provides necessary information about the feasibility of the network and conventional classroom designs used in Saudi universities and their effectiveness in mediating instruction.

Definition of Terms

Classroom configurations: refers to the structural and technological arrangements undertaken to teach female students in gender-separated classrooms. This study focuses on the use of network classrooms and conventional classroom designs. Network classrooms are used to teach female students on female-only campuses physically separated from male campuses. Conventional classroom designs are used to separate genders in the same classroom.

Closed circuit television (CCTV): is the use of video cameras to transmit a signal to a specific place. The signals are not distributed publicly but are transmitted to a limited number of monitors. In Saudi universities, this method transmits a lecture delivered by a male faculty member to female students. The instructor delivers the lecture from a CCTV-equipped studio at the female student campus (Mirza, 2007). There is a microphone and a camera in the studio that the lecturer uses to transmit the lecture and communicate with his students. In the classroom, there is a microphone so the students can respond to the lecturer.

This technology is often used for security and surveillance but is also used in distance education.

Cognitive presence: "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse" (Swan, Garrison, & Richardson, 2009, p. 8).

Community of inquiry: a theoretical framework that explains the learning experience in terms of interactions between three overlapping presences: Teaching, Social and Cognitive (Garrison et al., 1999).

Computer self-efficacy: refers to one's perception of one's ability to use and master a computer, which may influence one's perception of a technology's productivity and effectiveness (Kang & Shin, 2015).

Conventional Classrooms: refers to the structural arrangements in gender-separated classrooms that accommodate male and female students in the same classroom. This includes the use of partitions and double deck systems amongst other arrangements.

Double deck: refers to the gender-separated classroom configuration used to accommodate female and male students together in the same classroom. Female students are seated in the top deck surrounded by privacy glass and overlooking the male students and professor in the lower deck.

Effectiveness: is defined in terms of users' acceptance and satisfaction with technology. This definition includes the effectiveness of the use of technology to facilitate instruction and the effectiveness of supporting the educational experience.

Effectiveness of facilitating instruction: refers to the perceived effectiveness of technology in facilitating instruction between male professors and female students. In this study,

effectiveness of facilitating instruction is evaluated according to the Technology Acceptance Model, which measures users' satisfaction and perception of technology.

Effectiveness of supporting the educational experience: supporting the educational experience refers to the accumulation of deep and meaningful learning and is defined in terms of the social, cognitive, and teaching presences in a learning environment. The educational experience is evaluated in terms of the Community of Inquiry framework, which is concerned with the interactions between the social, cognitive and teaching aspects of learning.

Ethernet based videoconferencing (VCR): refers to the act of running an interactive video session over an IP (Internet Protocol) network, which relies on an Ethernet Local Area Network (LAN) for network connectivity. This method is often used in distance learning and for business meetings. It involves connecting two or more rooms via IP routers for a videoconferencing session.

Gender-separated classrooms: are what the name suggests, classrooms that do not allow male and female students to mix with one another. In institutions with gender-separated classrooms, male and female students often have separate campuses. Male students are taught by male faculty members and female students are taught by female faculty members. Students and faculty members communicate with each other via technology such as telephone, email, etc., or through an employed messenger (often male) who passes documents between the campuses.

Internet based videoconferencing (VC): refers to the act of running an interactive video session over an IP (Internet Protocol) network, which relies on the Internet for network connectivity. Internet based videoconferencing enables real-time sharing of computer screens, individual applications or content among two or more computers or mobile devices. Examples

of Internet based videoconferencing platforms include: Zoom, Skype, Blackboard, Collaborate etc.

Network Classrooms: refers to the technologies used in gender-separated classrooms. In Saudia Arabia, network classrooms are used to replace face-to-face contact between female students and the male professor as well as between male and female students. Examples of technologies applied in network classrooms include: closed-circuit television, Ethernet based videoconferencing (VCR), and Internet based videoconferencing (VC).

Partition: is a physical divider often made of concrete or wood used to provide privacy or separation between genders in mixed settings. Mirza (2008) describes it as a barrier that does not reach the ceiling, thereby allowing voices to go back and forth (Mirza, 2008).

Social presence: refers to the ability of students to identify with the community such as a course of study; communicate purposefully in a trusting environment, and develop inter-personal relationships by projecting their individual personalities (Garrison, 2009).

Subjective norm: refers to the "perceived social pressure to perform or not perform a behavior" (Kang & Shin, 2015).

Teaching presence: refers to the means by which to provide the design, facilitation, and direction for the educational experience (Garrison & Vaughan, 2008)

Technology acceptance model (TAM): is a widely used model that aims to predict people's acceptance of technology and their intention to use it. The early version of TAM suggested that behavioral intention in technology use is influenced by two main factors: perceived usefulness and perceived ease of use (Davis, 1989). Recent studies have introduced computer self-efficacy and subjective norm to determine the acceptance of technology use in online learning (Kang & Shin, 2015).

Summary

This study evaluated the effectiveness of current classroom configurations used in gender-separated classrooms at Qassim and Alfaisal universities in Saudi Arabia. Five commonly used arrangements in Saudi campuses were studied. The perceived effectiveness of the conventional classrooms and network classrooms was evaluated based on female students' and male faculty members' perceptions of their effectiveness in facilitating instruction and support for the educational experience.

Chapter Two - Review of Literature

Introduction

This chapter reviews the literature on technology-mediated instruction both in the context of gender-separated classrooms in Saudi Arabia and the Arab Gulf States and in the context of classrooms in western universities. Due to the scarcity of research that describes the conventional classrooms and network classrooms used to mediate instruction to female students in gender-separated environments, the search presented in this literature review has been broadened to include the use of technology to mediate instruction in coeducational settings at western universities. The search was then narrowed to focus on technologies commonly used to mediate instruction in Saudi Arabian higher education (i.e. CCTV, Internet based videoconferencing (VC), and Ethernet based videoconferencing (VCR)); excluding technologies that have not yet been applied in this regard, such as computer simulations and virtual reality worlds.

Research on Conventional Classrooms

Gender-separated institutions in Saudi Arabia utilize a variety of classroom configurations to enable male professors to deliver lectures to female students. Examples include classrooms with partitions and double deck classrooms.

Partition

The use of a partition or divider takes on a variety of forms in gender-separated teaching contexts. Mirza (2007) experienced using this method while teaching a Master's level course in Information Systems at a Saudi public university. He explained that this method used a special lecture room that was divided by one-way see-through glass allowing the female students to see the professor but preventing him from seeing the female students. In Mirza's

experience, the glass divider did not reach all the way to the ceiling, allowing voices to go back and forth (Mirza, 2007). In some cases, however, the lecture hall is equipped with microphones, speakers, and large smart-boards.

Another arrangement involving partitions was described by a prominent education technology scholar in his report on different e-learning strategies used by four Saudi universities he visited. He described his preferred method as follows:

> I was seated at a table at the front, and the room was divided at right angles from the centre [sic] of my table by a screen, with the women on one side and the men on the other. I could see both groups and interact with them equally, and they could both see the screen behind me. (Bates, 2009).

Bates (2009) reported that the women were completely covered in black Abayas (head and body cover); some women showed all their face, while others had only their eyes uncovered. This method of separating genders in Saudi Arabia is a more traditional method, which varies widely in its application. Some institutions use screens or wooden dividers while others use privacy glass. The privacy glass is often dark or textured. In any case, Saudi women ordinarily wear their Abayas with this method to ensure full privacy.

Double deck

Double deck classrooms and lecture halls are designed to accommodate male and female students in the same classroom in a two-floor (double deck) gender separated setting. The male students and professor are accommodated on the lower floor, while the female students are accommodated on the top floor. There is usually a platform on the lower floor from which faculty members deliver their lectures. There is usually a low lying railing on the top deck made of wood or privacy glass which allows some visibility and voices to go back and forth. Generally there are stairs that connect the lower deck with the top deck in large

lecture halls to allow the exchange of documents, exam papers etc. Like partitions, women usually wear Abayas with this method to ensure full privacy. The researcher found no published research about the use of partitions or double deck to mediate instruction to female students in higher education. Google scholar and the K-state library databases retrieved no results.

Research on Network Classrooms

In addition to partitions and double-decks gender-separated institutions in Saudi Arabia utilize a variety of synchronous tools to enable male professors to deliver lectures to female students. Examples include closed-circuit television, Ethernet based videoconferencing, and Internet based videoconferencing.

CCTV

Closed circuit television (CCTV) transmits a male faculty member's lecture to female students. The faculty member delivers the lecture from a CCTV-equipped classroom on the male campus. A classroom on the male campus has a microphone and a camera in the studio that allows the female students to see and hear the lecture (Del Castillo, 2003). The CCTV-equipped classroom on the female campus includes a microphone but no camera. The male faculty member can hear but not see the female students.

CCTV is one of the most commonly used methods of instruction delivery to female students in Saudi Arabian universities. Abdel-Raheem (2014), a former instructor at a women's college in Saudi Arabia, reports that CCTV creates disciplinary problems, especially with attendance. Sometimes instructors rely on female teaching assistants to take attendance and to manage the classroom; otherwise, the instructor is expected to manage the classroom via distance. Another challenge that CCTV sometimes presents relates to technological difficulties. Abdel-Raheem (2014) reported that the equipment often breaks down. The

television monitor sometimes malfunctions during the lectures. Sometimes the instructor can hear the students but they cannot hear him, and sometimes the students can hear the instructor but he cannot hear them. Abdel-Raheem (2014) also reported that exchanging materials and assignments between the instructor and the students was a burdensome process. These exchanges are done through email or female students ask a male relative to deliver assignments to the male faculty member.

A study conducted at the Texas A&M University examined the relative effectiveness of CCTV as a communication medium for classroom instruction in accounting (Flaherty, 1974). CCTV was being used at the university to deliver lectures to a large number of students more efficiently by dividing them into smaller sections (fewer than 50 students) whilst economizing on faculty lecture time (Flaherty, 1974). CCTV was used in two ways. In the first, CCTV provided a synchronous broadcast of an instructor's live lecture in one small section (50 students or fewer) to remote classrooms with 50 or fewer students in attendance. In the second, no one section received the "live" lecture – each section received a CCTV-provided prerecorded lecture (Flaherty, 1974).

The researcher compared these two methods of CCTV lecture delivery. He also compared the two methods as used with large traditional lecture sections (51 students or more) versus small traditional lecture sections (50 students or fewer). The research was conducted over six regular semesters. Comparisons were made based on student achievement as measured by a common final examination and student grades in the two courses in accounting. Analysis of variance was used to determine if there were statistically significant differences between student achievement in the CCTV sections compared to student achievement in the traditional sessions. The researcher also developed a questionnaire to determine students'

attitudes and perceptions towards the use of CCTV in the classroom. The questionnaire was handed out to students at the end of each semester throughout the duration of the study.

The researcher concluded that student achievement in a CCTV system was better than the achievement of students in a small traditional lecture section (with 50 students or fewer). The study also revealed that the achievement of students receiving instruction via CCTV or videotapes was as good as or better than the achievement of students receiving instruction in a large lecture section (with 51 students or more). However, students' responses to the questionnaire revealed that the majority of students preferred a large lecture section to a small section (Flaherty, 1974). The majority of students responded negatively to the use of CCTV and videotapes in the accounting course.

CCTV is now considered an outdated method in instruction technology and has been replaced by videoconferencing and other more current technologies. Yet, it is still widely used in Saudi Arabia to deliver instruction to female students.

Videoconferencing

Another e-learning technology commonly used with female students in Saudi universities is videoconferencing. This technology has been adopted by many institutions around the world to deliver lectures across campuses or institutions. This method was implemented in Australia to connect campuses and to convey instruction to geographically distant sites. As Australian educators Andrews and Klease (1998) explain:

> Video conferencing is a unique method of providing real time face-to-face interaction that enables immediate peer and teacher interaction and feedback. This interaction can minimise [sic] feelings of isolation and provide for a richer learning experience for students and staff at geographically separated sites. (Andrews & Klease, 1998, p. 90)

From a technical perspective, videoconferencing occurs via the *Internet* or *Intranet*. With *Internet* supported videoconferencing, data can be delayed due to Internet congestion and latency (the time it takes to transfer data via a network). In an *Ethernet* environment, data travels between LANs (Local Area Networks) with larger bandwidth and minimum latency (Wang, 2004). Internet based videoconferencing is an economical option with minimum initial investment and no ongoing maintenance (Wang, 2004). This option is also user friendly and less place and time dependent given that some software (e.g., Zoom, Skype) can be freely downloaded from the Internet. By contrast, Ethernet based videoconferencing often involves more complicated set-ups and technology and the initial investments and cost can be massive (Wang, 2004).

Internet based videoconferencing (VC)

At Ajman University for Science and Technology in the UAE, Naaj et al. (2012) measured the perceived student satisfaction with blended learning in a gender-separated environment and explored whether satisfaction differed along gender lines. The researchers defined blended learning in the context of their study as "a combination of face-to-face and video-conference learning, complemented with the use of Moodle as a learning management system" (Naaj et al., 2012, p.187). In general, a blended learning environment integrates e-learning with face-to-face instruction. Some of the instruction is provided via a learning management system such as Moodle or Blackboard or an Internet based videoconferencing service such as Zoom. The rest of the instruction is face-to-face. In this case, the instruction delivered via technology was provided to both male and female students at the same time in gender-separated campuses, while the face-to-face instruction was provided separately with teachers of the same gender.

The researchers created a survey and distributed it to a sample of 153 male and female undergraduate students enrolled in blended learning courses in the College of Information Technology at Ajman University. Of the 153 participants, a total of 108 completed the survey, giving a response rate of 70%. The researchers found a statistically significant gender difference on overall student satisfaction with blended learning. Male students were more satisfied with blended learning than female students. Females had higher approval rates than males in the face-to-face sessions.

Student satisfaction was measured using five categories: interaction, technology, instructor, class management, and instruction (Naaj et al., 2012). The study showed that both male and female students were satisfied with the level of interaction amongst themselves (Naaj et al., 2012). However, 49% of the female students responded that they did not interact with their instructor when he was on the other side of the video/conference classroom. Nearly 30% of the female students reported that they could not concentrate enough to participate when the instructor was in another classroom. Approximately 20% said that they did not feel comfortable knowing that there were male students listening to what they were saying (Naaj et al., 2012).

The study also showed that students were satisfied with the technology, instructor, and course management. Student satisfaction was lowest with regards to discipline in the video-conferencing classroom. Both male and female students preferred face-to-face instruction to blended learning, although their performance and grades in blended learning versus face-to-face instruction were similar.

Ethernet based videoconferencing (VCR)

Although many universities around the world use Ethernet based VCR for the delivery of mass lectures between sites, there is a concern that the quality of education experienced in

an Ethernet based VCR classroom is not as good as in a face-to-face classroom (Knipe & Lee, 2002). To investigate this concern, researchers at a United Kingdom (UK) university conducted a study on a course in the master's degree that was delivered to both local (via face-to-face) and remote site students (via Ethernet based VCR) (Knipe & Lee, 2002). Of the 66 students taking the course, 45 received the instruction face-to-face and 21 via Ethernet based VCR. The researchers asked students to keep a research diary, recording classroom activities and classroom and cognitive outcomes over a ten-week period. The outcomes included classroom outcome categories such as note taking, group discussion, and exercises. The cognitive outcome categories include outcomes such as understanding the content, critical evaluation, problem solving, and decision-making. Students were asked to indicate YES or NO as to whether a classroom outcome or cognitive outcome had taken place during the class. Moreover, at the end of each week students were asked to rate from a scale of 0 (not at all) to 2 (to a large extent) the extent to which instructional variables or self-monitoring, such as sources of information, feedback, planning and self-monitoring, independent learning, confidence, working as a team, and communication, took place during the week.

Knipe and Lee (2002) found a high level of disagreement between the perceptions of the local students and the remote students with regard to the instructional variables and self-monitoring that occurred. Local students reported a higher occurrence in activities such as receiving information and explanations from the lecturer, reading and reviewing material, working in groups and making presentations. Remote students reported a higher occurrence in receiving instructions and working with technology and equipment during an Ethernet based VCR session (Knipe & Lee, 2002).

With regard to cognitive outcomes, local students also reported a higher occurrence in cognitive outcomes than remote students in most categories. Remote students reported a higher

occurrence of learning for only three out of fifteen categories: memorizing information, learning new terminology, and practicing new skills. However, the differences in the frequency of occurrence of these categories were very small (<5%). By contrast, differences of 10% or more occurred in ten out of fifteen cognitive outcome categories. Local students reported the category "learning to be critical" took place in 63% of the classes while remote students reported it as taking place in only 29% of the classes.

The researchers also found that Ethernet based VCR classes had the potential to be disruptive. Because students could sit out of the view of the camera, the lecturer could not always tell what they were doing. "Students could have walked out of the room, used a PC, or chatted with other students and the lecturer would not have known" (Knipe & Lee, 2002, p. 310). Knipe and Lee (2002) explained, "This ultimately has an effect on the rest of the students and could contribute to this lower frequency of learning outcomes in the class" (p. 310).

Mirza (2007) explored the use of Ethernet based VCR in the delivery of instruction at King Saud University. The study was based on a Master's of Health Informatics course that consisted of 25 students, 16 female and 9 male. The male and female students were separated into two adjacent classrooms. Each student had an individual client machine connected through a local area network to the instructor's PC. A shared access feature on the instructor's PC granted students access to download any PowerPoint slides, assignments, or any other course materials needed. Each classroom included a smart board and a multimedia projector that displayed content of the instructor's workstation (Mirza, 2007).

The instructor could manipulate the system through the smart board. Digital markers were provided that allowed writing and drawing on the smart board with a duplicate copy simultaneously generated in the adjacent classrooms. Females could also use the instructor's

PC in their classroom for giving their presentations, which in turn could be displayed on the smart board in the male students' classroom (Mirza, 2007). Additionally a video camera was situated in the classroom to transmit video to female students through Ethernet based videoconferencing while the class was in session (Mirza, 2007).

Mirza (2007) developed a survey that questioned students on their previous classroom experience with the opposite gender, their previous e-learning experiences, and their perspectives of their Ethernet based VCR experience within the Health Informatics course. Mirza (2007) found that all of the female students in the research had experienced education with a male instructor while only 67% of male students had experienced education with a female instructor. Of the students who completed the study, 80% had experienced mixed gender education, presumably due to the fact that the majority of the students came from health education programs where co-educational classes are common (Mirza, 2007).

Mirza (2007) reported some disparity between male and female students' satisfaction of the use of Ethernet based VCR. When asked whether the use of technology had been beneficial to their educational experience, 89% of male students compared to only 69% of female students agreed. The remaining 31% of the female students did not disagree but were neutral. Moreover, 94% of females and 89% of males reported that having face-to-face interaction was more useful. Mirza (2007) concluded that female students showed a greater preference for having face-to-face instruction even by an instructor from the opposite gender. The researcher attributed this to the students' previous classroom experiences with the opposite gender coupled with employment in the health sector where gender intermixing is the norm (Mirza, 2007). The results from this research cannot be generalized due to the small sample size.

Summary

Given the importance of network and conventional classrooms in Saudi higher education and the important role they play in mediating instruction to female students, one wonders about the scarce body of research developed in this area. Research in this field has not yet collected sufficient data, formulated the necessary research questions, uncovered existing issues and challenges, or developed adequate solutions to existing challenges. The work of Mirza (Mirza, 2007) and Naaj, Nachouki, and Ankit (Naaj et al., 2012) were amongst the few academic publications that explored the transmission of instruction to female students in gender-separated campuses. Overall, the literature on separated classrooms in Saudi Arabia is scarce, confusing, and unhelpful.

Theoretical Framework

Attempting to frame a study that addresses the network and conventional classrooms used to deliver instruction to female students in a gender-separated learning community means choosing from a great number of theories from different disciplines including education, technology, and gender studies. It was tempting to use a gender studies framework; however, it seemed erroneous to use a Western theory to examine an Eastern phenomenon. This notion has been explored by Edward Said (1994), who famously criticized Eastern researchers studying in the West for using Western theories to study Eastern societies, arguing that this contributes to Western misunderstandings of Eastern societies. On the other hand, framing this study from the context of Middle Eastern gender studies, otherwise known as postcolonial feminism, means drawing from a scant body of research that is unevenly developed, particularly with regards to women in Saudi Arabia.

Because the focus of this research is on the effectiveness of the classroom configurations and technologies used in gender-separated classrooms, the search for theories

became focused on the definition of effectiveness. In Chapter 1, effectiveness was defined in terms of users' acceptance and satisfaction with technology. This definition includes the effectiveness of the use of technology to facilitate instruction between male professors and female students and the effectiveness of the use of technology to support the educational experience. Also, the educational experience was defined in terms of the interactions between the social, cognitive, and teaching aspects of learning. Therefore, this study is situated at the crossroads of two frameworks, one theoretical (Community of Inquiry) and one contextual (acceptance of technology). The Community of Inquiry Framework, which focuses on the social aspects of learning and addresses communication and collaboration issues in the classroom, will be used in combination with the Technology Acceptance Model, which is widely used to evaluate users' acceptance of technology. The overlap of these two frameworks has shaped the design of this study and the analysis of the data.

Current vision of Saudi higher education

"It is of the utmost importance that our energy be given to meeting conditions that exist right about us rather than conditions that existed centuries ago or that exist in countries a thousand miles away" (Washington, 1896). It is of the utmost importance that the needs and aspirations of female students and male professors be understood and met in order to accomplish the academic goals and ambitions of the institutions as well as the developmental ambitions of Saudi Arabia. Thus, the philosophies and theories grounding this study are based on the missions, values, and visions of the universities being studied.

Qassim and Alfaisal Universities have adopted a progressive constructivist approach to education in their vision and mission statements. The Qassim University webpage states that its vision is to support sustainable development in the Qassim Region and to contribute to building a knowledge-based society (QU Website, 2016). Likewise, Alfaisal University states

that its vision is to "be a world-class research university committed to the creation, dissemination and application of knowledge" as well as to "the development of knowledge-based economies" (Alfaisal University, 2016).

The mission statement for Qassim University asserts its vision of contributing to the development of a knowledge-based economy and of the Qassim region through "high quality, accredited education" which produces "competent graduates who meet the needs of the labor market" as well as "conducting applied research" and "offering quality community services." Additionally, the university aims to achieve its goals through "fostering national and international partnerships" and "boosting the university's resources" (QU Website, 2016). In its mission statement, Alfaisal University declared that it is a "student-centered university" in addition to its commitment to the creation and application of research and knowledge and service to the region and the world (Alfaisal University, 2016).

The universities' student-centered approach and their commitment to community life, evident in their mission and vision statements, is aligned with John Dewey's philosophy of education. For Dewey the school was not only an integral part of community life but also a driver for social change. According to Dewey (2013), "True education comes through the stimulation of the child's powers by the demands of the social situations in which he finds himself" (p. 33). The school, according to Dewey (2013), is "simply that form of community life in which all those agencies are concentrated that will be most effective in bringing the child to share in the inherited resources of the race, and to use his own powers for social ends" (p. 35).

Constructivist approach

Many innovative approaches to teaching and learning in higher education have been framed from a constructivist perspective. Constructivist learning theory generally focuses on

making sense of one's experiences while confirming that meaning is not constructed in isolation. With the emergence of innovative technologies in education, some scholars argue that the ideal educational experience is a collaborative constructivist process that has inquiry at its core (Garrison & Vaughan, 2008).

From a constructivist perspective, social interaction and collaboration shapes meaning and enriches understanding and knowledge sharing. In a collaborative constructivist learning environment, the emphasis is on inquiry processes that ensure core concepts are constructed and integrated in a deep and meaningful manner (Garrison & Vaughan, 2008). The Community of Inquiry Framework (CoI) is a theoretical framework based on constructivist theory and influenced by John Dewey's progressive education philosophy. The CoI framework informed the data collection and analysis related to effectiveness in terms of supporting the educational experience.

Community of Inquiry Framework

The CoI framework, developed by Garrison, Anderson, and Archer (1999), was developed to promote higher order learning in technology-mediated education. The CoI framework (Figure 1) is defined as "a theoretical framework that explains the online learning experience in terms of interactions between three overlapping presences: Teaching, Social and Cognitive" (Kupczynski, Ice, Wiesenmayer, & McCluskey, 2010, p. 23-24), as shown in

Figure 1. Each of the presences is described in the sections that follow.

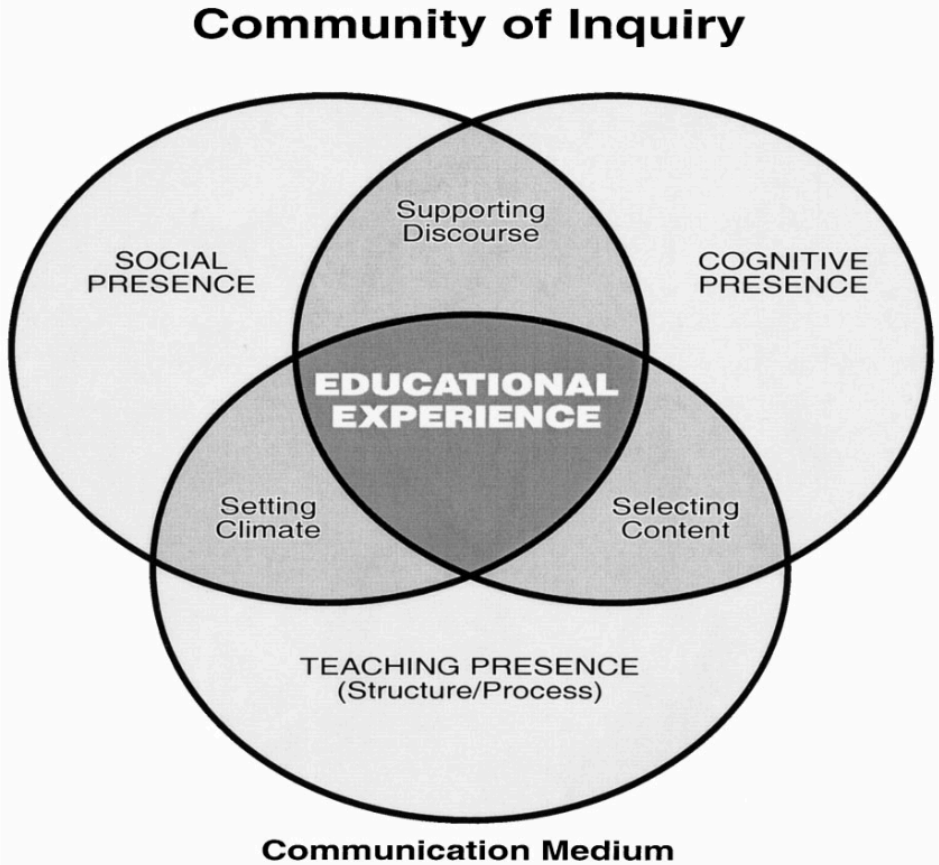


Figure 1. COI Framework (Garrison et al, 1999)

Social presence

The first element in the CoI framework is social presence. Social presence is considered the basis of collaborative learning and the foundation for meaningful, constructivist learning (Kupczynski et al., 2010). It has been described in a number of ways, "the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities" (Garrison, 2009, p. 352). The elements of social presence establish, sustain, and develop a community of inquiry (Garrison & Vaughan, 2008). These elements have been variously defined, but this study will adopt those elements defined by Swan,

Garrison, & Richardson (2009). They identify the elements of social presence as *affective expression*, *open communication, and group cohesion.*

Affective expression. Affective expression or affective responses is the ability to express emotions, humor, and self-disclosure, which supports interpersonal relationships in the classroom (Akyol, Garrison, & Ozden, 2009). In this study affective expression will be evaluated between female students (with each other) and with the male professor.

Open communication. Open communication is when the professor builds and sustains a sense of group commitment with his female students (Swan et al., 2009). This often occurs through recognition, encouragement, reflective participation, and interaction inside and outside the classroom (Akyol et al., 2009).

Group cohesion. Group cohesion is when the female students interact around common intellectual activities and tasks (Swan et al., 2009). This can be achieved in class by addressing students by name, using salutations, and using inclusive pronouns, such as *we* and *our* (Akyol et al., 2009).

Cognitive presence

The second element in the CoI framework is cognitive presence. Cognitive presence is defined as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse" (Swan et al., 2009, p. 8). In the CoI framework, cognitive presence is progressive in nature and represents the cyclical inquiry pattern of learning from experience through reflection and conceptualization to action and then on to further experience, for example asking questions, connecting ideas and reflecting on experiences are all examples of cognitive presence(Garrison & Vaughan, 2008). Some indicators of cognitive presence include having a sense of puzzlement, exchanging information, connecting ideas, applying new ideas, and testing the viability of solutions(Garrison & Vaughan, 2008).

Cognitive presence is based on the Practical Inquiry Model (Figure 2), which stems from Dewey's(1960) concept of critical inquiry. The practical inquiry model has been used to assess the process of learning in a variety of settings (Akyol et al., 2009; Garrison & Vaughan, 2008).

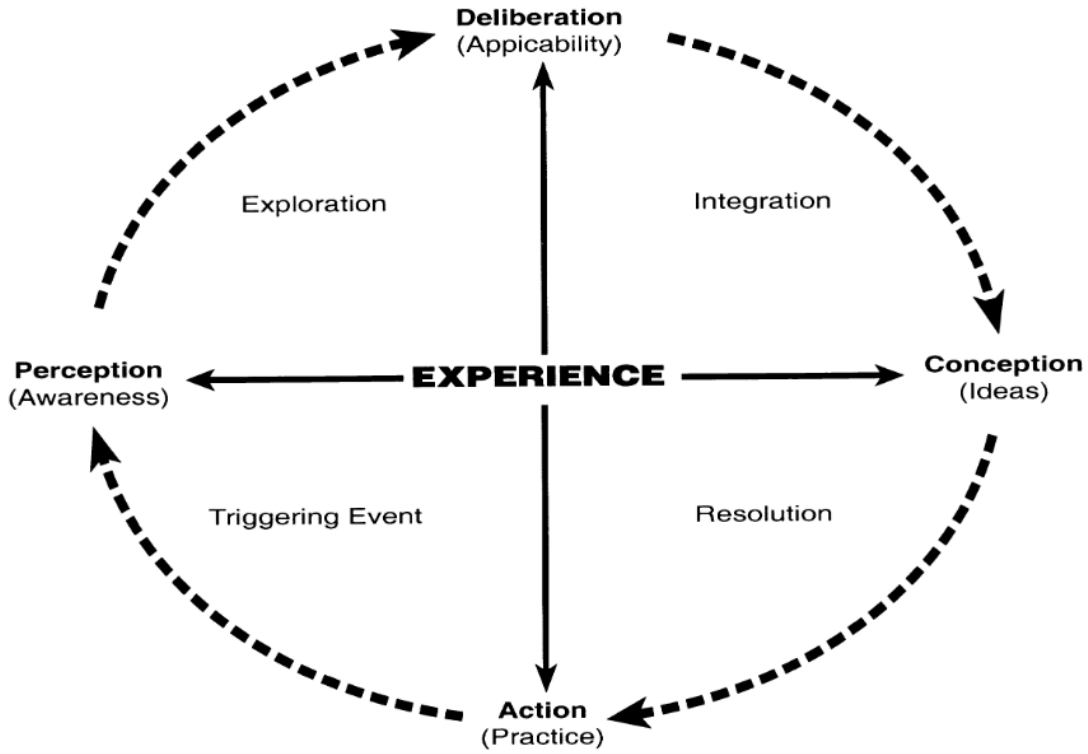


Figure 2. Practical Inquiry Model (Garrison et al., 1999)

The Practical Inquiry Model presents the process of inquiry as a cyclical process that occurs in four phases and two dimensions. The first phase is a triggering event which moves to exploration to integration and finally to resolution. Two of the phases, exploration and integration involve deliberation, while both the triggering event and eventual resolution lead to actions. The vertical axis represents the deliberation-action dimension, symbolizing the recursive nature of inquiry that encompasses collaborative and constructive activities. The horizontal dimension represents the perception-conception dimension, with the triggering event and exploration of that event relying on perception and both integration and resolution

requiring conceptualization. The entire process constructs meaning from experience (Garrison & Vaughan, 2008).

Teaching presence

The final element in the CoI framework is teaching presence. The term *teaching* is used instead of *teacher* to emphasize the possibility of distributing the roles and responsibilities of a teacher (Akyol et al., 2009). Teaching presence is described as "the means by which to bring together social and cognitive presence in an effective and efficient manner" (Garrison & Vaughan, 2008), p. 24). Teaching presence provides the design, facilitation, and direction for the educational experience (Garrison & Vaughan, 2008). It is considered essential in balancing cognitive and social issues to provide the intended educational outcomes (Garrison et al., 1999). The authors identified three indicators of teaching presence: instructional management, building understanding, and direct instruction.

Instructional management. This involves structural concerns and planning issues such as designing curriculum, methods, assessment, maintaining time, and utilizing mediums (Garrison et al., 1999).

Building understanding. This indicator is concerned with the facilitation of discourse to provide productive and valid knowledge acquisition (Garrison & Vaughan, 2008; Garrison et al., 1999). It is critical to maintaining students' interest, motivation, and engagement (Akyol et al., 2009). Garrison et al. (1999) explain it as follows:

> This category is very much concerned with the academic integrity of a collaborative community of learners. It is a process of creating an effective group consciousness for the purpose of sharing meaning, identifying areas of agreement and disagreement, and generally seeking to reach consensus and understanding. Through active intervention, the teacher draws in less active participants, acknowledges individual contributions,

reinforces appropriate contributions, focuses discussion, and generally facilitates an educational transaction. (Garrison et al., 1999, p. 101)

Direct instruction. This indicator is concerned with focusing and directing discussion. It is associated with specific facilitation issues, such as presenting content, diagnosing misconceptions, providing questions, injecting knowledge from diverse sources, proactively summarizing the discussion, and confirming understanding through various means of assessment and feedback (Akyol et al., 2009; Garrison et al., 1999). The process is also concerned with providing constructive explanatory feedback within a context of high levels of social presence (Garrison et al., 1999).

Each of the CoI presences is comprised of categories and indicators that form the elements used to study, design, and evaluate the teaching and learning process (Garrison & Vaughan, 2008). All three presences are interdependent. Teaching presence, for example, has a significant influence on cognitive presence and social presence and so forth (Garrison & Vaughan, 2008). Moreover, the categories of all three presences are progressive and do not reflect static categories (for example, planning occurs throughout the educational process) (Garrison & Vaughan, 2008).

Validation of the CoI framework

Since its beginnings, the CoI has shown strong empirical validation and has been the most frequently cited model for describing the online learning experience, with extensive research undertaken on each of the individual presences (Arbaugh et al., 2008; Garrison & Vaughan, 2008; Kupczynski et al., 2010). Arbaugh et al. (2008) developed and tested an instrument to measure the CoI framework using a multi-institutional sample. The authors developed a survey instrument, which was then administered to four academic institutions in the United States of America and Canada. The study took place in the summer of 2007.

Participants were enrolled in either Education or Business graduate level courses. Two hundred eighty-seven students participated in the survey with a 43% response rate. The 34-item survey used an ordinal scale from 0=Strongly Disagree to 4=Strongly Agree. The Principal Component Analysis (PCA) approach in SPSS was used to verify the three subscale structure (cognitive presence, social presence, and teaching presence) of the 34 items.

When considering all respondents' ratings, the findings showed that the teaching presence items collectively yielded a mean score of 3.34. Social presence items yielded a mean score of 3.18. Cognitive presence items yielded a mean score of 3.31. PCA allowed for a more comprehensive analysis of variance revealing significant detail regarding the nature of the three factors. The researcher reported that the principle component analysis of the data supported the construct validity of the CoI framework of teaching, social, and cognitive presences. These three factors accounted for 61.3% of the total variance in scores. The PCA analysis also yielded an additional fourth factor; however, the authors dismissed this as the scree plot yielded inconclusive results. The results of the research endorsed the use of the CoI framework as a valid measure of Teaching, Social, and Cognitive presences (Arbaugh et al., 2008). The authors recommend the use of the CoI framework in qualitative and quantitative studies to compare courses as well as to study the implementation of emerging technologies in courses (Arbaugh et al., 2008).

Application of the CoI framework

Stodel, Thompson, & MacDonald's (2006) research used the Community of Inquiry as a framework to identify learners' perceptions of what was missing from their online learning experience. The inquiry followed a qualitative methodology and was conducted from a constructivist perspective. The research took place at an Introduction to Research in Education online course at a Canadian university. The course was one of ten courses learners must take

to complete the M.Ed. program and was one of only two online courses offered in the program. Two of the researchers in this research designed and co-taught the online course. Interviews were conducted with ten participants from the online course who had indicated that they would have liked face-to-face instead of online instruction.

Five themes emerged from the data: robustness of online dialogue, spontaneity and improvisation, perceiving and being perceived by the other, getting to know others, and learning to be an online learner. The authors reported that participants focused on issues relating to online dialogue with varied perceptions of the quality of online discussions. Some students felt the quality of online discussions was poor, that communicating through text constricted the conversation. Others reported that they miss the dynamic of face-to-face conversation. Participants also reported that they missed the spontaneity in face-to-face classrooms, as there was a decreased tendency for online discussions to go off on a tangent and a lack of spontaneity in the discussion forum. Students also reported that they were conscious of how they perceive and are perceived by others in an online community, questioning the accuracy of the images constructed. Participants also commented on the formality of the conversation, with informal conversations considered "as important for relationship building as for learning" (Stodel et al., 2006, p. 10). The research found that deficiencies in any of the three presences could affect students' perceptions of the online environment. Stodel, Thompson, and McDonald (2006) concluded that it is essential to develop an understanding of techniques for optimizing each of the presences in a learning community.

Summary

The CoI framework has been used extensively to evaluate social, cognitive and teaching presences in online learning communities(Cleveland-Innes, Garrison, & Kinsel, 2007; Conrad, 2005; Kanuka & Garrison, 2004; Meyer, 2004; Richardson & Swan, 2003; Stodel et

al., 2006). The research conducted by Stodel et al. (2006) provides a good example of how the CoI framework has been used to collect and analyze qualitative data. Their findings suggest that the framework could be used successfully to evaluate an online learning community using qualitative data methods.

Technology Acceptance Model

One of the most vital factors in determining the effectiveness of technology in gender-separated settings is students' and faculty members' acceptance of technology and their satisfaction with using it in these settings. The Technology Acceptance Model (TAM) (Davis, 1989) is a widely used model that aims to predict people's acceptance of technology and their intention to use it.

The use of TAM in predicting technology acceptance has received empirical validation with a variety of technologies and in various contexts and settings (Davis, Bagozzi, & Warshaw, 1989; Koufaris, 2002; Park, 2009). In electronic commerce, the TAM was used to examine how emotional and cognitive responses to visiting a Web-based store for the first time can influence online consumer behavior (Koufaris, 2002). In higher education, the TAM was used to understand university students' behavioral intention for using e-learning (Park, 2009).

The early version of TAM suggested that behavioral intention in technology use is influenced by two main factors: perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness is the extent to which a person believes the use of technology is useful (e.g., will enhance his or her performance in a course) (Giesbers, Rienties, Tempelaar, & Gijselaers, 2013). Perceived ease of use refers to the perceived effort it would take to use a particular communication tool (e.g., a webcam) (Giesbers et al., 2013). Perceived ease of use has been shown to influence perceived usefulness, while perceived usefulness has been shown to have a direct effect on behavioral intention (Davis, 1989).

Although the early version of TAM was successfully applied to predict the acceptance of various technologies, recent studies have introduced other factors that influence behavioral intention in online learning. Kang and Shin (2015) introduced four additional factors to determine the acceptance of synchronous e-learning in online universities: computer self-efficacy, systematic lecture content, subjective norm, and system accessibility (Kang & Shin, 2015). As shown in Figure 3, Kang and Shin (2015) found that these factors affect perceived usefulness and perceived ease of use, which affects behavioral intention.

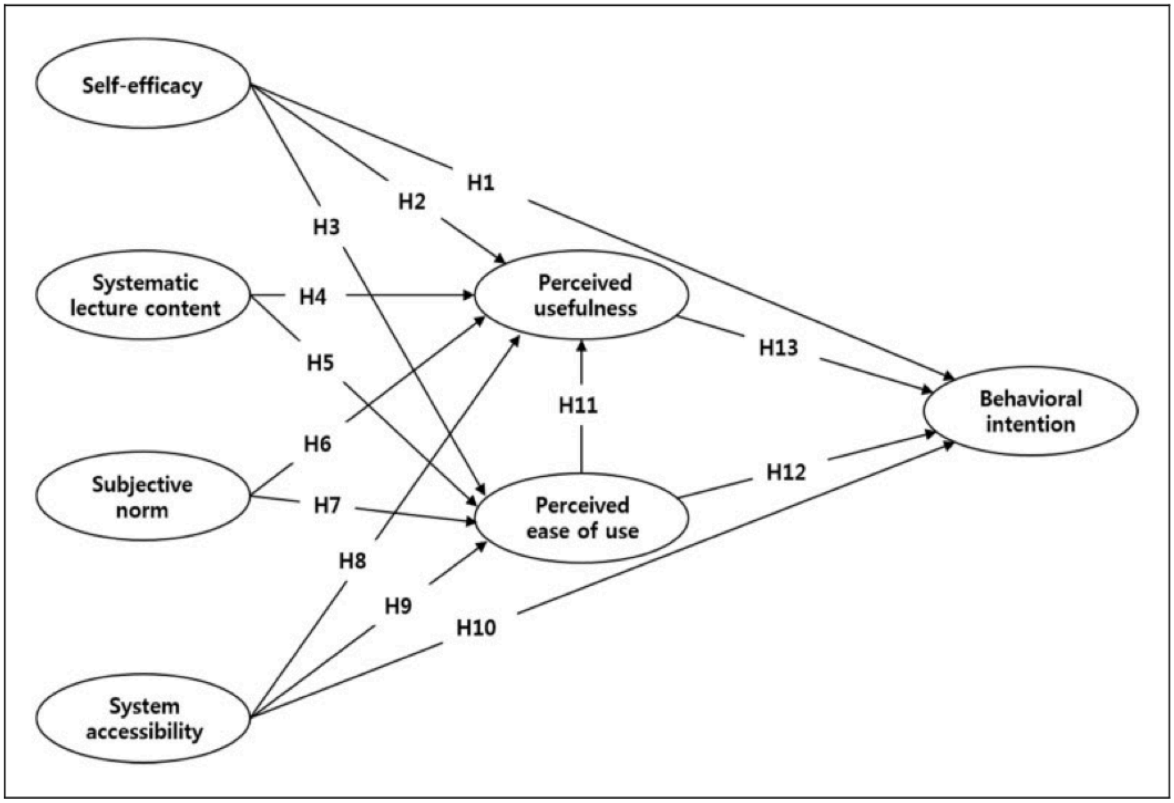


Figure 3. e-TAM Technology Acceptance Model (Kang & Shin, 2015)

Self-efficacy

This factor refers to "people's judgment of their ability to organize and execute an action required to achieve a specific goal" (Bandura 1977, as cited in Kang & Shin, 2015). Computer self-efficacy refers to one's perception of one's ability to use and master a computer,

which may influence one's perception of a technology's productivity and effectiveness (Kang & Shin, 2015).

In their study, Kang and Shin (2015) examined the relationships between self-efficacy, subjective norm, and system accessibility with behavioral intention and perceived usefulness and ease of use of synchronous e-learning technology. Two hundred fifty-one students from an online university participated through an online survey. The researchers employed structural equation modeling to test and analyze the data. The study showed that self-efficacy of synchronous e-learning technology influences behavioral intention in addition to perceived usefulness and perceived ease of use (Kang & Shin, 2015). The researchers concluded that students with strong self-efficacy of synchronous e-learning are more likely to accept synchronous e-learning as a new technology (Kang & Shin, 2015).

Subjective norm

This factor is described as the "perceived social pressure to perform or not perform a behavior" (Kang & Shin, 2015). Although subjective norm was not included in the early version of TAM (Davis, 1989), it was found to significantly influence user acceptance of technology (Park, 2009; Park, Nam, & Cha, 2012; Venkatesh & Davis, 2000). It was subsequently incorporated in the revised version of TAM, which was named TAM2 (Venkatesh & Davis, 2000). It has been suggested that subjective norm influences perceived usefulness and perceived ease of use (Kang & Shin, 2015).

System accessibility

This factor refers to the degree to which a system is accessible and easy to learn(Kang & Shin, 2015). Previous studies indicate that system quality has a significant impact on perceived ease of use and behavioral intention(Freeman, 1997; Kang & Shin, 2015).

Researchers suggested that technical inconvenience is an obstructive factor for synchronous e-learning due to its significant effect on ease of use and behavioral intention (Park et al., 2012).

Application of the TAM

Park, Nam, and Cha (2012) used the TAM as a theoretical framework to research university students' acceptance and intention to use mobile learning. The researchers developed and distributed a survey instrument that consisted of four parts. The first part asked for demographic information. The remaining parts explored the three TAM presences with slight modifications to fit the context of mobile learning. Two hundred eighty-eight students from 22 e-learning courses at a Korean university participated in the study.

Structural equation modeling using LISREL included the following factors: self-efficacy of mobile learning, relevance of major, systems accessibility, subjective norm, perceived usefulness, perceived ease of use, attitude, and behavioral intention. The results of the study showed that the university students' behavioral intention to use mobile learning (BI), which was the key independent variable in the study, was significantly influenced by the following variables: Attitude (AT), Subjective Norm (SN), and System Accessibility (SA). It was not significantly influenced by perceived usefulness (PU) and perceived ease of use (PE).

Park et al.'s (2012) findings regarding the variables, perceived usefulness (PU) and perceived ease of use (PE) seemed to contradict previous research. The original version of the TAM hypothesized that PU and PE influence BI, which has been validated by a number of studies (Davis et al., 1989; Koufaris, 2002; Park, 2009). Park et al. (2012) explained that all participants of the study conveniently used mobile devices for learning and that Korean university students excel at using mobile devices and frequently access wireless internet for information. They reasoned that the variables, PU and PE, may not be directly related to BI in

this case (due to the participants' fluency with technology) and may have an indirect influence instead.

The contradictory evidence in the literature concerning the variables that significantly influence behavioral intention (BI) indicates that the TAM may provide contradictory results across different cases or different settings. In this study the TAM will be used to collect qualitative data from different cases classroom configurations. To limit inconsistency, the data will be coded and themes will be identified across the cases.

Summary

Combining the Community of Inquiry Framework and Technology Acceptance Model in this research will offer a better framework for evaluating the effectiveness of synchronous tools in a gender-separated environment compared. The CoI framework will explore the social, cognitive, and teaching aspects of learning with an emphasis on inquiry processes to evaluate whether core concepts are being constructed and integrated. The TAM will be used to study students' and faculty members' acceptance of different synchronous e-learning tools.

Both the COI and TAM fit well with the missions, visions, and objectives of the universities in this study. In general, the vision and mission of the two universities embraces a progressive constructivist philosophy of education. Both universities focus on student-centered, collaborative learning (reinforced by the CoI framework) and emphasize sustainable development and building a knowledge-based society. Qassim University's objectives reveal their interest in maintaining human resources, which means they are concerned with the satisfaction of their students and faculty.

Chapter Three - Methodology

Introduction

This chapter describes the research design, population, instrument development and data analysis for this research. The purpose of this research was to explore the classroom configurations and technologies used to mediate instruction to female students in gender-separated classrooms at Qassim University and Alfaisal University in Saudi Arabia. The study was designed to describe the methods used, evaluate and compare the effectiveness of the approaches, and describe the issues and challenges that female students and their male instructors face in gender-separated classrooms. Qassim University's interest in improving their female educational facilities and both Qassim and Alfaisal Universities' willingness to participate in this study provided fertile grounds for conducting this research.

This research was conducted using a sequential exploratory mixed methods design and contains two phases, a qualitative and a quantitative phase.

The research questions were:

1) What classroom configurations and/or technologies are used by male professors to teach female students in gender-separated classrooms?
2) To what extent are the classroom configurations and/or technologies currently used in gender-separated classrooms seen to be effective from the perspective of the users?
    a. Effective in facilitating instruction.
    b. Effective in supporting the educational experience.
3) What issues and challenges do female students and male professors report in gender-separated classrooms?

Overview of the research design

Figure 4 provides an overview of the study. The study involved both a qualitative and quantitative component. Two theoretical frameworks, Community of Inquiry (Garrison et al., 1999) and Technology Acceptance Model (Davis, 1989), were used to guide the data collection in the qualitative component of the study. The results of the qualitative component were used to develop a survey instrument used to collect data from a larger sample of the population.

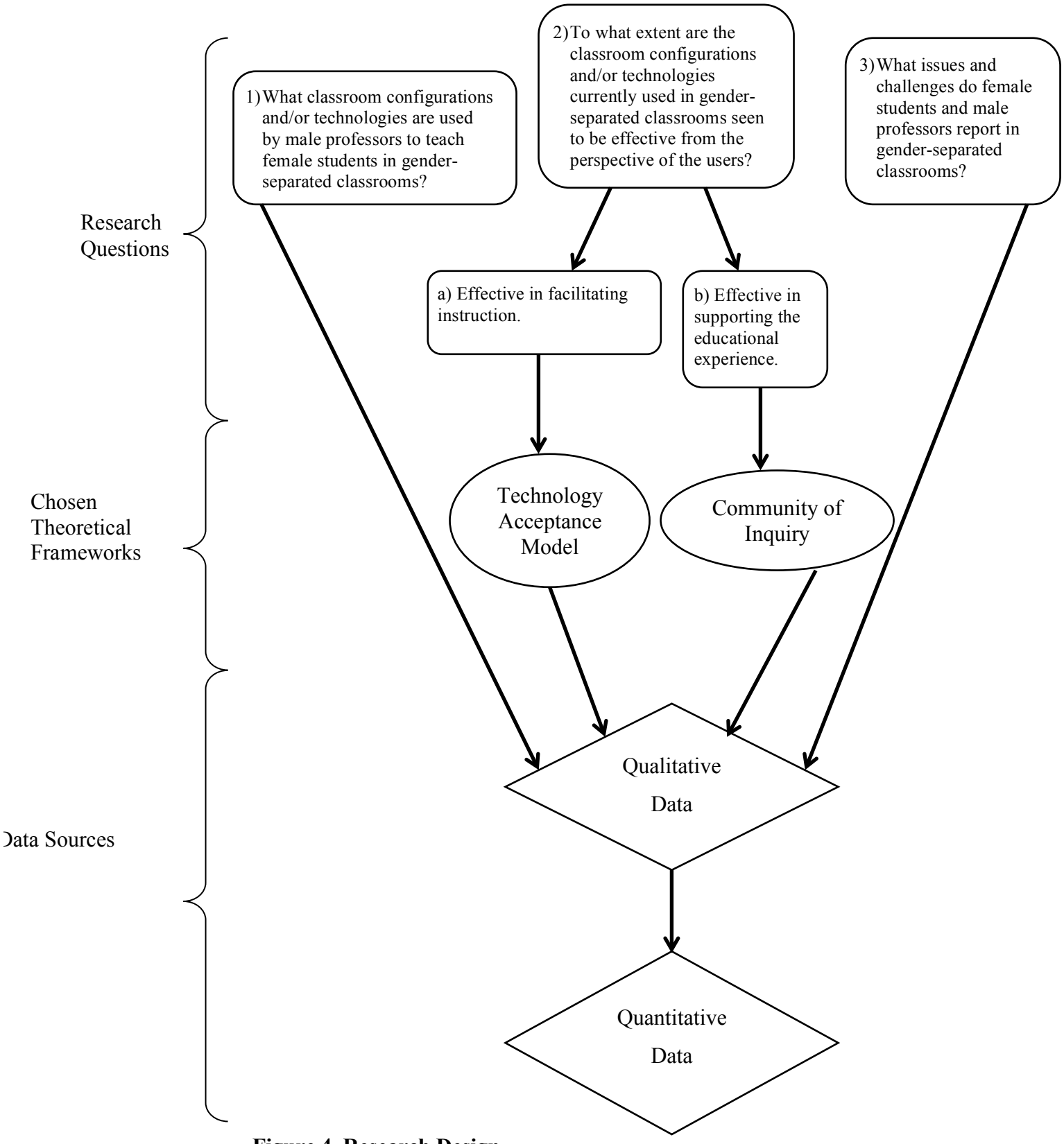


Figure 4. Research Design

This study used a *sequential exploratory mixed methods* design, in that the qualitative and quantitative data collection and analyses occurred in two distinct phases. The qualitative data collection included observations of gender-separated classrooms with different classroom configurations at Qassim and Alfaisal Universities, interviews with male faculty members, focus groups with female students, as well as informal interviews with technical support personnel, teaching assistants, administrative assistants and university leaders. This data was coded and themes across the cases were identified. Using the *instrument development model* (Creswell, 2013) in an exploratory design in which mixed methods researchers use qualitative data to construct an instrument for quantitative data collection, the themes identified from the analysis of the qualitative data were used to develop the survey instrument.

Neither quantitative nor qualitative methods were sufficient by themselves to capture the perceptions and classroom context of the learning environments. A purely quantitative study would not provide an understanding of the approaches used to mediate instruction to female students nor an understanding of the issues and challenges that the female students and male professors face in the classrooms, while a purely qualitative study would provide limited generalizability and applicability of the results. The qualitative phase of this study allowed the researcher to apply an insider rather than an outsider understanding of the experiences of female students and their male professors in gender-separated female classrooms. The survey enabled the researcher to report findings reflective of a larger and more diverse sample of female students and male professors at Qassim University. When used in combination, qualitative and quantitative tools complement each other and provide a more complete analysis of the situation(Tashakkori & Teddlie, 2003).

In many ways, this study is similar to one conducted by Crede and Borrego (2013), who used a sequential exploratory mixed methods study using the instrument development model. The authors explored how research groups foster successful learning and professional development for graduate engineering students as well as how those findings could be used to inform management of engineering research groups. The study consisted of nine months of ethnographically guided observations and interviews that were then used to develop an online survey. The online survey was then administered to graduate engineering students at four universities in the United States. The authors argued that the qualitative data enabled the research team to better understand the social and cultural norms of engineering research groups, while the survey enabled the researchers to include a larger and more diverse sample with which to justify their findings(Crede & Borrego, 2013). The choice of mixed methods in this study fits well with the rationale given by Creswell & Plano Clark (2007) that there is a need to generalize exploratory findings.

Population

The population for this study was female students who were taking classes with male professors at Qassim and Alfaisal Universities and male professors who teach female students at Qassim and Alfaisal Universities. Qassim University is a public institution located in the central (Najd) region of Saudi Arabia, one of the most culturally conservative areas in the country. It is also the institution with which the researcher is affiliated. Alfaisal University is an elite private institution located in Riyadh, the capital of Saudi Arabia. Riyadh is a metropolitan city inhabited by a more liberal and diverse population. As shown in Table 1, Qassim University is much larger and consists of multiple campuses housing 35 colleges. By contrast Alfaisal University operates from a single campus and, with only 5 colleges, provides less breadth in its academic programming. Both universities offer academic programs in

business, engineering, medicine and science. Qassim University includes programs in agriculture and veterinary medicine, applied medical sciences, pharmacy, dentistry, as well as Arabic and social sciences. The language of instruction at Qassim University is mainly Arabic, whereas the language of instruction at Alfaisal University is English. The student population at Alfaisal University is considerably more diverse, with students from 48 countries pursuing postsecondary degrees. The student population at Qassim University is less diverse.

Table 1. Site and Population

Site	Type	Region	Colleges / campuses	Countries represented	Population		
					Students	Faculty	Student faculty ratio
Qassim University	Public research university	Conservative agricultural region	35 colleges, 10 campuses	13	52,000	5,000	10/1
Alfaisal University	Elite private university	Metropolitan liberal region	5 colleges, 1 campus	48	2,500	140	18/1

Qassim University is representative of most public and private institutions in Saudi Arabia with regards to the approaches used to teach female students. With the exception of KAUST (King Abdullah University for Science and Technology) and medical education, all educational institutions must adhere to Article 155 of the Educational Policy of Saudi Arabia, that intermixing between genders is impermissible at all levels of education except in pre-school (Ministry of Education, 1969). Due to the shortage of female faculty members, most public universities, including Qassim University, use technology to enable male professors to provide instruction to female students on separated campuses. Even institutions that cater to only female students, such as Princess Norah University in Riyadh and Effat University in

Jeddah, avoid the intermixing of genders on campus by utilizing technology to enable male professors to provide instruction to their female students. By contrast Alfaisal University campus is unique. It utilizes conventional classrooms to accommodate male and female students on the same campus. Collectively, the two campuses are representative of current strategies used to provide instruction to female students while conforming to Article 155.

Qualitative Data Collection and Analysis

The first phase in the study focused on identifying the approaches used to mediate instruction to female students and to explore the experiences and challenges of female students and their male professors in gender-separated classrooms. A multiple case study design (Stake, 1995) was used for collecting and analyzing the qualitative data. A case study is an exploration of a "bounded system" (Stake, 1995, p. 2) or case over time through in-depth data collection, which is rich in context by using multiple sources of information (Merriam, 1988). Stake's (1995) conception of case study research draws from a "naturalistic, holistic, ethnographic, phenomenological, and biographic research methods" (Stake, 1995, p. xi). Stake (1995) advocates for a "disciplined, qualitative mode of inquiry" (p. xii) which "emphasizes episodes of nuance, the sequentiality [sic] of happenings in context, the wholeness of the individual" (p. xii). Following the philosophical and methodological method advocated by Stake (1995), a realistic portrait of the use of conventional classrooms and network classrooms to mediate instruction delivered by a male faculty member to female students coupled with focus groups with female students and interviews with male faculty members at each site will be developed.

Classroom settings

The qualitative phase of this study was conducted at two sites: Qassim University and Alfaisal University. Qassim University consists of gender-separated campuses and relies

entirely on e-learning technologies to facilitate instruction to their female students. The only exception is medical education, which is divided into two stages. The first stage is academic training, which takes place on a gender-separated campus and involves e-learning technologies to facilitate instruction to female students. The second phase is clinical education, which involves co-educational classrooms and conventional classrooms located at university clinics and hospitals. Observations and interviews with technical support, administrative staff, and university leaders were conducted to discover the type of technologies utilized to transmit instruction to their female campuses.

By contrast, a tour of Alfaisal University revealed that it is a single campus that has separate facilities for men and women. Women's facilities are usually on the top floor, while men's facilities are on the ground floor. Medical and pharmaceutical classrooms are co-educational, while other classrooms involve the use of conventional classrooms to physically separate men and women in the same classroom. The classrooms that involve the use of partitions and double deck were included in this study. Observations and interviews with a senior member of staff at the College of Business were conducted to discover the type of classroom arrangements utilized to teach female students.

The first approach (network classrooms) is the most commonly used approach to deliver instruction in female classrooms in Saudi Arabian universities. The researcher identified three different network classroom configurations utilized to mediate instruction at Qassim University: Closed Circuit Television (CCTV), Ethernet based videoconferencing (VCR), and Internet based videoconferencing (VC). The second approach (conventional classrooms) was chosen due to its uniqueness and lack of depiction in the literature. The researcher identified two types of classroom configurations involving conventional classrooms at Alfaisal University: Double deck classrooms and one level partitions. Both approaches were

chosen due to their accessibility to the researcher. Each type of classroom configuration was treated as a single case. Thus, the study was a multiple case study with five cases: three cases at Qassim, which utilizes technology to mediate instruction and two cases at Alfaisal, which utilizes conventional classrooms.

Sample

Participants were recruited through *maximum variation sampling* (Patton, 2002). This is a strategy for purposeful sampling that aims at "capturing and describing the central themes that cut across a great deal of variation" (Patton, 2002, p. 234-235). This strategy involves intentionally selecting participants who are "information rich" (Patton, 2002, p. 242) and diverse in nature. The logic for using maximum variation sampling is that "any common patterns that emerge from great variation are of particular interest and value in capturing the core experiences and central, shared dimensions of a setting or phenomenon" (Patton, 2002, p. 235). The reason for using purposeful sampling is because little is known about the population of the study.

Five male faculty members were selected from Qassim University and three from Alfaisal University. At Qassim University, faculty members were selected with the goal that each male professor teaches a female classroom during the duration of the study and with the aim of maximum variation in the types of classroom configurations utilized in each classroom and demonstrate diversity in ethnicity, number of years of teaching experience, and number of years spent in Saudi Arabia. The three faculty members at Alfaisal University were recruited with the goal that they teach female students during the duration of this study, teach in classrooms that utilize gender separated classrooms, and demonstrate diversity in ethnicity, number of years of teaching experience, and number of years spent in Saudi Arabia.

At Qassim University, two administrative assistants and a female assistant professor that works as female faculty coordinator assisted in the recruitment of male faculty members who teach female students through CCTV, VCR, and VC. Female students at Qassim University were recruited during classroom observations. At Alfaisal University, the coordinator for student affairs at the College of Business assisted in the recruitment of faculty members who teach female students through conventional classrooms. She also assisted in the recruitment of female students.

Five to ten female students from each classroom configuration were selected to participate in the focus group interviews. Participants were selected with the aim of maximum variation in ethnicity, level of engagement in instruction during the classroom observations, and willingness to speak to the professor during classroom observations. Observations of female students' behavior and interactions in the classroom assisted in selecting a maximum variation sample for this study. Finally, the sample of female teaching assistants consisted of those in the observed classrooms.

Data sources

Four different data sources were used for this study: visual representations, classroom observations, focus groups with female students, and interviews with the male faculty members. When available technology, personnel and female teaching assistants were also interviewed. The four data sources were designed to allow triangulation of information specific to the approaches used by male professors to mediate instruction to female students, perceptions of the effectiveness of the approaches, and perceptions of the issues and challenges in the methods used to mediate instruction to support female student learning. Table 2 presents the correspondence between the research questions, theoretical frameworks, and data sources.

Table 2. Correspondence of Research Questions, Theoretical Frameworks, and Data Sources

Research Question	Theoretical framework	Data sources
1. What classroom configurations and/or technologies are used by male professors to teach female students in gender-separated classrooms?		• Observations of classrooms • Visual representation • Informal interviews with administrative assistants
2. To what extent are the classroom configurations and/or technologies currently used in gender-separated classrooms seen to be effective from the perspective of the users?		
a) Effective in facilitating instruction.	Technology Acceptance Model Behavioral Intention { • Perceived usefulness • Perceived ease of use • Computer self efficacy • Subjective norm • System accessibility	• Observations of classrooms • Interviews with male professors • Focus groups with female students • Informal interviews with teaching assistants

b) Effective in supporting the educational experience.	Community of Inquiry Social presence • Affective expression • Open Communication • Group cohesion Cognitive presence • Exploring • Applying new ideas • Testing solutions Teaching presence • Instructional management • Building understanding • Direct Instruction	• Observations of classrooms • Interviews with male professors • Focus groups with female students • Informal interviews with teaching assistants
3. What issues and challenges do female students and male professors report in gender-separated classrooms?		• Interviews with male professors • Focus groups with female students • Informal interviews with teaching assistants

Visual representation. Visual representation of the female classrooms and professors' workstations at Qassim and Alfaisal Universities in the form of pictures and video recordings were obtained to provide a description of the settings. A male volunteer took pictures and video recordings of the male classrooms and professors' workstations. The pictures and video recordings were taken after classroom sessions ended to protect the privacy of male students and professors. The images along with data obtained from observations contribute to creating a rich description of how female students are taught by male professors in gender-separated classrooms.

Observations. Five classroom observations were conducted in the female classrooms during regular sessions at each site. Observations were conducted at the following classroom

settings: VCR, CCTV, VC, Double Deck, and Partition. The researcher obtained permission from male professors to observe the classrooms and received information regarding classroom location and time via Whatsapp messenger. Before the class sessions began the researcher explained the purpose of the study to the female students and requested their cooperation and participation. The researcher then used an observation protocol (Appendix A) to collect information from the female classrooms during classroom sessions.

These observations were integrated with the data gathered from the pictures, focus groups, and interviews to better understand how teaching is mediated to female students as well as the issues and challenges female students and male professors face in each setting. The observations also aided in recruiting "information rich" participants for the focus groups.

Focus Groups. Five focus group interviews (See Appendix B for the Focus Group Interview Protocol) were conducted with five to ten female students from each of the classroom settings (VCR, CCTV, VC, Double Deck, and Partition). Interviews were conducted face to face with female students at classrooms in the female campuses at Qassim University and face to face in a meeting room at Alfaisal University. Participants were recruited during classroom observations at Qassim University and with the assistance of the undergraduate student affairs coordinator at Alfaisal University. The focus group interviews (Appendix C) lasted approximately 45 to 60 minutes. The focus group interviews were recorded and informed consent was obtained from each participant.

The purpose of the focus group interviews was to gather in-depth information about female students' perspectives of the approaches used to mediate instruction to them in the classroom and to discover any issues missed in the classroom observations. For focus groups conducted at Qassim University, images were provided of technology-mediated facilities to support the interview questions and help encourage the conversation.

Faculty Interviews. Overall five interviews were conducted with male professors. One interview was conducted with a male professor from each of the classroom settings (CCTV, VCR, VC, Double Deck, and Partition). The interviews were conducted face to face with professors at Alfaisal University and via telephone with professors at Qassim University due to cultural restrictions. At Qassim University professors were contacted through Whatsapp messenger (considered a formal communication medium in the Saudi academic social context) to establish a day and time for the interview and then reminded of the interview via messages. At Alfaisal University professors were contacted face to face and a time was established for the interview, which took place at their offices. The interviews were semi-structured (See Appendix C for the Interview Protocol) and lasted approximately 45 to 60 minutes. The interviews conducted with male professors provided information about the male professors and the courses, the approach they use to teach female students, their perception of the effectiveness of the technology or partition and the issues and challenges they face in the classroom. Faculty interviews were conducted after the female student focus groups in order to triangulate the constructed realities of the female students with the perceptions of the male faculty members.

Teaching and Administrative Assistant Interviews. Informal interviews were conducted with teaching assistants who supervised the classrooms that were observed at Qassim University and administrative assistants who assisted in operating the technology. An informal interview is an "open-ended approach to interviewing" (Patton, 2002, p. 342), which "offers maximum flexibility to pursue information in whatever direction appears to be appropriate, depending on what emerges from observing a particular setting or from talking with one or more individuals in that setting" (Patton, 2002, p. 342).

Teaching and administrative assistants provided a unique and important data source for two reasons. The first was their management of the technology, which provided them with a first-hand knowledge of any difficulties. Second, they were often present to witness the happenings in the female classroom and provided an independent perception that could be triangulated with the perspectives of the female students and male professor. The informal interviews were conducted after completing the focus group interviews and interviews with the professors.

Instrument development

The observation protocol was designed to collect information about the classroom configurations and technologies used in each network classroom or conventional classroom. The observation, interview, and focus group protocols were designed to explore the social, cognitive, and teaching presences as defined by the Community of Inquiry framework (Garrison et al., 1999). They were also designed to assess the usefulness and acceptability of the technology as well as the benefits and challenges of the classroom configurations for learning in gender-separated female classrooms.

The interview questions were semi-structured (Patton, 2002) and worded in an "open-ended" (p. 353) fashion. The questions were translated by the researcher into Arabic (the participants' main language) and were reviewed by a bilingual student (who speaks Arabic and English) and a male professor (who speaks Arabic and English) at Qassim University. The student and faculty member were chosen due to their familiarity with the terminology used by students and faculty members at the university. The observation, interview, and focus group protocols were presented to a doctoral supervisory committee for review prior to collecting data.

Male faculty participants and female students participating in the focus groups received a copy of the assigned interview protocol before the designated meeting. They were informed the interview would be tape recorded and transcribed verbatim. Participants were offered an opportunity to review, and if necessary correct, the contents of the interview after it had been transcribed.

Qualitative data analysis

Data analysis was a combination of direct interpretation of each individual instance and categorical aggregation of all instances (Stake, 1995). As Stake (1995) suggests "Case study relies on both of these methods" (p. 74). In this study, instances refer to the happenings and incidents observed in each of the classroom sites. Stake (1995) suggests, "The qualitative researcher concentrates on the instance, trying to pull it apart and put it back together again more meaningfully—analysis and synthesis in direct interpretation" (p. 75). The meaning of an individual instance does not always yield information, however. Some instances may be irrelevant and potentially distracting. It is the role of the qualitative researcher to decide whether to find additional instances to aggregate with it or to omit it from the report.

The process of categorical aggregation is to sequence the action, categorize properties, and make tallies in some intuitive aggregation (Stake, 1995). The researcher systematically searched and organized the data sources. Categorical aggregation was then used to code and analyze the data. This method enabled the researcher to synthesize data as a whole and decide how much data supports emerging themes(Bogdan & Biklen, 1998). The interview data from male professors, focus group transcripts from female students, and information gathered through the informal interviews with the teaching assistants and administrative assistants was crosschecked with each other as well as with the observation field notes. This enabled

examination of the emerging themes and refining what was being said to corroborate those themes.

Because the purpose of the qualitative phase of the study is to explore phenomena (the mediation of instruction by network classrooms or conventional classrooms) and the issues that exist within each case and across the cases, data analysis involved developing a detailed description of each case. Due to the variation in methods used to mediate instruction for students at both Qassim University and Alfaisal University; five cases were identified, three cases were identified at Qassim University that utilize technologies and two at Alfaisal University that utilize partitions. Based on this analysis, a detailed narration of each case is provided in Chapter 4.

In multiple case study design, the analysis was performed at two levels: within each case and across the cases (Stake, 1995). In this study, each case was analyzed separately for emerging themes. Then all cases were analyzed for themes that are either common or different. This shows the extent to which the identified approaches have a similar or different influence on the effectiveness of mediating instruction to female students. It also shows the extent to which the issues and challenges that male professors and female students face in gender-separated classrooms are similar or dissimilar within the different approaches.

Qualitative data validation

Creswell and Plano Clark (2007) suggested that qualitative data validation involves assessing the accuracy of information obtained through data collection, while Guba and Lincoln (1989) indicated that qualitative data validation involves establishing *trustworthiness*. They later suggested four criteria that "adequately (if not absolutely) affirm the trustworthiness of naturalistic approaches" (Guba & Lincoln, 1989, p. 43). The criteria are: transferability, credibility, dependability, and confirmability (Guba & Lincoln, 1989).

Transferability. Transferability enables readers to determine whether a research finding can be transferred to other settings (Creswell & Plano Clark, 2007). This can be achieved through extensive and careful description of the time, place, context, and culture of the research setting (Guba & Lincoln, 1989). Transferability is thought of as a parallel to generalizability or external validity in quantitative research (Guba & Lincoln, 1989). To ensure transferability in this study, the researcher described in detail each of the classroom settings at Qassim and Alfaisal Universities.

The multiple case study design (Stake, 1995) chosen for the qualitative phase emphasizes "particularization" (p. 8), which is getting to know each case (in this context the approaches of mediating instruction at Qassim and Alfaisal University) well and providing an in-depth description of it. The descriptions were provided based on data gathered from observations, male faculty interviews, female student focus groups, and informal interviews with the teaching assistants and administrative assistants. This data was validated through member checks, as described in the following section.

Credibility. Credibility, analogous to internal validity, is defined as the "isomorphism between constructed realities of respondents and the reconstructions attributed to them" (Guba & Lincoln, 1989, p. 237). Guba and Lincoln suggest several methods for verifying such isomorphism. In this study, *peer debriefing*, *member checks,* and *triangulation* were used to ensure credibility of the qualitative findings.

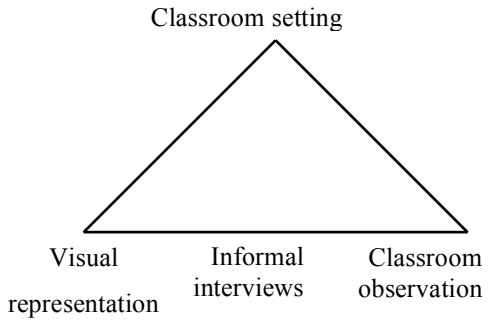
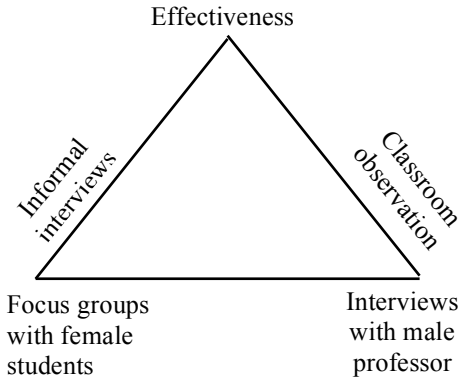
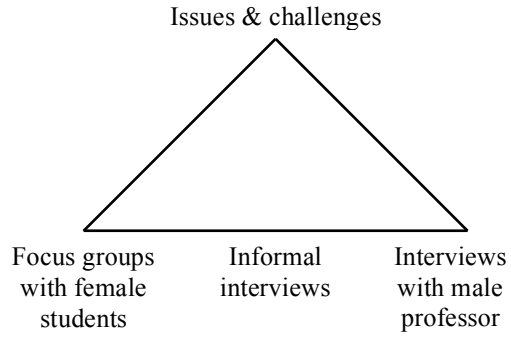
1) *Peer debriefing*: Guba and Lincoln (1989) encourage extended and extensive discussions with a disinterested peer to test out the findings and also to refine the information that the researcher may have to "make propositional that tacit and implicit information" (Guba & Lincoln, 1989, p. 237). The researcher engaged in prolonged discussions of the findings and analyses of the study with

a peer colleague and a female student at Qassim University. The researcher also engaged in debriefing sessions with her major professor.

2) *Member-checks*: Considered the most crucial method for establishing credibility, member-check is a process in which preliminary themes and interpretations are reviewed by the participants of the study (Guba & Lincoln, 1989). Informal member-check meetings were held during the final observation sessions in each classroom with the female students who participated in the focus groups as well as the male professors who participated in the interviews.

3) *Triangulation*: Creswell (2013) described triangulation as occurring when "researchers make use of multiple and different sources, methods, investigators, and theories to provide corroborating evidence" (p. 251). In this study, triangulation was achieved by using multiple data sources and multiple theoretical frameworks. Table 3 shows how the data sources and theoretical frameworks were triangulated to answer the research questions. Five different triangulation attempts were identified. To present a rich description of the settings, the observation field notes were triangulated with the pictures of the classrooms and information obtained from teaching assistants during observations. Another example is triangulating the perspectives of female students with that of their male professors while evaluating the effectiveness of the technology or partition used in their classroom. Administrative and teaching assistants also provided an important perspective due to their neutral standpoint. Their perspectives were triangulated with the perspectives of the female students and male professors.

Table 3. Triangulation Approach

Research Question	Triangulation method
1. What classroom configurations and/or technologies are used by male professors to teach female students in gender-separated classrooms?	Triangulation of data sources 
2. To what extent are the classroom configurations and/or technologies currently used in gender-separated classrooms seen to be effective from the perspective of the users?	Triangulation of data sources 
3. What issues and challenges do female students and male professors report in gender-separated classrooms?	Triangulation of data sources 

Dependability. Dependability deals with the consistency of the data over time(Guba & Lincoln, 1989). It can be achieved by having an external expert or group of experts examine

the process and product of the research. The experts determine whether the findings, interpretations, and conclusions are supported by the data (Creswell & Plano Clark, 2007). The researcher's major professor and doctoral committee members served as external experts who examined the research design before the research was conducted. They examined the findings and interpretations and determined whether the conclusions were adequately supported by the data.

Confirmability. Confirmability, analogous to objectivity, is concerned with ensuring that data, interpretations, and findings are rooted in the contexts and participants involved in the study and are not figments of the researcher's imagination (Guba & Lincoln, 1989). Guba and Lincoln (1989) promote making both the "raw products" (Guba & Lincoln, p. 243) and the "processes used to compress them" (Guba & Lincoln, p.243) available to be inspected and confirmed by external experts. This was achieved by making the observations, interviews and focus group transcripts, visual representations, the audio recordings, and the analysis and coding process available and accessible to the researcher's major professor.

Quantitative Data Collection and Analysis

The second phase in the study focused on collecting quantitative data based on the themes identified in the qualitative study. In the quantitative phase of this study, one survey instrument was constructed and distributed to female students and male faculty members at Qassim University. The survey focused on the experiences of female students who take or have taken classes with male professors and the experiences of male professors who teach or have taught female students at Qassim University.

Sample

The research sample consisted of female students who have taken classes with male professors at Qassim University and male professors who have taught female students at

Qassim University. It is important to note that the population of this study is small relative to the general population at Qassim University. Because the university is gender-separated, female instructors teach most of the courses available to female students. Most male professors teach male students. Moreover, courses and faculty members (both male and female) change each semester at many of the departments in the university, making it difficult to estimate the population size. Therefore, the population in this study is a hidden population for which there exists no sampling frame.

Traditionally researchers sample these populations by constructing a partial sampling frame by identifying unhidden venues or institutions through which members of the hidden population could be found (Semaan, Lauby, & Liebman, 2002). This method is biased in favor of the classroom attendees and the sampling method's coverage is limited to those who attend the class on the day of sampling. Moreover this method is costly and requires traveling to the research sites.

A new network-based sampling method was utilized in this study. Participants were recruited through *respondent driven sampling* (Gile & Handcock, 2010). Researches have been using this strategy to collect data from hidden populations for which there exists no sample frame (Gile & Handcock, 2010; Semaan et al., 2002; Wejnert & Heckathorn, 2012). This strategy starts with a selected sample that expands from wave to wave to a larger segment of the population (Gile & Handcock, 2010). In this study the selected sample consisted of thirty female students and ten male professors. The survey link was distributed via Whatsapp messaging service with a brief message to the selected sample. The selected sample or "seeds" (Gile & Handcock, 2010) were carefully selected in an effort to reach a wide range of participants. Female students were recruited with an emphasis on diverse student classification standing (year in college), specialization, college location, and students' ethnicity. Male

faculty members were recruited with an emphasis on diverse specialization, professors' seniority, college location, and professors' ethnicity. These female students and male faculty members were asked to distribute the survey to their acquaintances of male professors and female students at the university. These participants, or the "seeds" (Gile & Handcock, 2010) distributed the survey by forwarding the researcher's message containing the survey link to their inner circle of male professors and female students via Whatsapp groups or through individual messages.

Instrument development

The survey design was based on the Tailored Design Method (Dillman, Christian, & Smyth, 2009). This method of survey development applies principles from the Social Exchange Theory to maximize the benefits and decrease the costs of participation (Dillman et al., 2009). To maximize benefits, a description of the study was provided on the first page of the survey with a statement about the purpose of the study and the importance of participation. The study's social usefulness and importance for female students' education was explained. To minimize costs, requests for sensitive or personal information were minimized and the survey questions were designed to be short and easy to complete. The survey link was provided online and distributed via Whatsapp groups and messages to make it more convenient to respond. For convenience, the survey was designed with maximum compatibility for mobile phones as well as computers.

The survey was designed and made available through Qualtrics using the display logic method. The survey was designed first in English. The researcher's major professor was consulted and adjustments were made according to her feedback to reduce measurement error. The survey questions were then translated to Arabic. Cognitive interviews (Dillman et al., 2009) involving the survey questions were conducted with a female undergraduate student in

mathematics and a male professor of economics at Qassim University to ensure fidelity of the research questions and ensure that the translation was valid and age appropriate. Changes were made to the instrument based on the feedback received. After the final revisions were completed, the survey was pilot tested with a sample of five people, three female students and two male professors at Qassim University to determine whether the proposed survey instrument was appropriate and adequate for the study. The pilot study gave a sense of how the instrument functioned and identified vague or unclear questions as well as indicated whether the individual questions were measuring the themes identified in the qualitative phase of the study as intended. Finally, the survey was published and distributed to the selected participants 'seeds.' Participants were given the choice to take the survey in Arabic or English.

A statement was displayed at the beginning of the survey that contains instructions on how to complete the survey, a brief description of the study, the researchers' contact details, and how participants can leave the study. Informed consent was granted if the participant clicks on "Next" to take the survey. Qualtrics keeps the data generated by the responses anonymous so the confidentiality of participants is kept intact.

Quantitative data analysis

Descriptive statistics was used to summarize the data gathered from the survey. The Qualtrics data analysis software was sufficient to produce the descriptive statistics including the graphical images and tables displayed in Chapter Five.

Quantitative data validation

Threats to the validity of quantitative research are mainly categorized into internal validity threats and external validity threats (Creswell, 2013; Johnson & Christensen, 2014) and validity of the measurement instrument (Gay, 2000).

1) *Internal validity*: Threats to internal validity can occur from "experiences of the participants that threaten the researcher's ability to draw correct inferences from the data about the population" (Creswell, 2013, p.162). In this study the suspected threats to internal validity include mortality and compensatory rivalry.
    a. Mortality: Some of the participants may have dropped out or refused to participate in the study. To minimize risk, the researcher applied principles from the Social Exchange Theory in the instrument design to maximize the benefits and decrease costs.
    b. Compensatory rivalry: Participants in Qassim University may be motivated by social and academic competition to attempt to influence the results of the study towards a more desirable outcome. This risk was minimized by informing participants of the purpose and significance of the study and the importance of their complete and honest participation.
2) *External validity:* Threats to external validity can occur when researchers draw incorrect inferences from the sample data to other people, settings, and times (Creswell, 2013; Johnson & Christensen, 2014). The suspected threats to external validity include the risk of unequal distribution of the survey. At Qassim University, the risk of unequal distribution arose due to the lack of email lists or sample frame for students and faculty. To minimize bias a respondent driven sampling method was used to recruit participants. Every effort was made to distribute the survey link to a diverse sample of male faculty and female students. The selected sample used Whatsapp messenger groups and messages to distribute the link to a wide range of participants. Still this

sampling method was limited to female students and male professors who use Whatsapp messaging service.

3) *Validity of the measuring instrument:* Content and construct validity of the instrument (Gay, 2000) had been established to guarantee the validity of the survey.

    a. Content validity showed the extent to which the items of the survey were representative of themes identified in the qualitative phase of the study. The researcher's major professor was provided with a summary of the themes from the qualitative study as well as a draft of the survey questions. Changes were made based on feedback.

    b. Construct validity refers to the extent the survey instrument reflects the construct it is intended to measure (Gay, 2000). Threats to construct validity occur when researchers use inadequate definitions and measures of variables (Creswell, 2013). To ensure construct validity, cognitive interviews (Dillman et al., 2009) were conducted with a female student and a faculty member at Qassim University to ensure the validity of both the English and the Arabic translation of the survey questions.

To validate the translation of the interview questions, survey, and consent forms, a female student and faculty member at Qassim University who speak Arabic and English reviewed the translations.

Research Permission and Ethical Considerations

Ethical issues were addressed at each stage in the study. In compliance with the regulations of the Kansas State University (KSU) Institutional Review Board (IRB), permission for conducting the study was obtained. The Request for Review form was filed and

approval was acquired prior to collecting any data. The initial application for IRB permission contained information about the primary investigator, a description of the project and its significance, methods and procedures, participants, and the qualitative data instrumentation. Because the quantitative instrument was based on the results of the qualitative data in this study, the survey instrument was submitted as an IRB amendment for approval. The IRB training modules were completed prior to submitting the IRB application. The study was conducted at two universities and the participants were over 18 years of age. The topic of the research did not fall in the sensitive category. Because this is international research, the required permission letter was obtained from Qassim University and written consent via email was obtained from Alfaisal University.

An informed consent form was developed (See Appendix D) for participants in the qualitative phase of the study. The form provided a brief description of the study, informed participants of their rights, and requested their agreement to be involved in the study. The consent form was translated to Arabic and both the English and Arabic versions were presented to participants to ensure they fully understand their rights. A statement about informed consent was affixed to the web survey (which was also translated to Arabic) and infers consent by participation.

The anonymity of participants was protected by assigning fictitious names to participants in the focus groups and interviews. The use of Qualtrics to develop the survey ensured the anonymity of survey participants by assigning numeric codes to the returned surveys. The responses for all data collected have been kept confidential. All recorded material including survey electronic files, transcripts, video recordings of male participants, and audio recordings of female participants have been saved in a password protected flash

drive and have been locked in a safe place in the researcher's office. They will be destroyed after a reasonable period of time.

Researcher's Resources and Skills

Prior to enrolling in the Ph.D. program in Curriculum & Instruction, the researcher completed a BSc in Computer Science and a Master's in Education Technology. Advanced courses in statistical analysis were completed during both the Bachelor's and PhD programs. During her time at Kansas State University, the researcher completed coursework in qualitative and quantitative research and has become proficient in the use of SPSS, Windows Excel, Qualtrics, and NVivo. The researcher had access to all of these tools and statistical packages.

As a faculty member at Qassim University, the researcher has access to both students and faculty members at the university. The researcher contacted the Vice Rector for Graduate Studies and Academic Research at Qassim University for an unofficial authorization to conduct the study. The latter approved the topic being studied and offered his cooperation in the research.

The vice president at Alfaisal University also provided initial approval for conducting the study and directed the researcher to prospective contacts in the university. The researcher was taken on a tour of the facilities at Alfaisal University in the summer of 2016 and met with the vice-dean of admissions and registration. While there, the researcher was received with a warm welcome and met with potential participants and university affiliates who indicated their readiness to cooperate in the study.

Summary

This chapter described the methodology used to conduct this research. This research used a sequential exploratory mixed methods design and consisted of two phases; a qualitative phase and a quantitative phase. The qualitative phase of this study involved a multiple case

study design comprised of five cases, each case representing a distinct use of technology or classroom configuration. The qualitative phase was conducted at two sites Qassim University in Buraydah and Alfaisal University in Riyadh, Saudi Arabia. The quantitative phase involved a survey instrument made available to male faculty members and female students who had experienced the use of technology and gender-separated classrooms at Qassim Univeristy.

Chapter Four - Qualitative Results

Introduction

Saudi universities use a variety of classroom configurations and technologies in varying proportions to teach female students. Traditionally, wooden and privacy glass partitions have been used to separate genders in cultural and educational centers that accommodate men and women, such as mosques, universities and convention centers. When Saudi universities first accommodated female students in the early 1990s, King AbdulAziz University in Jeddah, King Faisal University in Alahsa and King Saud University in Riyadh all used partitions to separate male and female students in one classroom. Separate campuses for female students began to emerge in the late 1990s. CCTV and VCR networks were later used instead of partitions. Nonetheless, partitions have not been entirely replaced by technology. They are still commonly used in universities and elsewhere in Saudi public life.

Although universities differed in their approach to separating genders, CCTV and VCR networks have been most frequently used to connect male and female classrooms at separate campuses. Emerging technologies such as sophisticated Web-conferencing software are currently replacing CCTV and VCR technologies. Additionally some universities are shifting towards the construction of a single campus, using innovative architectural designs to minimize costs and improve communication. For example, Alfaisal University constructed a unique single campus design that employs an architectural solution for gender-separation.

In this chapter, the results of the qualitative data are presented. Data collected from interviews with male professors, focus groups with female students, interviews with administrative and teaching assistants and observations of the classrooms at Qassim and Alfaisal Universities were analyzed and are presented in this chapter. Qassim and Alfaisal

University campuses are described in more detail and pictures of the sites and the classrooms observed are provided to give the reader a sense of the place. Three sites were visited at Qassim University: the women's section in the main campus at Almleyda, the College of Education at Aleskan, and the College of Education at Almontazah. Two classroom configurations were studied at Alfaisal University.

The following sections describe Qassim University and Alfaisal University campuses in more detail.

Site 1: Qassim University

As mentioned in Chapter Three, Qassim University is a public research and teaching university located in a conservative agricultural region. It accommodates mostly Saudi students and contains 38 colleges comprising of 110 disciplines distributed across 5 large campuses and many small campuses spread across the region. The large campuses are located in three large cities, Buraydah, Onaizah, and Alrass (some still under construction), while the smaller college branches are distributed across nine small towns in the Qassim region. Due to cultural restrictions on women travelling, campuses in all of the larger cities have classrooms for female students. Only two of the smaller towns have classrooms for male as well as female students.

Most of the disciplines accommodate both male and female students. However, some disciplines, such as Engineering, are open to only males; and other disciplines, such as Fashion Design, are open to only females. The university upholds a strict gender-separation policy on its premises at all times, with exceptions made only on special occasions such as the Qassim University book fair at the main campus, an annual event open to men, women and children.

Before visiting the university to collect data, the researcher obtained special permission from the Vice President for Research and Graduate Studies. After obtaining IRB approval and

Saudi research fieldtrip approval, the letter of permission to conduct research at Qassim University was granted (See Appendix E). Saudi research field trip approval was obtained through a lengthy bureaucratic process that involved administrative processing and reviewing through the Saudi Arabian Cultural Mission, the Ministry of Education, and the College of Education at Qassim University, taking approximately two months to complete (with extensive follow up).

Three campuses were selected for this study based on the diversity of methods used to mediate instruction and the willingness of faculty members and students to participate in this study. First the Female Student Center in the main campus at Almleyda was visited, then the College of Education at Almontazah, and finally the College of Education at Aleskan. Generally the classroom configurations provided at these sites are representative of the classroom configurations at other female campuses at Qassim University. For convenience, all of the sites chosen for this research are in Buraydah, the capital of Qassim and the only city in the region that has multiple female student campuses.

Case 1: Ethernet Based Videoconferencing (VCR)

Ethernet based videoconferencing (VCR) is implemented at the main campus at Almleyda, the headquarters of Qassim University. The Almleyda campus houses the main administration offices, the main library, the university's medical facilities, the sports and recreational center, as well as most of the university's colleges, departments and services. The Female Student Center at Almleyda campus accommodates most of these services. The center was built as a single building with annexes later built on demand. It currently comprises of lecture halls, classrooms, a library, computer and science labs, administrative offices, health services and a prayer hall. It temporarily accommodates the Foundation year, the College of Business, College of Computer Science, Medical Colleges and female university

administration offices. Most of the lecture halls, classrooms, and laboratories are connected via VCR technology to the buildings on the male student complex. Faculty members and administrative staff members communicate with colleagues of the opposite sex via the university telephone network.

For privacy and security purposes, the Female Student Center is surrounded by high walls. Outside the main entrance sits a male security guard, while inside is a shaded area surrounded by walls of glass and built in chairs. A small office for female security guards is situated in the corner. Female students and staff members walk in from the main entrance, take off their Abayas (long black cloaks) and head covers in the shaded area, and continue walking across the open courtyards that surround the college buildings. Visitors are requested to show an ID and explain their reasons for visiting.

Only a few meters away from the Female Student Center is a new complex currently under construction at Almleyda site that will replace the Female Student Center. This new complex includes seven buildings that will accommodate the female administration, the Colleges of Business, General Sciences, Computer Science and Medical Colleges including Pharmaceuticals, Nursing, Applied Medical Sciences, and Dentistry. Informal discussions with members of the university administration revealed that the College of Medicine will accommodate female students and staff on the same campus as male students and will be using diverse approaches to mediate instruction, including partitions in lecture halls instead of separate buildings for male and female students. Female graduate students in the College of Business may also be accommodated in the same building as male graduate students.

Description of VCR classrooms

Ethernet based videoconference rooms, or 'VCR' as they are commonly called in Saudi universities, involves connecting classrooms usually within physical proximity of each other

via an Ethernet network. The network consists of a router in each classroom commonly called the 'VCR box.' At the Almleyda site, the network connects classrooms at the male campus with classrooms at the female campus. An Internet Protocol (IP) address is generated for each VCR router and the IP address is used to connect any two classrooms. A remote control is used to enter the IP address in order to connect with the specified classroom. At Almleyda, the VCR router is kept in a locked metal box in the classrooms. The remote controls are locked in the technology personnel's office to prevent theft and loss of equipment. In addition to the network equipment the VCR classrooms contain a camera, speakers, a microphone and a projector in both the male and female classrooms. One computer workstation (See Figure 6) is used by the professors in the male classroom.

Figure 5. VCR Female Classroom

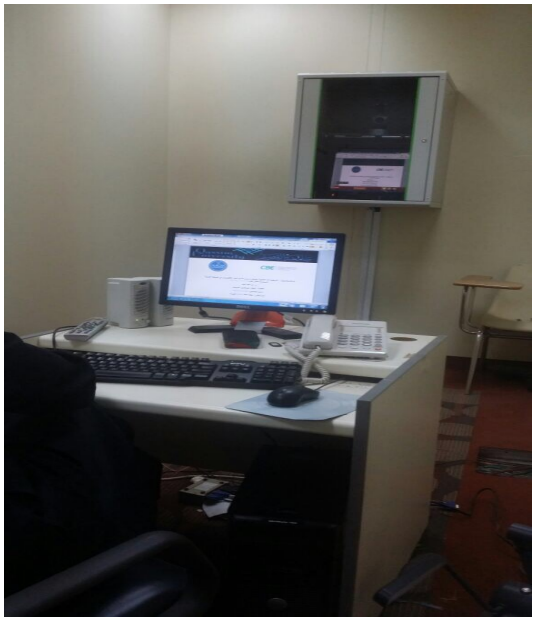


Figure 6. VCR Professor Workstation

Use of VCR in the College of Business and Economics

At the College of Business and Economics at the Almleyda campus, VCR technology was used to connect room 210 (Figure 5) in the women's college with room 207 (Figure 6) in a separate building in the men's college. The course 'Computer Applications in Economics' was taught by a non-Saudi associate professor who completed his postgraduate education at a Middle Eastern co-educational university in his home country. He is referred to as Dr. VCR. Having joined Qassim University in 2013, Dr. VCR has been teaching female students at the Almleyda campus for five years.

Course and enrollment. Computer Applications in Economics is an upper-level Bachelor's degree course. Most of the students were sophomores or seniors. There was only one male student and 11 female students enrolled in the course. The course was scheduled from 11:50 am – 1:00 pm on Mondays and Thursdays. The classroom was observed on a Thursday afternoon. Only four female students arrived on time. Three were late and four were

absent. The professor took attendance at the end of the lecture, so that students would not record their attendance and then leave.

Approximately ten minutes after the scheduled class time, Dr. VCR established a connection and the female students could see the professor's computer desktop screen on the large white projector screen in front of them. Dr. VCR greeted his students and apologized for being late, explaining that it took some time to find a remote control to make a connection. His voice could be heard through large speakers on the walls. There was a camera in the male classroom that Dr. VCR did not use on the day of the observation. There was also a camera in the female classroom that was covered with black tape and locked in a metal box in the classroom (along with the VCR router).

Due to the small number of students in attendance, Dr. VCR decided to give a review that day and deliver the lecture via Blackboard Collaborate, an Internet based videoconferencing software, on another day outside school hours. He began reviewing material by demonstrating lecture content which included equations on a word document and switching occasionally to an excel spreadsheet. He also demonstrated the use of the E-views program. Students were recording the session using their mobile phones. One student was following along with the professor's demonstrations on her personal laptop.

Learning objectives. The course's main objective is to enable economics students to use specialized programs in econometrics, mainly the E-Views program, to process data. According to Dr. VCR, the VCR technology greatly hinders accomplishment of the learning objectives. "VCR does not contribute much to the learning objectives of the course. It helps with only 20-30% of what is required to achieve the learning outcomes. I need to observe the students working out problems on a workstation, but with the VCR system I cannot do that." Dr. VCR noted that there is a difference in teaching theoretical and applied subjects using

VCR. The theoretical parts of the course are achievable via VCR, but not the application parts of the course. He clarified, "I teach theoretical material in this course and that doesn't require applying knowledge on a computer, so the theoretical parts are achieved via VCR." Some female students expressed dissatisfaction with their learning outcomes, saying that the VCR technology makes it difficult for them to achieve the desired learning outcomes. One student exclaimed, "in the end we get there, we achieve the learning outcomes, but only after substantial struggle!" Her classmates agreed.

Teaching presence. Dr. VCR expressed his dissatisfaction with the VCR's limitation on instructional methods especially in building and sensing students' understanding. He confessed: "If I was compelled to choose between facilitation approaches then the worst would be VCR." Some of the limitations of VCR are specific to certain subjects such as applied subjects that require demonstration, the professor explained. "For mathematical economics, I need to use the whiteboard to demonstrate. For computational applications in economics I need to see the students demonstrate on their computers to see if they understand."

Female students suggested that some professors were better at managing the technology than others. They mentioned an instructor, who was not a participant in this study, who was very good at explaining material using the whiteboard via the VCR system. When Dr. VCR was asked about using the whiteboard via the VCR system, he said, "It is an exhaustive task. It takes time. I have to keep adjusting the camera as I'm writing on the board. Sometimes the camera is not in the right place. Students tell me so I adjust the camera by zooming in or out until they can see what's on the board."

Lack of supervision. Technology supervision is currently allocated to female lecturers and teaching assistants at the College of Business and Economics. Some of them do not show up to the designated class, which often frustrates male professors and female students alike.

One teaching assistant exclaimed, “This is not my job. I am a teaching assistant, I should be teaching. I am not here to supervise technology.” One female student pointed out that “All these teaching assistants we have are not qualified to teach us. They have Bachelor’s degrees, they’re just like us. They’re supposed to continue to study Master’s and PhDs, some of them did and some didn’t.” In order to meet the standards of the Association to Advance Collegiate Schools of Business (AACSB), the College of Business and Economics must strategically deploy and maintain faculty who demonstrate academic and professional engagement. Academic and professional engagement requires initial academic and professional preparation that, according to Standard 15 of the AACSB Business Standards, is assessed by earned degrees and other academic credentials (AACSB International, 2013). To maintain the AACSB accreditation, teaching assistants without postgraduate degrees are not engaged in academic and professional activities in the College of Business and Economics. They are asked to supervise the VCR technology, but some of them refuse to do so believing that this is outside their job description.

Social presence. Regarding students’ participation in class, Dr. VCR said, “Students interact and participate but not as much as they should. When asked whether VCR hinders his ability to communicate with students, he said “I personally believe education is a social experience so I like to joke and use humor in class. I need to use humor to prevent continuous frustration that emerges from using VCR. I personally need this, my students need it more.”

Limitations of VCR technology also included connecting with students on a deeper level. Dr. VCR explained, “Face-to-face is better because I can see the student, I can make eye contact with them and they can make eye contact with me. They notice my emotions and I can observe their emotions and their responsiveness.”

Dr. VCR showed a sincere interest in getting to know and interact with his students. He often joked with students, calling them by name, "Maryam is our teacher - she doesn't need to have her attendance taken" or "Salwa left us, she's gone to watch a Turkish soap opera." However, not all professors make an effort to interact or get to know their students. The female students recalled one professor in their department who often asked them to turn their microphones off when he's teaching. He is often annoyed by the sound of static so he tells them to turn the microphone off. At the end of the lecture they can turn it back on to ask questions.

Dr. VCR was asked about this issue. He responded that he had heard about a colleague who requests his students to turn their microphone off. However, he explained that he firmly denounces this behavior. Although he finds the students' murmurs and the background noise of static annoying and distracting; he's always mindful of the female students in the classroom and encourages them to participate and ask questions in class.

Cognitive presence. During the observation in Dr. VCR's class, female students turned the microphone off and talked among themselves. When asked what they were talking about they said that sometimes they are discussing issues related to the course topic and sometimes they are not. Some students walked in and out of the classroom without permission. One student put on her headscarf and Abaya and began to pray in the classroom while the professor was delivering his review.

Technical issues. One technical issue that reoccurs is the inaccessibility of remote controls. As one female student explained "The remote is locked up. It's treated like precious jewelry. They don't give it to us." Without the remote control, students and professors are not able to connect their classrooms for a VCR session.

Other technical issues include the sound breaking up or connecting the video but not the audio. One female student explained "sometimes he hears us we can't hear him [the professor], sometimes we can hear him but he can't hear us." Another student added "sometimes there's clicking noise with the sound, or static." "Sometimes the connection is lost." The students recalled one time the connection was lost during another professor's course. "The professor was explaining the material for 20 minutes without realizing that the connection was lost. He became frustrated after that incident, he started giving us a summary of the lecture in the first five minutes and he would tell us he is not going to repeat anything even if the connection is lost." Another student said chuckling, "Yeah, that professor hates VCR. He said if someone's mother prays against him, he ends up teaching girls at Qassim University [Due to his misfortune]."

In search of better methods. Dr. VCR, the Econometrics professor in the College of Business at the Almleyda campus, has been using free Internet based videoconferencing software out of university hours in a personal effort to communicate effectively with his female students. He shared his experience and his opinion of this method, "Modern software such as Blackboard Collaborate and Internet based videoconferencing software are better for interacting with female students than VCR. The technical services provided by Internet based videoconferencing software such as Blackboard doesn't require much effort to use." He also commented on the technical support of Internet based videoconferencing compared to Ethernet-based VCR: "The technical support at the university only supervises the technology, they are not associated with the companies that establish and provide the service. To the contrary the tech support provided by Blackboard are from the same company, so there's fewer technical issues with Internet based videoconferencing software."

Summary

Overall, the use of Ethernet based VCR technology at the Almleyda campus displayed many problems. Both female students and Dr. VCR were not satisfied with the use of Ethernet based videoconferencing to mediate instruction in the classroom. They both expressed concerns regarding technical issues, limitations in communication, limitations in instruction, difficulties with classroom management, and difficulty in achieving the learning objectives. One of the issues that further complicated the situation was the non-cooperation of teaching assistants who refused to supervise the technology, thereby leaving the burden on female students and male professors. The teaching assistants' lack of cooperation also led to challenges in students' behavior and classroom management. Collectively the technical problems and the teaching assistants' lack of cooperation led to a great deal of frustration and irritation from both male professors and female students.

Case 2: Closed Circuit Television (CCTV)

Surrounded by high walls with a large metal black gate is an old unkempt building that is the site of the College of Education in Almontazah. The site is situated on a busy road in the heart of Buraydah. Like other sites, a male security guard sits outside the entrance and a female security guard sits inside. The vice-dean, a Saudi female assistant professor, was very welcoming and directed her staff to help with the research. The college is small, has fewer students, and seems more orderly compared to other campuses in Buraydah. As a standard procedure, visitors were intercepted at the entrance and requested to show ID. The female students were dressed in long black skirts and, due to the cold weather, sweaters or jackets. The college had an overall ambiance of a Saudi female high school rather than a college.

At the center of the building is a large indoor courtyard. The courtyard was very noisy with groups of young female students, walking, talking, studying or sitting around in circles on

mats socializing over Arabic coffee and food. At the corners were stairs that lead to the upper floors. On the upper floors, the long silent corridors have classrooms on each side. One of the corridors contains classrooms that are connected via CCTV technology used primarily to enable male professors to deliver instructions to female students.

The college, which used to be a teacher preparation college, currently offers Bachelors degrees in Education. Students choose from a number of degree programs including Early Childhood and Elementary Education with minors in Mathematics, Science and Arabic Studies. However, the college has stopped accepting new students into their Elementary Education programs in the last two years because of plans to eliminate the Elementary Education degree altogether. This is in line with new nationwide educational policy to only employ teachers with graduate degrees in education and undergraduate degrees in specialized subjects. Under the new educational policy, someone who wants to become an elementary school teacher must major in mathematics, science, or art and then obtain a Master's degree in Education. The Early Childhood degree program is still open and may be moved to a different site in a few years.

Description of CCTV classrooms

The building, which accommodates the College of Education, is wired with Closed Circuit Television technology (CCTV). Each classroom in this corridor contains two television screens, four speakers, and two microphones fixed to the walls in the front of the classroom (See Figure 7). The classrooms are connected via CCTV technology to the 'network room.' The 'network room' contains four workstations and is attended full time by a male network technician who is responsible for operating the technology. It is located on the same building, near the male security guard's room. Male professors, whose offices are located on the main

Almleyda campus, commute to this location to deliver their lectures and take turns using the workstations according to an assigned academic schedule.

Figure 7. CCTV Classroom

Use of CCTV in the College of Education

The course, 'Geography of the Kingdom of Saudi Arabia,' is a core course for the elementary education track and was taught by a Saudi male professor who has been teaching female students at Qassim University for 10 years. The professor is a native of Buraydah and received his higher education from the United Kingdom. He considers himself non-traditional and open-minded but committed to moral values. He will be referred to as Dr. CCTV.

Course and enrollment. There were approximately 40 students enrolled in the course. The lecture hall was full, with only a few empty chairs. There was a supervisor sitting on a chair at the front of the classroom. The female students seemed attentive. Overall, the class was well managed. The female students were quiet and most appeared to be listening. Some seemed distant and uninterested.

Learning objectives. According to Dr. CCTV, the goal of this course is to develop a sense of national belonging and national spirit amongst students. He clarified "The course also gives doses of factual knowledge about the country, such as the economy." In addition to the Saudi economy, the course gives brief factual knowledge about the country's geography and agriculture.

Dr. CCTV believed that using CCTV does not hinder achievement of the learning objectives, "there is no difference for me personally between boys and girls in terms of communicating the content or conveying the goals." However, his female students had a different opinion. "The learning outcomes are very low. I've taken three courses [with male professors] and I didn't understand much from any of them. There's a big difference between male and female professors, the women are much better." Students expressed their preference for face-to-face instruction but also emphasized their preference for female professors stating that they feel more comfortable and relaxed with female professors.

Teaching presence. The lecture was delivered in a traditional manner with Dr. CCTV explaining content from a textbook. Only Dr. CCTV's hands showed on the screen as he zoomed the screen on a graph. He occasionally pointed to the textbook, flipping through the pages to demonstrate content, which included a map, graphs, and descriptive text. The images were very clear and most students seemed to follow attentively. Some were taking notes. Dr. CCTV said that this was an easy subject, "It's not hard it doesn't need a lot of demonstration. It doesn't require application or experimentation so there's no problem in delivering or understanding the content." He explained that he relied on humor and informal discourse to engage his students. He also stated that he used different instructional methods in other courses depending on content and course requirements, such as a computer, projector, and whiteboard. He explained, "when I'm teaching geology, I use a whiteboard and make some drawings and I ask if they understand or not, they usually do."

However, Dr. CCTV's female students in 'Geography of the Kingdom of Saudi Arabia' expressed their dissatisfaction with his instructional approach to the course. One student compared Dr. CCTV's instructional approach in teaching the 'Geography of the Kingdom of Saudi Arabia' with the instructional approach of a female professor. She stated, "I took this

course with a female professor before and I dropped it towards the end of term. All of the information I know is from the female professor. She was a lot more engaging. She used to give us maps in the middle of class; she incorporated a lot of activities in our classes. I don't think I've learned anything from him even though it's a really easy subject."

On the other hand, students described another male professor, who taught Educational Psychology. He was more successful in engaging students in the classroom using CCTV. One student shared her experience explaining, "He was very encouraging, he makes us get up and move around, and we have to speak and participate in class, sometimes he makes us explain the material to him. He put us in groups and gave us activities, such as best answer, shortest answer, and sometimes he would ask a student to explain or discuss a point." She added, "A lot of the girls couldn't talk to him on the microphone at first, but then it became normal to them and they communicated and participated fine."

Instructional limitations. Dr. CCTV believes that CCTV technology does not limit his instructional methods in any way. He stated, "I use my maps to demonstrate the lecture. To the contrary, the male students that I teach don't have a projector. So technically the girls have better instructional technology facilities, it's better because I can show them the maps and demonstrate to them." His female students disagreed. One student articulated, "For a male professor, CCTV may hinder his ability to incorporate activities in the class." She explained that with the CCTV system, the professor has to send instructional material, such as handouts for classroom notes, quizzes or activity worksheets, in advance with a female supervisor. In the case of quizzes or activity worksheets the supervisor collects the documents after class and sends them back to the professor. "It all takes time and effort," said student.

Applied vs. theoretical instruction. Students differentiated between theoretical subjects and applied subjects. One student suggested, "CCTV may be appropriate for theoretical

subjects that depend on reading, but not applied subjects like math. We need women to teach us math." Another student shared, "I specialize in math and it's based on understanding but some professors just read out to us, they don't demonstrate or explain the content." A student exclaimed, "If they [male professors] taught us math we would be so lost"!

Sensing students' understanding. The lack of face-to-face instruction limits male professors' ability to sense female students' understanding. One student said "Even if we ask a question, sometimes he doesn't know what we're asking right away and some girls get uncomfortable, they don't want to elongate the discussion." Her classmates agreed. Another student added, "I wouldn't tell him if I didn't understand. I'd rather be quiet and mess up in the exam than get up and tell him I didn't understand. Most professors ask if we understand, and most students would say yes even if they don't." The student expressed that this was due to the professors' gender "Because he is a man, I don't get up and speak unless I'm very confident with my answer. With female professors, I don't mind putting myself out there more."

Acknowledging student contributions. Dr. CCTV acknowledged that he cannot tell his students apart from their voices. He only knows them by name. He explained, **"**I ask students when they participate for their names. When one of them speaks, I ask 'who are you' and I note it down on a piece of paper. If it's only one student participating, I'll say why are you the only one talking? Where are your classmates? I can't tell them apart from their voices but I ask for names." Students also sensed that their male professors don't know them. One student said "They [male professors] only know [name of female student], because she's very outspoken and she's always next to the microphone."

Social presence. Generally, the female students considered communication with their male professors to be poor "unlike female professors who have office hours and we can go and talk to them directly." Students mentioned that some male professors provide their personal

contact information such as email, Whatsapp messenger, and Twitter to all students. Other male professors provide their contact information to only three female students who are expected to coordinate and communicate on behalf of the rest of the class. However, the majority of male professors refuse to share any contact information with their female students, making the only way to communicate is through the teaching assistant.

Cognitive presence. Dr. CCTV felt that his male students are more interactive and engaged in their learning than the female students, which causes him to prepare more for courses that only serve male students. He reasoned that this is related to the female students' conduct rather than the technology. He clarified, "with boys there are five to six students that interact and participate, they are interested and involved in their learning. They text me on Whatsapp and ask questions. But the girls, nothing at all." He acknowledged that some female students may be shy and some may refrain from interacting due to peer pressure. He explained, "some are too shy to interact or speak to a professor. Generally, girls mock and poke fun at each other, so some are fearful of speaking up so that her peers wouldn't laugh at her. Unlike boys, boys have more boldness." Yet, he thought the female students' conduct is mostly influenced by the desperation and frustration associated with the new degree requirements in teaching. The Elementary Education Bachelor's degree will not enable them to get a teaching position. Dr. CCTV also thought that some of the female students lack of passion and interest for learning.

Technical issues. Dr. CCTV, his female students and administrative staff reported no technical problems or failures. "There are absolutely no technical issues." said the administrative assistant who is in charge of the CCTV classrooms. "Only lecture hall number 2, the technology there requires a password, so sometimes we have issues, but other than that no technical issues at all." Although a more out of date technology, CCTV seemed to function

well with no connectivity problems. CCTV classrooms also had good sound and video systems (even though the equipment was old).

Summary

All in all, CCTV displayed fewer issues and problems compared to the Ethernet based VCR system at Almleyda campus. The technology, although the most out of date, displayed the fewest technical problems and failures. The classrooms were well managed due to the presence of a female supervisor in the classroom. However, the CCTV system was limiting. Dr. CCTV's female students preferred face-to-face instruction with female professors. They expressed that the CCTV system limited male professors' instructional capabilities and they personally felt more comfortable in the presence of a female professor.

Case 3: Internet Based Videoconferencing (VC)

Like other Saudi female institutions, this site is surrounded by high walls. A male security guard sits in an air-conditioned room outside the gates and a female guard sits in an air-conditioned room surrounded by glass inside the gates. The site is located on a busy road between a business and a residential district. It is a rented temporary location for the College of Education for women. On the main road is an entrance for female employees. On the other side of the building is an entrance for female students. The employees' entrance leads directly to the administration offices and meeting rooms on the right and the lecture halls, cafeteria, and faculty offices on the left. A strong fresh aroma of Arabic coffee lingered in the hallways. The newly constructed building was clean and quiet except for the occasional voices of women greeting each other.

The College of Education in Aleskan currently accommodates students enrolled in graduate degrees in Curriculum and Instruction, Education Technology, and Educational Principles as well as graduate and undergraduate degrees in Art, Educational Psychology, and

Special Education. Many of the classrooms and all of the meeting rooms (See Figure 8) are equipped with Internet based videoconferencing capabilities thereby adopting an alternative approach to communication with male colleagues and instructors.

Figure 8. VC Room

Description of VC classrooms

The newly furnished classrooms and conference rooms are equipped with Internet-videoconference room technology (VC). The VC conference rooms consist of a display screen, a desktop computer, microphone, speakers, and a fiber optic Internet connection. Qassim University is currently a Huawei partner university and maintains a subscription with the Huawei videoconferencing software, TE Desktop. TE Desktop delivers an audiovisual video conferencing experience using computers, mobile phones, and tablets. It provides secure, high quality audio and video sharing between a variety of devices and video conferencing systems. In this case, it is the software currently used to communicate with male colleagues and professors via the desktop computers provided in the Internet-videoconference rooms.

Use of VC in the College of Education

In one of the Internet-videoconference classrooms, the course 'Research Methodology' was taught by a male faculty member to female graduate students enrolled in the Master's program in Education Technology. The Internet-videoconference classroom was equipped with a projector, a whiteboard, a desktop computer (locked in a box), a microphone, speakers, and a high speed Internet connection. The male faculty member, an Associate Professor in Education Technology, was a non-Saudi who has been teaching in Saudi universities for over ten years. He joined Qassim University three years ago and has been teaching female and male students in the College of Education. He will be referred to as Dr. VC.

Course and enrollment. The course 'Research Methodology' had 12 female students and no male students in their third semester (second year) in the Masters program. Dr. VC effortlessly connected from his office at Almleyda to his students at 8:05, only five minutes after the designated lecture time. He greeted his students on the Internet-videoconferencing platform. Five female students were already waiting for him in the classroom, while two students arrived late. There was no supervisor in the classroom. The course was designed to feature students' presentations, which included research proposals followed by final research reports. Three students were scheduled to present their research at every class. Students were expected to upload their documents and PowerPoint presentations to a shared Google Drive designated for this class. After greetings, the first female student downloaded her PowerPoint presentation from the Google Drive and shared the desktop screen with the professor. She then sat in a chair next to the microphone and began reading her presentation while flipping through the PowerPoint slides on the computer.

Learning objectives. The objective for this course was to teach students the appropriate methodologies for research in education. Students were expected to construct and

present a proposal for their research as a mid-term exam and then construct and present a final research paper for their final exam. Dr. VC and his female students agreed that the learning objectives are achieved via Internet-videoconferencing. Students presented their papers via the web-conferencing platform and seemed to be at ease while doing so.

Teaching presence. Preparing and designing instruction via Internet-videoconference is more time consuming and requires more effort, said Dr. VC. "It's easier to just draw and write on the board with male students [face to face instruction], whereas with this method, I have to be well prepared in advance and have my lectures uploaded for the students before the class."

Instructional limitations. According to Dr. VC, one of the main limitations of the Internet-videoconference rooms is the lack of eye contact and the inability to see students and sense their level of understanding and engagement. Another issue, according to Dr. VC, is that Internet-videoconferencing is restrictive. "When I teach male students face to face, I can move around and use the board, with VC I'm restricted I can't move."

Additional resources. Some male professors provide additional resources such as PowerPoint presentations, YouTube videos. One female student mentioned "In statistics the professor provides PowerPoint presentations with explanations of the answers. When we get home we can apply the steps on the statistical software on our computers." Other professors also provide additional resources in the form of documents and videos that are sent to students via email. Students shared, "It depends on the professor, but some of them send us additional resources such as articles or videos if we have a question or didn't understand something during class."

Social presence. Students considered Dr. VC's classes very interactive. They commented on his teaching style and instructional methods, considering it interactive and

engaging. However, Dr. VC considered face-to-face instruction with male students much more interactive than Internet-videoconferencing. Though he reflected that Internet-videoconferencing allows female students the liberty to speak freely without the pressure of feeling that the professor is watching her, the way she would in a face-to-face setting. Students also considered this an advantage of Internet-videoconferencing and preferred this method for this reason.

Group cohesion. The female students were relaxed and communicated openly with each other before, after and during class. Students knew each other's names, telephone numbers and contact information. They explained "we share everything with each other [the class of female students]. We upload our presentations in advance and check each other's work and give each other feedback." Students were actively taking control of their learning. One student said, "I would give us 99% for effective communication and collaboration with each other." Her classmate responded, "100%, everyone is cooperative."

Cognitive presence. Female students in Dr. VC's class had mixed opinions regarding their comprehension and understanding of the classroom content and material via Internet-videoconferencing. One student stated that face-to-face instruction is better for higher-level learning, "I think when I'm engaged in a discussion it's better face to face." she said. All of the students said that they did not have any issues understanding content from Dr. VC, but they expressed that it often depended on the course and the professor. One student said, **"**there is some difficulty in some of our courses, but this is due to the difficulty of the subject and the background of the professor. It has nothing to do with the technology." To elaborate, one of the students said, "for example, statistics would be difficult to take via Internet-videoconferencing." Her classmate responded, "It depends on the professor. The professor who taught us statistics was excellent. He was very devoted. Even though he taught us via

Internet-videoconferencing, but everything was so clear……he gave us homework to do at home, so we applied everything we learned in class on our personal computers and at the end of the course we had a file with all of the work that we did." Another student jumped in "yeah, I took that class as well. He was excellent. I learned so much."

Technical issues. Some of the most common technical problems with Internet-videoconferencing involved IP connection. Dr. VC stated, "Sometimes a colleague would use the same IP address and I would lose connection during class." and "Sometimes I spend 20 minutes searching for an IP address, which causes classes to start late." There are also problems with the sound system, including static and an echo with the sound. Dr. VC explained, "The sound isn't clear most of the time, I have to ask a student to repeat herself a couple times because I can't understand what she's saying." The female students also complained about the sound system, indicating that they cannot hear their professors clearly. One student said that she could not hear half of what the professor is saying due to sound issues. She explained that sometimes it is due to the quality of the sound system and sometimes the professor's strong accent.

Summary

Overall, Internet based videoconferencing demonstrated more technical issues and problems with the sound system than CCTV. However it provided a good alternative to both CCTV and Ethernet based VCR systems due to its advanced instructional capabilities. In this case, Dr. VC used supportive tools such as PowerPoint slides and Google Drive to support learning. All of these tools were compatible and easy to access via the Internet-Videoconferencing platform.

Perspectives at Qassim University

Dr. VCR was very explicit about his dissatisfaction with the use of Ethernet based videoconferencing technology (VCR) to teach female students at Qassim University. He expressed his preference for face-to-face instruction and his belief that Saudi Arabia should outgrow gender separation regulations, especially in academia. There was a diversity of opinion amongst his female students. Some of his students agreed. Yet, one student firmly suggested that all female courses should be taught by female faculty members. There was a short discussion about the feasibility and costs of this solution. Her classmates responded that in their college, male faculty members were often more experienced and qualified than female faculty members, so they are better off being taught by male professors. Another student suggested that some subjects require specific rare specialties where there is only a male faculty member qualified to teach it. Students also considered the overall shortage of female faculty and the heavy workload they have. For example, in the 'Computer Applications in Economics' course, the only female faculty member qualified to teach this course had a full workload so the course had to be allocated to a male professor.

Dr. CCTV and Dr. VC had a neutral perspective regarding the technology in their classrooms. Dr. CCTV's female students expressed conservative views regarding co-education and partitions. When asked whether they would be more engaged in a face-to-face classroom with a male professor, one student shyly said, "If it's from behind a partition. Girls barely speak or communicate. If it were face-to-face, we would be statues; we wouldn't engage or participate or anything."

Site 2: Alfaisal University

As mentioned in Chapter 3, Alfaisal University is a private non-profit research and teaching university located in the metropolitan city of Riyadh, the capital of Saudi Arabia. The

university was founded by the King Faisal Foundation in 2002 and consists of five faculties including, Business, Engineering, Medicine, Pharmacy and Science, and General Studies. The university offers graduate and undergraduate programs to a diverse student population that includes Saudi and international students.

The university consists of a single campus that accommodates male and female students in a semi-separated setting. Across the street is the King Faisal Specialist hospital and research center, which is one of the university's founders and partners. The crescent shaped campus building, which overlooks King Faisal's palace, is surrounded by beautiful landscapes with a large mosque shaped like an inkwell on the side towards the right of the main entrance. Outdoors are separate gardens for men and women and separate sports facilities. There is a separate entrance for men and women with a female security guard sitting at a desk indoors near the women's entrance. The entrance leads to the second floor, which is generally allocated for female student lecture halls, laboratories, libraries and study areas. Some areas on the second floor are allocated for faculty offices, with privacy glass at the beginning of the corridors leading to the offices and a sign indicating that this is a 'mixed zone.' Women on this floor keep their Abayas on but relax their head coverings in 'separated' areas and readjust them before entering 'mixed' areas. The hallways on the second floor overlook the foyer on the first floor, with railing in the form of privacy glass surrounding the open areas so that voices of male and female students can be heard. As the tour guide explained, this is meant to give the feeling of a cohesive institution while maintaining privacy for women and separation of the sexes. The first floor, separated by partitions, contains the female administration offices and the food court. The food court consists of a variety of Saudi and international fast-food restaurants. The area is also separated by partitions. Each restaurant has windows on the men's side and windows on the women's side, with a male server serving both windows.

According to a senior member in the administration at Alfaisal, the university is committed to equality of services, opportunities, and education for men and women. “We have the same education and the exact same facilities” she stated, “including with extracurricular activities. When we offer a club for boys, we offer the same club for girls. If we have an association for boys, we have the same association for girls. The students don’t meet or mix but they receive the same opportunities.” With regard to the university’s philosophy she said, “The philosophy of Alfaisal is equality of education but no mingling between the sexes.”

Case 4: Double Deck

Description of double deck classrooms

As a manifestation of this philosophy, Alfaisal University’s architectural design includes double deck lecture halls for male and female students. Female students are accommodated on bench seating on the top floor (Figure 9) while male students are accommodated on the lower floor (Figure 10). The tilted low-lying railing on the top deck is made of tinted privacy glass. On the sides of the lecture hall are stairs connecting the lower deck with the upper deck. Short glass sliding doors are located at the top of the stairs and are used by male faculty members to hand out documents, activities and exam papers to female teaching assistants or female students seated at the top deck. There is a platform on the lower deck from which faculty members deliver their lectures. Both male and female faculty members use the platform to deliver the lectures. There is a door to the side of the lower deck for male students and faculty members to enter the lecture hall. A door on the top deck connects to the second floor, for female students to enter the upper deck. Female faculty members use both the door on the first floor and the second floor. Both small classrooms and large lecture halls are designed in this way although small classrooms do not have stairs connecting the lower and upper decks.

Figure 9. Double Deck Female Classroom

Figure 10. Double Deck Male Classroom (Alfaisal University, 2018)

Use of double deck in the College of Business

In the College of Business at Alfaisal University, the course 'Strategic Management' was taught in a double deck lecture hall by a female Canadian-Arab assistant professor. She will be referred to as Dr. Double Deck. Dr. Double Deck stood on the platform in the first floor dressed in a black Abaya but no head covering. She was facing a group of male students in the lower deck and a group of female students in the top deck. There were 14 female students in the lecture hall, all dressed in black Abayas. Five were not wearing any head covering and the rest had their hair covered but not their faces. The number of male students served in the classroom is unknown.

The lecture hall consisted of two large projector screens that displayed the course lecture notes. One of the screens was hanging on the top of the wall at eye level for the female students sitting in the top deck, while the other screen hung below it at eye level for the male students sitting in the lower deck. There were two microphones in the top deck for female students to use. Female students could see the instructor on the platform and the instructor could see them. There was a female teaching assistant who sat quietly at the back of the top deck. Her responsibility was to take attendance and provide support in managing the class.

Course and enrollment. No information on course and enrollment was gathered for this case due to the limited time available with Dr. Double Deck.

Learning objectives. No information on the learning objectives and outcomes was gathered for this case due to the limited time available with Dr. Double Deck.

Teaching presence. Female students indicated that the double deck classrooms were difficult to manage. They felt excluded and were not engaged during the lecture. For example, during the observation some students would talk and eat during class despite the presence of the teaching assistant. Some students left the classroom without asking for permission. In the focus group, one student said: "The girls talk and eat during class because the professor will not see them. A lot of people come in and out and it's distracting." She added "the professor can tell, but the students make excuses. As a student you don't feel you are in class because the professor is not in front of you."

Acknowledging student contributions. Some students raised concerns that professors do not acknowledge them from the platform on the lower level. For the majority of the lecture, Dr. Double Deck seemed to engage and interact with the male students in the lower deck while ignoring the female students in the top deck. Some female students raised their hands during class but Dr. Double Deck did not acknowledge them. One student raised her hand three times

without being acknowledged. Additionally, Dr. Double Deck seemed to call male students by their names throughout the lecture but rarely called female students by their names. Halfway into the lecture she stated, "Girls, the boys are beating you." Towards the end of the lecture, she noticed one female student had raised her hand. Dr. Double Deck acknowledged her participation and asked her who she was.

Inconvenience. One female student expressed that their professors often find it difficult to hear them. Despite the accessibility of microphones, many students don't use microphones due to inconvenience. She explained, "because it is not so convenient [to speak through a microphone]. It is based on ones decision." The student revealed that the biggest challenge for her was being heard in class, "because we are not really used to big classes. I mean in high school the classes were small. They keep asking me to raise my voice and I started practicing at home to raise my voice."

Social presence. Students were generally engaged and following the lecture, yet they expressed their concerns that they do not feel included and part of a group. One student expressed, "with the double deck you don't feel included as much." Another student clarified "as students you don't feel like you're in a classroom."

Cognitive presence. Female students expressed that the Double Deck system was not engaging and caused many distractions. They preferred the one level partition system, as it was more engaging.

Technical issues. Dr. Double Deck and the female students mentioned that the technology breaks up often, however the technical support personnel rush in and fix it. Students expressed that they are very quick at fixing technical problems, however in a brief interview with one of Dr. Double Deck's colleagues at Alfaisal University, he expressed that if the students don't have the lecture notes with them in advance "then they might as well go

home." However, upon observing the double deck classrooms, voices go back and forth without the use of a microphone. Also there is some visibility, although limited between students and professor on the podium. So the technology plays a supportive role in this method rather than a central role for facilitating instruction.

Summary

Overall the double deck system seemed to function as intended. The system used technology to support learning and did not entirely rely on technology to mediate instruction. This advantage allows classes to go on as intended even if technical issues or failures occur. Another benefit of this system is that it is socially acceptable and does not challenge the conservative values of society.

Nonetheless female students reported feeling secluded and not part of the class. Dr. Double Deck said that it was difficult to teach the female students without seeing them. In the class observed, Dr. Double Deck seemed to be teaching the male students in front of her, rarely acknowledging the female students in the upper deck.

Case 5: Partition

In order to bypass the issues that occur with the double deck method, the College of Business was granted special permission to provide courses that accommodate male and female students on the same level in the male section of the College. This method is only for selected courses with selected professors and is currently provided for juniors and seniors only.

Description of partition classrooms

The classroom is an average sized room fully furnished with chairs, desks, a single projector at the front of the class and a transportable whiteboard so the professor can move it around the room. There was a single entrance for both male and female students. The male students sat at the front while female students sat at the back with a short wooden partition

between them. There was a tall wooden partition on the right of the classroom to provide privacy for female students as they pass by to get to the back of the classroom.

Use of partitions in the College of Business

The course, 'Business Law,' was taught by an American practicing lawyer and graduate of Harvard Law School. The practicing lawyer worked as a family lawyer and a commercial lawyer advising members of the royal family in their commercial activities in Saudi Arabia and abroad. He was the first person to teach law at the College of Business at Alfaisal University. His instructional method involves discussions and debates in the classroom. He will be referred to as Dr. Partition.

Dr. Partition stood in front of the classroom, facing a group of male students at the front and a group of female students at the back. He often moved around the classroom during the lecture. Most female students covered up with Abayas and headscarves, a few students covered their faces with a veil, and a few wore only Abayas without headscarves. The professor moved the portable whiteboard to the side between the male and female students so that female students in the back could see the board clearly.

Course and enrollment. No information on course and enrollment was gathered for this case due to the limited time available with Dr. Partition.

Learning objectives. The main objective for this course was for business students to develop a basic understanding of the rules of law. The course focused on essential global concepts in business law and their application. Dr. Partition incorporated many activities in his class such as debates and discussions. He also engaged students in group activities, such as a group research project where students are expected to work in a randomly selected group and present their work to other students. The groups are divided by gender. The female students present at the back of the class in their designated area, while the male students present in the

front. He does not consider the separation of genders in the classroom to be a barrier to learning he explained "I can't say that there is a barrier to learning because the women sit separately from the men." However he did find it difficult to know the female students by name.

Teaching presence. Dr. Partition explained that one of the challenges for him was getting to know his students. He explained, "There is an added burden for me because it is harder to get to know the women by name." If I don't know the women by name, it is improper that I should presume to offer them a grade. So for me to grade a work of a woman I must know who they are and I do make an effort to get to know how these women are doing in the course." He elaborated, "When I had problems with this in the past it was because of the size of the class. Last semester I had 75 students between two courses. I can't honestly say that I knew students of either gender, who they were in a class that size. I don't like classes that big."

In smaller classes however he said that he does not have a problem getting to know his female students. He clarified, "This semester I had 30 students in my class, like 18 women and 12 men. I expect to know every student by the end of the semester, both male and female".

Social presence. Female students and Dr. Partition were both pleased with the quality of interaction in the partitioned classroom. Dr. Partition stated "I can see everybody very clearly and I very often advance in the room so I speak directly to the women." He explained, "The quality of my interaction with the women when I can actually see them is somewhat higher and I get to know them more quickly."

Cognitive presence. One student shared "In the one level I feel I could focus more definitely because I could see the presentation in front of me and the professor. In terms of

participation I feel I could participate more." Another student added: "You feel you are part of the class in the one level."

One student mentioned that the current arrangement in the partitioned classroom is not ideal ". . . because boys are taller, so we can not see the board clearly." For this reason, the College provided portable whiteboards, so that the female students have better access and visibility of the whiteboard.

Access. A member of staff in the College of Business shared her opinion of the use of the partitioned classrooms. She said, "The girls have direct access to the instructor, same as the boys, while maintaining the privacy of our culture." She explained: "The outcome we get is really good, the discussion is rich and there is flexibility. The instructor can access the girls easily in the one level."

Summary

All of the students and professors who participated in the interviews and focus groups favored the face-to-face partition system over Double Deck. The benefits of the partition system included better interaction and better visibility for both professors and female students. Female students also reported feeling more included and part of the class in the Partition system. Professors acknowledged female students more effectively since they were in the same room. They could see and interact with the female students freely.

Perspectives at Alfaisal University

Students, professors, and members of staff at Alfaisal University all favored the use of partitions over the Double Deck system. They all mentioned better interaction in the classroom and better classroom management as some of the benefits of the partition system. One student expressed that the Double Deck provides better privacy. The female students can take their head covers off since the men cannot see them.

A senior professor in the College of Business at Alfaisal University shared his opinion of the Double Deck method, saying, "The first thing that really shocked me is the [double deck] classroom, they bragged about it at the time. They considered it an innovation in Saudi Arabia. They thought it is a unique feature that Alfaisal gave to the society. It is an improvement [compared to VCR] but nevertheless I expect that it is better for the female students to stay home and study through the computer." He conveyed "right now our main problem is managing and controlling what is going on up there within the lecture. We don't know who is up there, especially if they wear the veil. We don't know who is who in an exam. They use their phones, they don't care…", he continued, "for the class as a whole the professor doesn't have much control and the students do not have that much access."

The professor shared his criticism of the double deck method explaining, "it is very expensive to design and build, and expensive to maintain the AC and technology." Additionally, "its capacity is limited. You can't expand the two levels. You can add rows and chairs." He concluded that "the experience with the double deck, even though it gives us the illusion of a mixed gender university, is bad. It has impacted education. It is not efficient and expensive."

Summary

The cases in this study are defined based on the classroom settings and technologies. Overall five cases were identified, Ethernet based videoconferencing (VCR), CCTV, and Internet-based videoconferencing(VC) at Qassim University and Double Deck and partition systems at Alfaisal University. A description of each of the sites and cases was provided. Each case involved certain issues and challenges. Ethernet-based Videoconference (VCR) involved many technical problems, which often hindered the educational experience. CCTV technology, although out of date, displayed fewer technical issues but provided very little

flexibility in teaching, thereby limiting instructional methods. Internet-based videoconferencing (VC) provided a variety of technical tools and features and more competent technical support. The Double Deck system provided privacy but was criticized for limited interaction, limited capacity, and high costs of construction. The partition system was considered interactive and more personable, but was criticized for lack of privacy for women. All of the methods, except the partition system, revealed issues with classroom management and required the supervision of a female technology or administrative assistant.

Chapter Five - Quantitative Results

Introduction

In order to gather information from a larger and more diverse sample of female students and male professors, an electronic survey was developed based on the findings of the qualitative data. As described in Chapter 4, the qualitative interviews and observations were conducted at five classrooms, each of which used a different classroom configuration to facilitate education to female students. The five classrooms were located at two universities, Qassim University and Alfaisal University. A survey was developed to be distributed to both universities, but university officials at Alfaisal University refused to cooperate in distributing the survey. This chapter describes the development of the survey and presents the results of the data collected from female students and male professors at Qassim University. As described in Chapter 4, the classroom configurations at Qassim University were Ethernet based Videoconference (VCR) classrooms, Closed Circuit Television (CCTV) classrooms, and Internet based Videoconference (VC) classrooms.

Survey Development

Creating the survey from qualitative data

Themes identified in the qualitative data analysis phase served as constructs for the survey instrument entitled *Female Classroom Configurations at Qassim University*. The constructs were developed from observation field notes, interview and focus group transcripts, and analytic memos. Table 4 presents three examples of how the qualitative data was mapped to constructs and then to survey items. For example, if an issue or a problem appeared across multiple interviews or field notes it was used to create a question that would address that item.

The survey items were then grouped into their respective constructs with similar working hypotheses to minimize the number of survey questions.

Table 4. Creating Survey Items From Qualitative Data

Qualitative Data	Construct	Survey item
"sometimes there's clicking noise with the sound, or static."	Technical issues	Sound has static
Field notes: picture on screen is far away/ not clear	Technical issues	Video not clear
"I need to see the students demonstrate on their computers to see if they understand."	Teaching presence	Sense whether students understand the material

The first example presented in Table 4 is a quote from students in Dr. VCR's class regarding the audio quality in their classroom. Dr. VC and his students also spoke of problems in the audio quality of the videoconferencing system in their classroom. This was developed into a survey item and was grouped with similar survey items under the construct 'Technical Issues' in the survey instrument.

Survey instrument

The online survey instrument (Appendix F) was comprised of two parts. The first part asked about participants' demographic background. The second part asked about participants' prior experience using the specific classroom configuration used to mediate instruction to female students at Qassim University. The survey instrument was designed to collect data from male professors and female students at Qassim University. Table 5 presents the demographic variables included for male professors and female students.

Table 5. Demographic Variables

Respondents	Male professors	Female students
Demographic variables	Academic rank	Year in college
	Academic specialization	Number of years lived in Saudi Arabia
	Number of years lived in Saudi Arabia	Number of classes taken with a male instructor
	Number of years worked in academia	Religion
	Number of years teaching female students	Citizenship
	Religion	
	Citizenship	

Participants were provided pictures of the five classroom configurations used at Qassim and Alfaisal universities (See Chapter Four) and asked to choose only one of the classroom configurations and rate its effectiveness. They were asked to respond to a three-point Likert scale regarding their prior experience and satisfaction with using the chosen classroom configuration. The survey items concerning prior experience and satisfaction were organized by the constructs provided by the two theoretical frameworks: Community of Learning (social presence, cognitive presence, and teaching presence) and the Technology Acceptance Model (technology self-efficacy, technical issues, classroom management, and subjective norm.)

Participants

In order to capture a broad representation of the population, every effort was made to distribute the survey to male professors and female students in all of the 35 colleges in Qassim University. The survey was distributed via the Whatsapp messaging service to a sample that consisted of thirty female students and ten male professors. These 'seeds' were carefully

selected in an effort to reach a wide range of participants. Female students were recruited with an emphasis on diverse student classification (year in college), academic specialization, college location, and students' background. Male professors were recruited with an emphasis on diverse academic specialization, professors' seniority, college location, and professors' background. These 'seeds' were asked to distribute the survey to their acquaintances of male professors and female students at the university. These participants, or the "seeds" (Gile & Handcock, 2010), distributed the survey by forwarding the researcher's message to their inner circle of male professors and female students via Whatsapp groups or through individual messages.

Figure 11 presents an overview of the number of recorded survey responses detailing the number of responses received, those eliminated from the survey analysis, and those that comprise the final sample. Survey responses were eliminated based on four criteria: (1) incomplete survey responses, (2) being neither a female student nor male professor, (3) being a female student who had never taken a course from a male professor, and (4) being a male professor who had never taught female students.

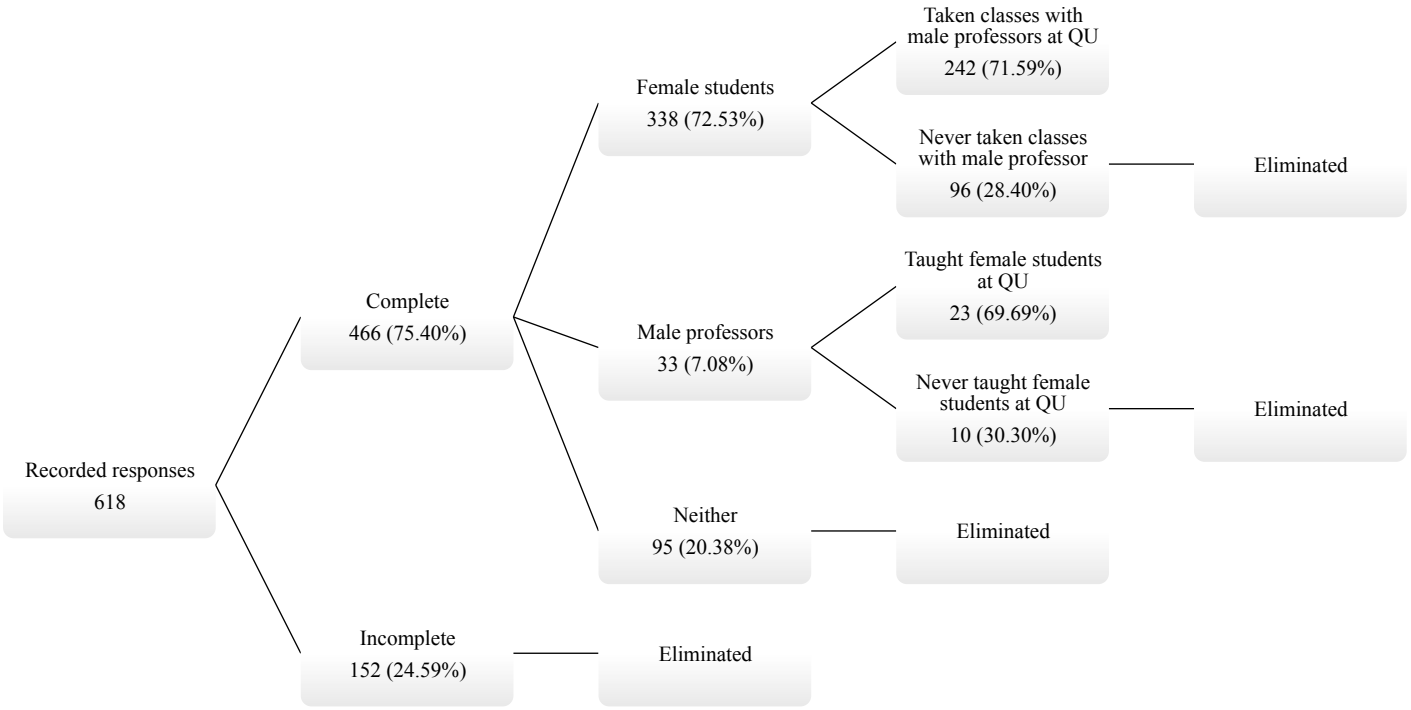


Figure 11. Recorded Survey Responses

After looking closely at the demographic data in the incomplete responses, there was nothing particularly unique about the non-completers; therefore all of the incomplete responses were eliminated from the analysis. Of the remaining responses, 95 of the respondents were neither female students nor male professors, so the survey was designed to exit them from the survey. Of the remaining complete responses, 96 respondents were female students who had never taken classes with a male professor at Qassim University and 10 respondents were male professors who have never taught female students at Qassim University. Both were eliminated from the analysis to ensure validity of the data and quality of the results. Finally, 242 female student responses and 23 male faculty responses were deemed usable, giving a total of 265 usable responses.

Demographic Background

Table 6 presents the demographic information for male faculty members.

Table 6. Faculty Members' Demographics

Q1	**Academic Rank**	**%**	**Count**
	Professor	26.09%	6
	Associate professor	8.70%	2
	Assistant professor	34.78%	8
	Lecturer	26.09%	6
	Other	4.35%	1
	Total	100.00%	23
Q2	**Academic Specialization**		
	Conceptual & Theoretical Studies (Humanities, Religious studies, Languages, Business, Economics, Education etc.)	73.91%	17
	Applied Sciences (Science, Math, Computing, Engineering etc.)	21.74%	5
	Health Sciences (Medicine, Dental medicine, Pharmacology etc.)	4.35%	1
	Total	100.00%	23
Q3	**How long have you been working in academia?**		
	Less than 5 years	4.35%	1
	5-10 years	21.74%	5
	11-15 years	0.00%	0
	15+ years	73.91%	17
	Total	100.00%	23
Q4	**How long have you been teaching female students at Qassim University?**		
	Less than 5 years	30.43%	7
	5-10 years	21.74%	5
	11-15 years	21.74%	5
	15+ years	26.09%	6

	Total	100.00%	23
Q5	**How long have you lived in Saudi Arabia?**		
	Less than 5 years	8.69%	2
	5-10 years	13.04%	3
	11-15 years	8.69%	2
	15+ years	69.56%	16
	Total	100.00%	23
Q6	**Religion**		
	Muslim	100.00 %	23
	Non-Muslim	0.00%	0
	Prefer not to say	0.00%	0
	Total	100.00%	23
Q7	**Citizenship**		
	Saudi	56.52%	13
	Non-Saudi	43.48%	10
	Prefer not to say	0.00%	0
	Total	100.00%	23

The male faculty members who provided complete responses to the survey were diverse in terms of the number of years' experience teaching female students at Qassim. Although they were diverse in other demographic variables as well, the majority (60%) were at the instructor or assistant professor level, taught conceptual or theoretical subjects (75%), had worked in academia 15+ years (73.91%) and had lived in Saudi Arabia for more than 15 years (69.56%). All male professor respondents were Muslim, but their experience in teaching female students at Qassim was very diverse.

Table 7 presents the demographic information for female students.

Table 7. Female Students' Demographics

Q1	Year in College	%	Count
	First year undergraduate	0.83%	2
	Second year undergraduate	9.09%	22
	Third year undergraduate	26.03%	63
	Fourth year undergraduate	56.20%	136
	Graduate student	7.85%	19
	Total	100.00%	242
Q2	**How many classes have you taken with a male instructor at QU?**		
	1-3	38.84%	94
	4-6	30.58%	74
	7-9	11.16%	27
	10+	19.42%	47
	Total	100.00%	242
Q3	**How long have you lived in Saudi Arabia?**		
	Less than 5 years	2.07%	5
	5-10 years	1.24%	3
	11-15 years	1.24%	3
	15+ years	93.52%	231
	Total	100.00%	242
Q4	**Religion**		
	Muslim	98.35%	238
	Non-Muslim	0.41%	1
	Prefer not to say	1.24%	3
	Total	100.00%	242
	Citizenship		
Q5	Saudi	91.74%	222

	Non-Saudi	6.61%	16
	Prefer not to say	1.65%	4
	Total	100.00%	242

The majority of female student respondents were undergraduate students with more than half of all female student respondents in their fourth year in college. There is a noticeable increase in the number of respondents for every year in college; that is because students who are more advanced in college are more likely to have taken classes with male professors. Additionally, it is more likely that male instructors teach higher-level courses since it is difficult to find female instructors in certain specialties. Nearly 70% of the female student respondents had taken 1-6 classes with male instructors at Qassim University. The majority had lived in Saudi Arabia for more than 15 years, were Muslim, and were Saudi citizens. Generally, this is a good representation of the population of female students that have taken classes with male instructors at Qassim University.

Classroom Configurations

The data collected in survey question 3.1 asked respondents to mark all of the classroom configurations they have used to communicate with male professors and other female students. Table 8 presents the results from female students and male faculty members, arranged in rank order from most to least used by female students.

Table 8. Classroom Configuration Use

#	Classroom Configuration	Female student		Male faculty member	
1	CCTV	34.25%	112	32.43%	12
2	Ethernet videoconferencing	45.26%	148	40.54%	15
3	Internet videoconferencing	5.50%	18	10.81%	4
4	Double deck	5.50%	18	5.41%	2

5	Partition	3.98%	13	5.41%	2
6	Other	5.50%	2	5.41%	2
	Total	Total	327	Total	37

As shown in Table 8, the majority of female students and male faculty members used either CCTV or VCR classrooms to communicate between female students and male faculty members. Internet based Videoconferencing (VC) was far less common. Double-decker and partitions were the least common for both female students and male faculty members, in part because the survey could not be disseminated at Alfaisal Unversity.

Prior Experience and Satisfaction

Participants' reaction to CCTV and VCR configurations

The next survey question (4.1) asked respondents to choose only one classroom configuration that they most commonly used to communicate between female students and male faculty members and to keep this classroom configuration in mind as they answer the subsequent survey items. The following items asked whether the classroom configuration was useful, easy to use, and how respondents felt about the classroom configuration.

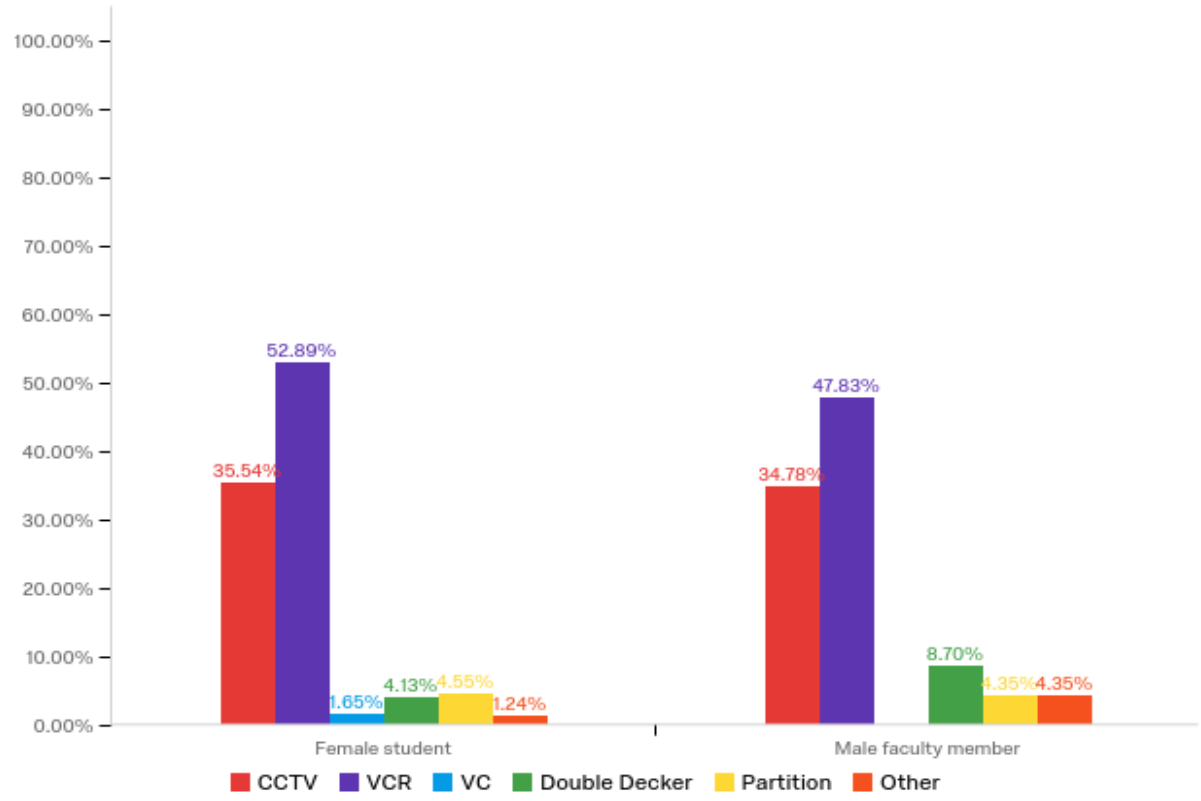


Figure 12. Classroom Configuration Used by Male Faculty Members and Female Students

As displayed in Figure 12 the majority of both male faculty members and female students selected either VCR or CCTV. This matches what was observed at Qassim University, as VCR and CCTV were the most frequently utilized methods at nearly all of the female campuses. Internet videoconferencing (VC), double-decker, and partition were all eliminated from any further analysis due to the small number of respondents. Examining only those who selected either CCTV or VCR, Figures 13-15, which combine female students' and male faculty members' responses, describe their perception of usefulness, ease of use, and whether they were pleased with the classroom configuration.

Figure 13 breaks down responses regarding the usefulness of the classroom configuration based on the classroom configuration they used (CCTV or VCR).

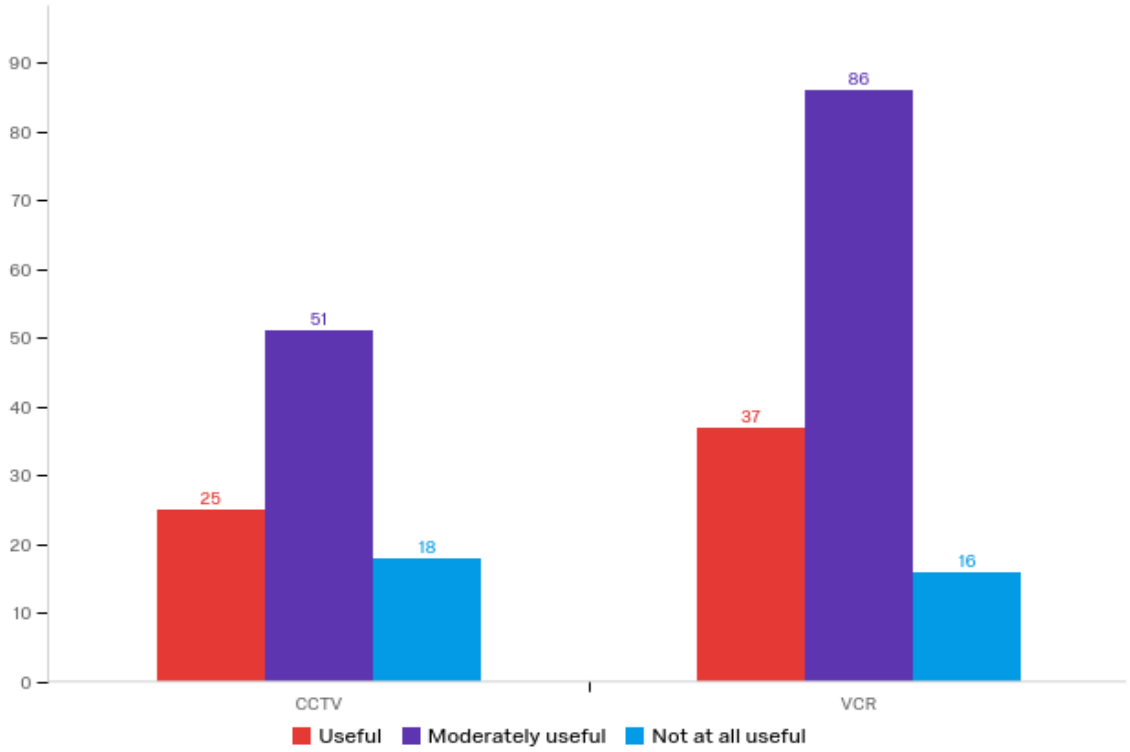


Figure 13. Usefulness

As shown in Figure 13 the majority of respondents said that both classroom configurations were either useful or moderately useful. CCTV was considered not at all useful by 19.15% of respondents, while VCR was considered not at all useful by 11.51% of respondents. As mentioned in Chapter 4, one of the benefits of both classroom configurations is that they do not challenge the conservative values of the Saudi society. This may explain why the majority of respondents in this survey considered CCTV and VCR to be useful or moderately useful.

Figure 14 presents the respondents' assessment of the classroom configurations' ease of use broken down by classroom configuration (CCTV or VCR).

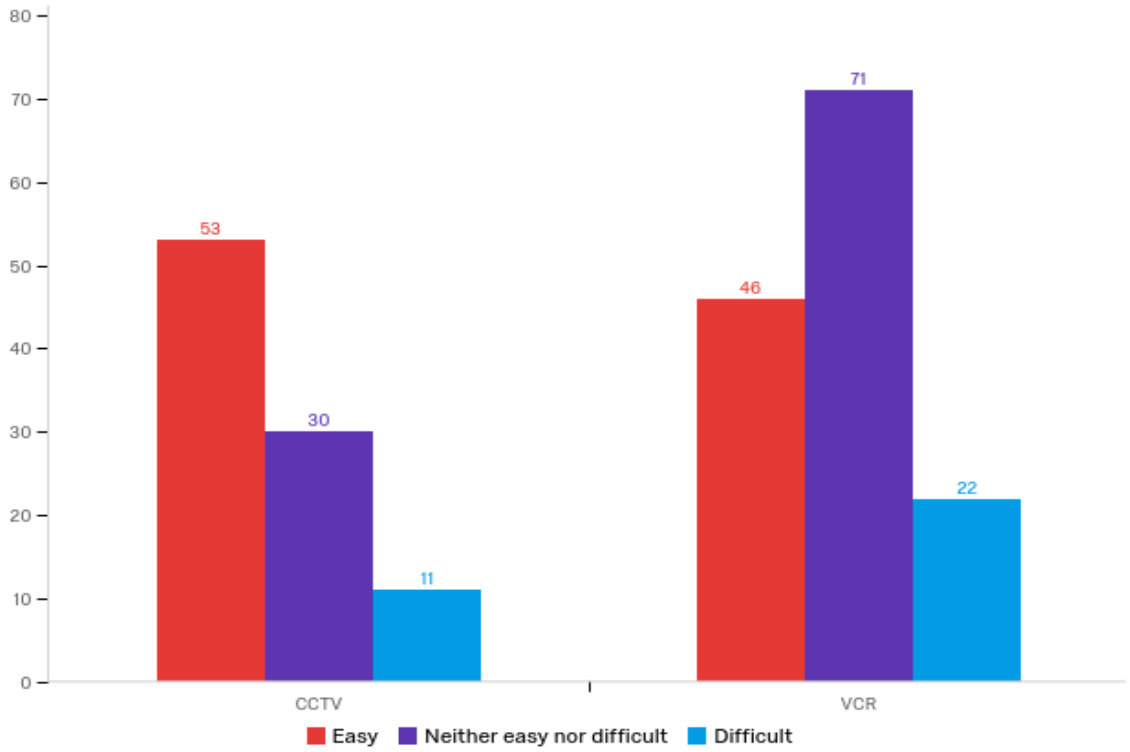


Figure 14. Ease of Use

The majority of respondents considered CCTV to be easy, while most respondents considered VCR to be neither easy nor difficult. More respondents who use VCR (15.83%) considered VCR to be difficult than did respondents who used CCTV (11.70%). This is consistent with what was observed at Qassim University.

Figure 15 presents responses regarding how they felt toward their classroom configuration. Figure 15 is broken down by classroom configuration (CCTV or VCR).

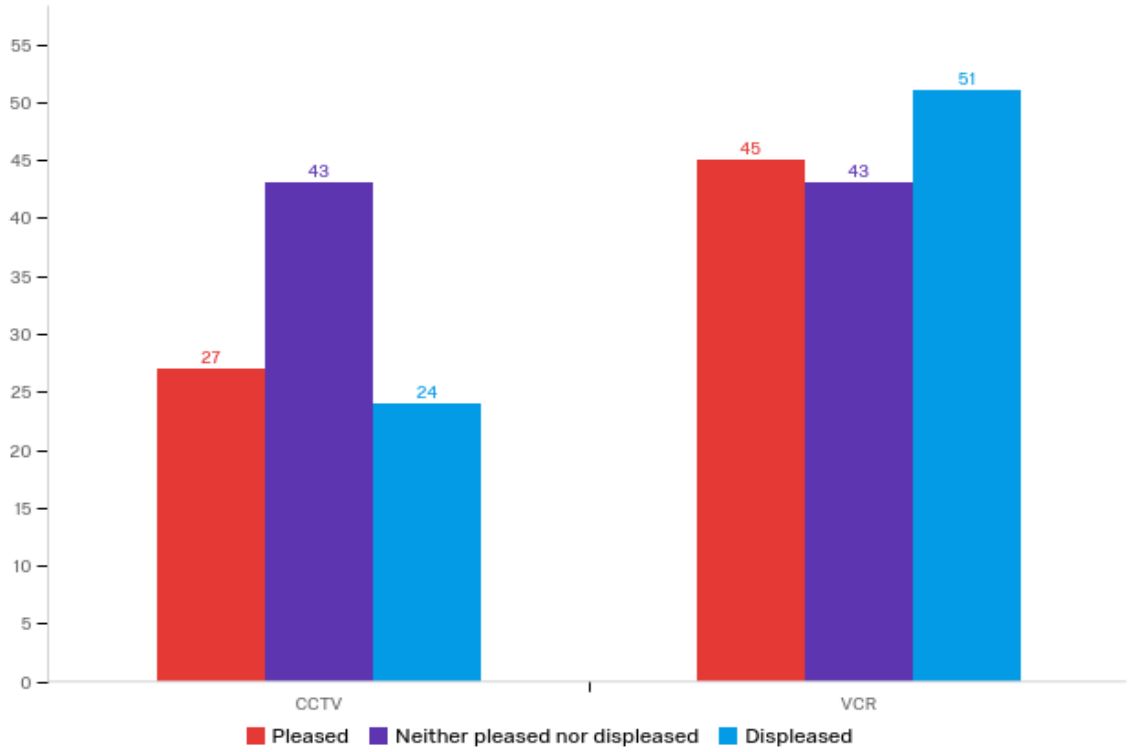


Figure 15. Respondents' Reaction

The largest percentage (36.65%) of VCR users were displeased with their classroom configuration, but only 25.53% of CCTV users were displeased. However, the remaining 63.35% of VCR users and 74.47% of CCTV users were either pleased or neutral. This confirms the qualitative findings in Chapter 4, that more VCR users are displeased with their classroom configuration than CCTV users; but it does not capture the level of frustration expressed for both technologies reported in Chapter 4.

Table 9 contrasts the responses by female students and male faculty members to the usefulness, ease of use, feelings of the two most frequently used classroom configurations CCTV and VCR.

Table 9. Usefulness, Ease of Use, and Reaction to Classroom Configurations

Q 4.2	Was the classroom configuration useful?	Female student		Male faculty member	
	Useful	26.45%	64	47.83%	11

	Moderately useful	60.33%	146	43.48%	10
	Not at all useful	13.22%	32	8.69%	2
		Total	242	Total	23
Q 4.3	**Was the classroom configuration easy to use?**	**Female student**		**Male faculty member**	
	Easy	43.39%	105	56.52%	13
	Neither easy nor difficult	43.39%	105	39.13%	9
	Difficult	13.22%	32	4.35%	1
		Total	242	Total	23
Q 4.4	**How does the class configuration make you feel?**	**Female student**		**Male faculty member**	
	Pleased	30.58%	74	56.52%	13
	Neither pleased nor displeased	40.50%	98	21.74%	5
	Displeased	28.93%	70	21.74%	5
		Total	242	Total	23

Generally male faculty members responded more positively to their classroom configurations compared to female students. More male faculty members considered their classroom configurations useful, easy to use, and were pleased with it than female students. More female students were displeased, considered the classroom configuration difficult and not at all useful compared to male faculty members.

Social presence

Survey question 5.1 asked respondents about social presence in the classroom. The question was divided into four items: whether the classroom configuration enables interaction between female students and male faculty, enables communication among female students, enhances students' ability to ask questions in the classroom and enhances students' participation in the classroom. Figures 16 and 17 present the responses for CCTV and VCR

classroom configuration. Table 10 contrasts responses from female students and male faculty members for the two classroom configurations combined.

Social presence by classroom configuration

Figure 16 presents CCTV users' perspectives regarding social presence in the classroom. The data includes the responses of both male professors and female students.

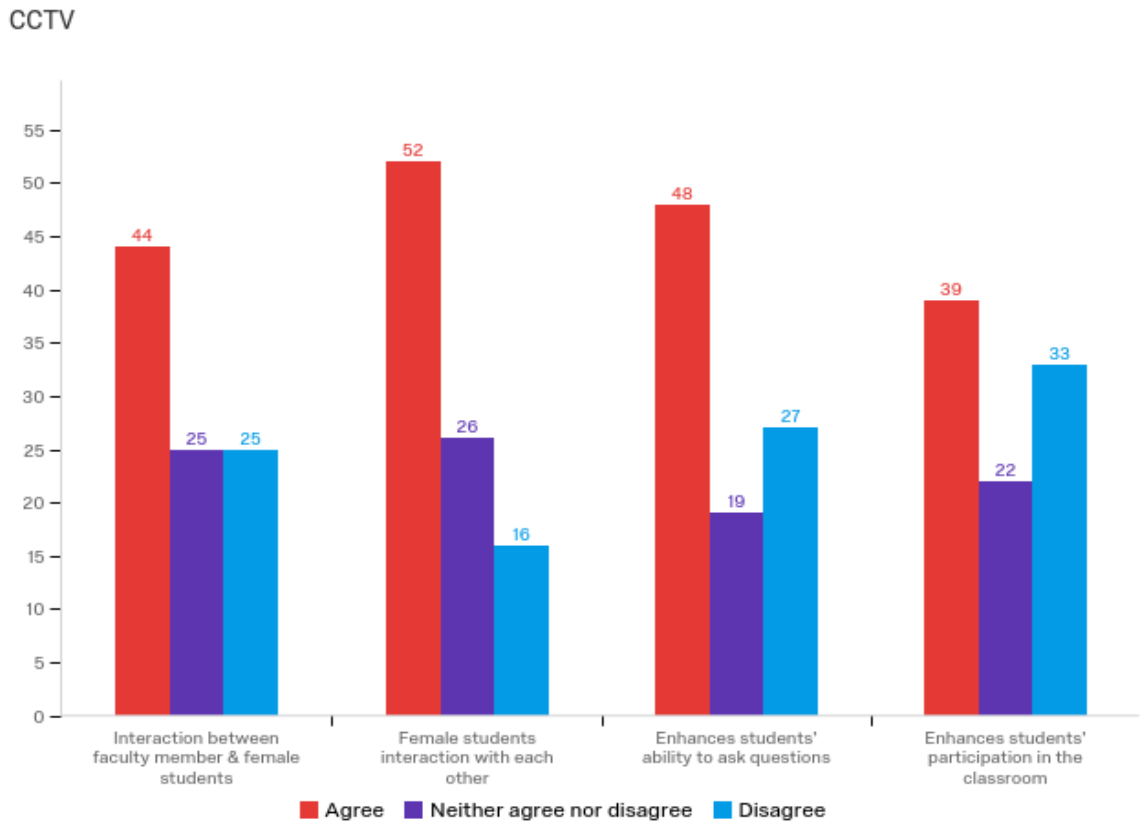


Figure 16. Social Presence in CCTV Classroom

Among the respondents who use CCTV, the statement with the most agreement (55.32%) and least disagreement (17.02%) was 'the classroom configuration enables female students' interaction with each other.' The statement with the least agreement (41.49%) and the most disagreement (35.11%) was 'the classroom configuration enhances students' participation in the classroom.' In short, the respondents agree that use of the technology

supports interactions between male faculty members and female students and interactions among the female students. Agreement decreases for use of the technology to support students' ability to ask questions or participate in the classroom.

As shown in Figure 17, those who use VCR technology show the least agreement (40.29%) and the most disagreement (36.70%) with the statement 'the classroom configuration enhances students' participation in the classroom.' Meanwhile the statement 'the classroom configuration enables interaction between faculty member and female students' had the most agreement (57.55%) among VCR users. The shift from agreement to disagreement is similar to that described for use of CCTV.

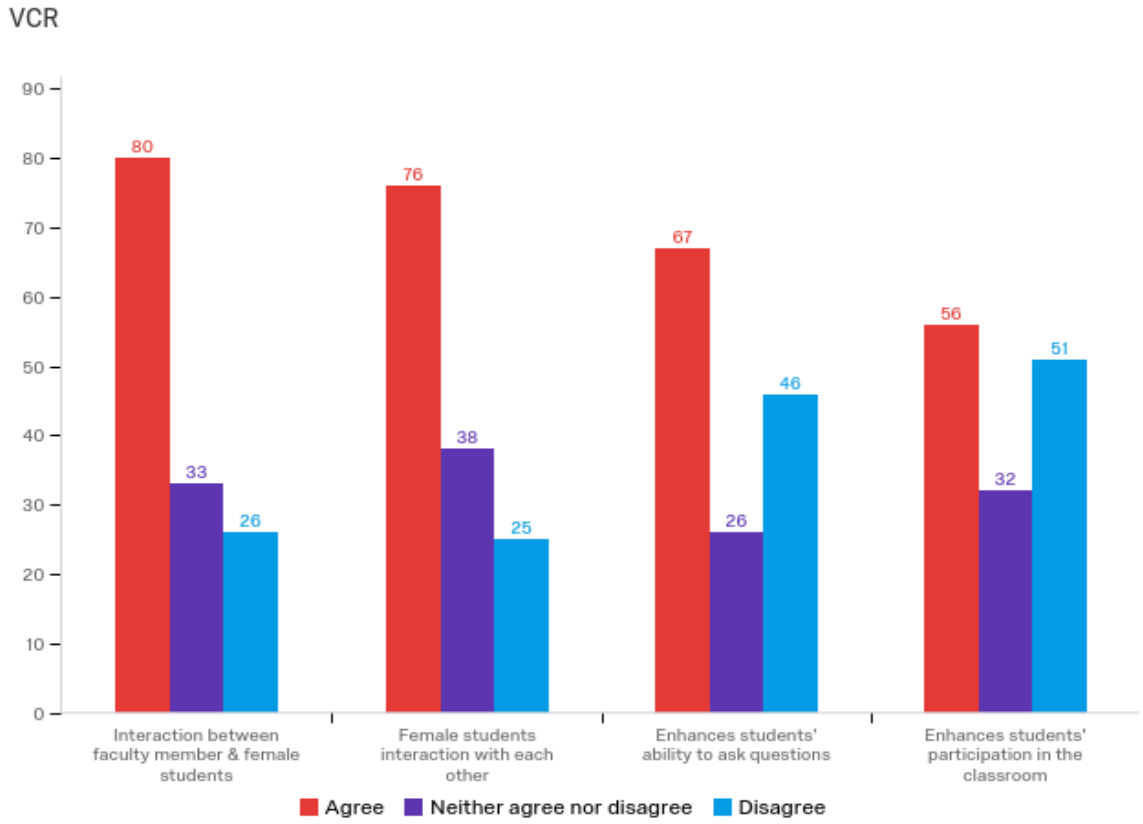


Figure 17. Social Presence in VCR Classroom

Overall, more respondents agreed that the VCR and CCTV classroom configurations enable interaction than agreed that these technologies enhance participation. Both VCR users

(33.09%) and CCTV users (28.72%) disagreed that their classroom configuration enhances students' ability to ask questions in the classroom. Nearly 18.00% of VCR users and 17.02% of CCTV users disagreed that CCTV and VCR technologies enable students' interaction with each other. In response to the item asking about interactions between male faculty members and female students, 8.71% of VCR users and 26.59% of CCTV users reported that it did not foster those interactions.

Social presence by female student and male faculty

Table 10 presents the data on social presence in the classroom according to female students' and male faculty's responses.

Table 10. Female Students' and Male Faculty's Perspectives of Social Presence

Q5.1	Does the classroom configuration enable the following:	Female students			Male faculty		
		Agree	Neither agree nor disagree	Disagree	Agree	Neither agree nor disagree	Disagree
	Interaction between male faculty member & female students	51.24%	28.10%	20.66%	73.91%	4.35%	21.74%
	Female students interaction with each other	56.20%	27.69%	16.12%	52.17%	26.09%	21.74%
	Enhances students' ability to ask questions	48.35%	20.25%	31.40%	56.52%	17.39%	26.09%
	Enhances students' participation in the classroom	42.15%	24.79%	33.06%	43.48%	8.70%	47.83%

Comparison of the responses from female students and male faculty members shows some interesting contrasts. Female students reported the strongest agreement for the use of technology to support female students' interaction with each other (56.20%) and male faculty members reported strongest agreement for the use of technology to support interactions between themselves and their female students (73.91%). Both female students and male

faculty members reported less agreement with the use of technology to support students' asking questions or participating in the classroom. What was striking was relatively low percentage of male faculty members (8.70%) who neither agreed nor disagreed that the use of technology supported students' participation in the classroom. Faculty members' perceptions varied considerably, with 43.48% agreeing that the use of technology supported students' participation in the classroom and 47.83% disagreeing with the statement. Participation in the classroom is a bigger concern to both female students and faculty members than interactions.

Communication

The survey included three questions about communication between male faculty members and female students. The first question (6.1) asked whether respondents use supportive communication methods to make up for the lack of communication in the classroom. Respondents were asked to choose all of the methods that they commonly use to support communication, allowing the electronic survey to enable multiple choices. Figure 18 presents the type of supportive communication methods used by male faculty and female students and the percentage of respondents who use them.

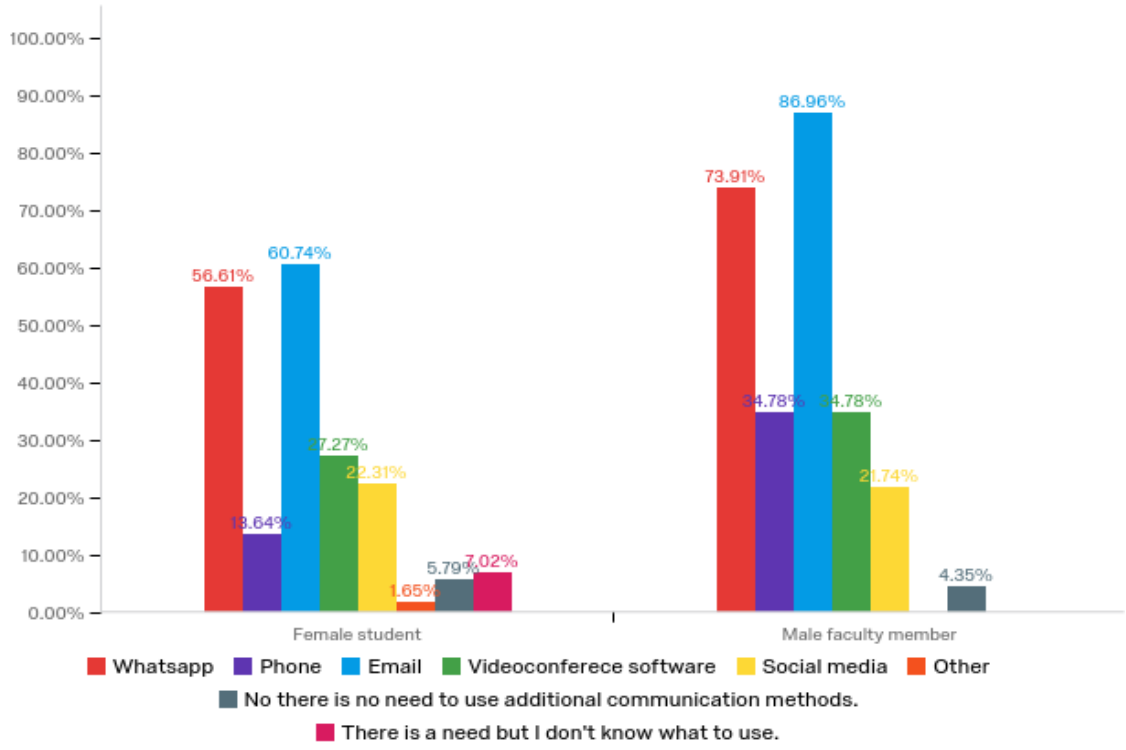


Figure 18. Supportive Communication Methods Used by Female Students and Male Faculty

The majority of respondents in this study reported that they use additional communication methods. Only 7.02% of female students said they do not know what to use and only 5.79% of female students and 4.35% of male faculty said there is no need to use additional communication methods. The most common communication method for both female students and male professors was Email followed by Whatsapp and then videoconferencing software. For male faculty members, telephone was more common than social media. The opposite was true for female students. This may be because faculty members communicate with only one to three female students via phone. These female students then usually communicate with the rest of the class as mentioned in Chapter 4.

The second question 6.2 was directed to faculty members and asked whether they use the same communication methods with male students. Most faculty members (70%) responded

that they use the same supportive communication methods with their male students, while 17% responded that they do not and the remaining 13% said that they do sometimes.

The third question concerning communication asked respondents to rank the factors that most restrict communication between male faculty and female students during the lecture, with 1 being the most restricting and 7 the least restricting factor. Female students and male faculty members ranked the factors according to the order displayed in Table 11. Both female students and male faculty members ranked 'technical problems' as the most restricting factor for communication. There were some noteworthy differences, with female students ranking 'too shy to speak in front of male classmates' as a more restricting factor than the male faculty members ranking of the factors 'female students' lack of interest' and 'lack of ambition'. The ranking is based on female students' and male professors' mean responses from lowest to highest as shown in Appendix G.

Table 11. Factors Restricting Communication

	Female students	**Male faculty members**
1	Technical problems	Technical problems
2	Female students are too shy to speak in front of a male faculty member	Female students are too shy to speak in front of a male faculty member
3	Female students are too shy to speak in front of male classmates	Female students' lack of interest (indifference)
4	Female students' lack of interest (indifference)	Female students' lack of ambition
5	Female students' lack of ambition	Female students are too shy to speak in front of male classmates
6	Other cultural factors	Other cultural factors
7	Other religious factors	Other religious factors

Cognitive presence

The survey included a question about students' cognitive presence in the classroom. Question 7.1 asked respondents whether their classroom configuration allows students to understand the material through reflection, engage in discussion with faculty members, engage in group discussion, and follow the lecture. Responses were broken down by classroom configurations (Table 12) and then broken down by female student responses and male professor responses (Table 13).

Cognitive presence by classroom configuration

Table 12 presents the mean and standard deviation for CCTV and VCR users' responses regarding cognitive presence in the classroom. The data includes the responses of both male faculty and female students.

Table 12. Cognitive Presence in CCTV and VCR Classrooms

The classroom configuration allows students to understand the material through the following actions:	Agree	Disagree	Mean for CCTV	Standard Deviation for CCTV	Mean for VCR	Standard Deviation for VCR
Reflection	1.00	3.00	1.73	0.83	1.59	0.75
Engaging in discussion with the faculty member	1.00	3.00	1.63	0.79	1.60	0.79
Engaging in group discussion	1.00	3.00	1.68	0.79	1.62	0.76
Following the lecture	1.00	3.00	1.56	0.75	1.68	0.82

In general, the mean responses for both CCTV and VCR users, as shown in Table 12, are closer to neutral. The least agreement from CCTV users is that the classroom configuration allows them to understand the material through reflection. The least agreement from VCR users is that the classroom configuration allows them to follow the lecture. A greater

percentage of CCTV users (24.47%) disagreed that their classroom configuration allows reflection than did VCR users (15.83%) (See Appendix H). A greater percentage of VCR users (23.02%) disagreed that their classroom configuration allows following the lecture than did CCTV users (15.96%) (See Appendix H).

Cognitive presence by female student and male faculty

Table 13 presents the data on cognitive presence in the classroom according to female student and male faculty responses.

Table 13. Female Students' and Male Faculty's Perspectives of Cognitive Presence

The classroom configuration allows students to understand the material through the following actions:	Agree	Disagree	Mean for female students	Standard Deviation for female students	Mean for male faculty	Standard Deviation for male faculty
Reflection	1.00	3.00	1.63	0.77	1.43	0.71
Engaging in discussion with the faculty member	1.00	3.00	1.62	0.77	1.35	0.70
Engaging in group discussion	1.00	3.00	1.60	0.75	1.61	0.82
Following the lecture	1.00	3.00	1.62	0.78	1.35	0.70

In general, the mean for female students' responses is closer to neutral than male faculty members (Table 13). Male faculty members had a lower mean in all of the factors except 'engaging in group discussion,' suggesting that more male faculty members agree that the classroom configuration allows reflection, engaging in discussion with the faculty member, and following the lecture. The female students' responses varied little across the four characteristics listed for cognitive presence.

Teaching presence

The survey included a question about teaching presence in the classroom. Question 8.1 asked respondents whether their classroom configuration enables male instructors to utilize a variety of instructional methods, be efficient with their time in the classroom, facilitate discussion effectively, sense whether students understand the material, demonstrate lecture content, utilize a variety of assessment methods, and provide explanatory feedback. The analysis compared the two classroom configurations CCTV and male faculty member/female student comparisons.

Teaching presence by classroom configuration

Table 14 presents CCTV and VCR users' perspectives regarding teaching presence in the classroom. The data includes the responses of both male professors and female students.

Table 14. Teaching Presence in CCTV and VCR Classrooms

The classroom configuration enables the faculty member to do the following actions:	Agree	Disagree	Mean of CCTV	Standard Deviation of CCTV	Mean of VCR	Standard Deviation of VCR
Utilize a variety of instructional methods	1.00	3.00	1.72	0.82	1.63	0.79
Be efficient in use of time in the classroom	1.00	3.00	1.70	0.84	1.75	0.84
Effectively facilitate discussion	1.00	3.00	1.82	0.85	1.91	0.84
Sense whether students understand the material	1.00	3.00	1.93	0.89	1.99	0.86
Demonstrate lecture content	1.00	3.00	1.50	0.70	1.45	0.65
Utilize a variety of assessment methods	1.00	3.00	1.86	0.79	1.77	0.80
Provide explanatory feedback	1.00	3.00	1.64	0.82	1.57	0.76

Overall, the mean responses for both CCTV and VCR users, as shown in Table 14, are closer to neutral. The lowest mean for both CCTV (1.50) and VCR (1.45) users is for the

factor ‘demonstrate lecture content’ suggesting that more CCTV and VCR users agree than disagree. The factor with the highest mean for both CCTV (1.93) and VCR (1.99) is ‘sense whether students understand the material.’

Teaching presence by female student and male faculty

Table 15 presents the data on cognitive presence in the classroom according to female student and male faculty responses.

Table 15. Female Students’ and Male Faculty’s Perspectives of Teaching Presence

The classroom configuration enables the faculty member to do the following actions:	Agree	Disagree	Mean of female students	Standard Deviation of female students	Mean of male faculty	Standard Deviation of male faculty
Utilize a variety of instructional methods	1.00	3.00	1.67	0.80	1.17	0.48
Be efficient in use of time in the classroom	1.00	3.00	1.69	0.81	1.57	0.82
Effectively facilitate discussion	1.00	3.00	1.81	0.83	1.65	0.87
Sense whether students understand the material	1.00	3.00	1.90	0.87	1.65	0.87
Demonstrate lecture content	1.00	3.00	1.47	0.66	1.17	0.48
Utilize a variety of assessment methods	1.00	3.00	1.78	0.80	1.35	0.63
Provide explanatory feedback	1.00	3.00	1.57	0.76	1.48	0.83

Similar to cognitive presence, there was more agreement from male faculty members than from female students in general as shown in Table 15. Overall, more female students were neutral about teaching presence than male professors. The least agreement from male faculty members was regarding ‘sense whether students understand the material’ and ‘effectively facilitate discussion.’ The same was true for female students. The most agreement for male faculty members was regarding ‘utilize a variety of instructional methods’ and

'demonstrate lecture content.' As to female students it was 'demonstrate lecture content' and 'provide explanatory feedback.'

Technical issues

In order to further understand the technical issues and challenges that accompanied the classroom configurations, the survey included four questions that focused on technical issues. First question 9.1 addressed participants' self-efficacy in using technology. For this question the data is broken down by female students' responses and male faculty's responses.

Self-efficacy of technology

Table 16 presents female students' responses regarding their self-efficacy in the use of a computer, a smartphone, and the technology in their classroom.

Table 16. Female Students' and Male Faculty's Self-Efficacy of Technology

How confident do you feel about your ability to do the following	Confident	Unconfident	Mean of female students	Standard Deviation of female students	Mean of male faculty	Standard Deviation of male faculty
Use a computer	1.00	3.00	1.31	0.54	1.00	0.00
Use a smartphone	1.00	3.00	1.07	0.29	1.09	0.41
Operate the technology in your classroom	1.00	3.00	1.54	0.71	1.13	0.34

In general more male faculty members responded that they are confident in their ability to use the technology than female students as presented in Table 16. However more female students and faculty members reported feeling confident in using a computer (100% of male faculty and 73.14% of female students) and confident in using a smartphone (95.65% of male faculty and 94.63% of female students) compared to those who said they felt confident in operating technology in the classroom (86.96% of male faculty and 58.68% of female students) (See Appendix L).

Consequences of technical difficulties

Question 10.1 asked about the consequences that technical difficulties have on the classroom experience. Four consequences were identified in Chapter 4: class gets cancelled, class gets delayed, class is moved to another room, and technical support is requested. Survey responses were examined in terms of CCTV and VCR classroom configurations.

Participants were asked to rate how often they experienced the above-mentioned factors due to technical difficulties. They were asked to choose from five experience levels: 1) never, 2) sometimes, 3) about half the time, 4) most of the time, 5) always. Table 17 shows the means and standard deviations for each of the factors.

Table 17. Consequences of Technical Difficulties in CCTV and VCR Classrooms

How often did you experience the following due to technical difficulties:	Never	Always	Mean of CCTV	Standard Deviation of CCTV	Mean of VCR	Standard Deviation of VCR
Class gets cancelled	1.00	5.00	1.71	0.88	2.53	1.11
Class gets delayed	1.00	5.00	2.49	1.09	3.34	1.17
Class is moved to another room	1.00	5.00	2.59	1.20	3.12	1.11
Tech support is requested	1.00	5.00	2.47	1.22	3.66	1.20

Overall, the mean of responses for VCR users is higher than the mean for CCTV users for all four factors. This suggests that consequences due to technical difficulties are experienced more frequently in VCR classrooms. The two factors with the highest means in VCR classrooms were tech support is requested with a mean of 3.66 and class gets delayed with a mean of 3.34; suggesting that these consequences occur more frequently in VCR classrooms than classes moved to another room or getting cancelled. The two factors with the highest means in CCTV classrooms were class is moved to another room and class gets delayed. The lowest mean for CCTV classrooms was class gets cancelled with a mean of 1.71

(close to never); suggesting that this occurs less frequently in CCTV classrooms than the other factors.

Network connection quality

Question 10.2 in the survey was concerning the issues in the network connection between the male faculty member and his female students. This question is only relevant to CCTV and VCR since these classroom configurations rely entirely on network technology in order to function. The qualitative study identified the following issues as factors that disrupt or delay the network connection for these two classroom configurations:

- Absence of the remote control
- Remote control does not work
- Poor network connection
- Network failure
- Software crashes
- Users do not know how to operate the software
- Users do not know the IP address or room number of the other classroom to establish a connection
- Too many classes going on at the same time

To understand the quality of the network connection in each of the classroom configurations, the data retrieved from Question 10.2 was broken down by classroom configurations CCTV and VCR.

Participants were asked to rate how often they experience difficulties with the above-mentioned factors. They were asked to choose from five experience levels: 1) never, 2) sometimes, 3) about half the time, 4) most of the time, 5) always. Table 18 shows the means and standard deviations for each of the factors.

Table 18. Factors Influencing Network Connection

How often do the following difficulties disrupt establishing a connection with your female students?	Never	Always	Mean of CCTV	Standard Deviation of CCTV	Mean of VCR	Standard Deviation of VCR
Absence of remote control	1.00	5.00	2.15	1.20	3.02	1.39
Remote control doesn't work	1.00	5.00	1.83	1.01	2.34	1.10
Poor network connection	1.00	5.00	2.35	1.12	2.88	1.33
Network failure	1.00	5.00	2.26	1.18	2.61	1.19
Software crashes	1.00	5.00	1.89	1.06	2.21	1.13
Don't know how to operate the software	1.00	5.00	2.08	1.29	2.49	1.35
Don't know the IP/room number of the other classroom	1.00	5.00	1.97	1.21	2.72	1.38
Too many classes going on at the same time	1.00	5.00	2.14	1.26	2.62	1.42

The disparity between the responses of participants who use CCTV compared to participants who use VCR is evident from the results presented in Table 18. Overall, the mean of responses for VCR users is higher than the mean for CCTV users for all eight factors. This suggests that network connectivity problems occur more frequently in VCR classrooms. The factor with the highest mean of responses by CCTV users was poor network connection, with a mean of 2.35. While the factor with the highest mean of responses by VCR users was absence of remote control with a mean of 3.02; suggesting that this is the most frequent problem concerning network connection in VCR classrooms. This confirms the qualitative findings regarding many technical problems in VCR classrooms and fewer technical problems in CCTV classrooms.

Audio and video quality

Question 11.1 in the survey was regarding the classroom configurations' audio and video system quality. This question is relevant to all of the five classroom configurations since they are all equipped with audio and video technology.

The following factors were identified in the qualitative study as technical problems with the video and audio system:

- Sound breaks up
- Sound has an echo
- Sound has static
- Microphone does not work
- Microphone breaks up
- Video on screen is not clear
- Video breaks up
- Video does not work

Audio and video quality by classroom configuration

To understand the quality of the audio and video in each of the classroom configurations, the data retrieved from Question 11.1 was broken down by classroom configurations. Only CCTV and VCR responses were considered due to the small number of responses from other classroom configuration users.

Participants were asked to rate how often they experience difficulties with the above-mentioned factors. They were asked to choose from five experience levels: 1) never, 2) sometimes, 3) about half the time, 4) most of the time, 5) always. Table 19 below shows the means and standard deviations for each of the factors.

Table 19. Frequency of Audio and Video Difficulties in CCTV and VCR Classrooms

How often did you experience the following with the video and audio system?	Never	Always	Mean of CCTV	Standard Deviation of CCTV	Mean of VCR	Standard Deviation of VCR
Sound breaks up	1.00	5.00	2.19	0.99	2.46	1.11
Sound has an echo	1.00	5.00	2.30	1.20	2.46	1.29
Sound has static	1.00	5.00	2.33	1.13	2.47	1.18
Microphone does not work	1.00	5.00	2.21	1.09	2.36	1.11
Microphone breaks up	1.00	5.00	2.12	1.02	2.37	1.11
Video on screen is not clear	1.00	5.00	2.91	1.27	3.16	1.35
Video breaks up	1.00	5.00	2.45	1.27	2.50	1.28
Video does 't work	1.00	5.00	2.31	1.23	2.46	1.20

Overall, the mean of responses for VCR users is higher than the mean for CCTV users for all eight factors. This suggests that audio and video problems occur more frequently in VCR classrooms. The factor with the highest mean was video on screen is not clear, with a mean of 3.16 for responses by VCR users and 2.91 for CCTV users; suggesting that this is the most frequent problem concerning audio and video quality.

The majority of participants who use CCTV and VCR said these factors are sometimes experienced in their classrooms. The factor 'Video on screen is not clear' which had the highest mean as presented in Table 19, was reported by 20.86% of VCR users as always experienced in the classroom and 26.63% as most of the time. This suggests that nearly half of the population of VCR users have frequently experienced poor video quality in VCR classrooms (See Appendix O). On the other hand, with CCTV classrooms 13.83% of CCTV users reported that 'video on screen is not clear' always and 23.40% said most of the time suggesting that around 37% of the population have frequently experienced issues with video quality (See Appendix O).

Students' behavior and discipline

The survey included two questions about students' behavior and discipline in the classroom. Question 12.1 asked participants to respond to how the classroom configurations influence female students' attendance, discipline in class, and desire to learn. The data retrieved from Question 12.1 was broken down by classroom configurations CCTV and VCR. Participants were asked to choose from three levels: 1) Positive, 2) Neutral, 3) Negative. Table 20 shows the means and standard deviations for each of the factors.

Table 20. Influence of Classroom Configurations on Student Behavior

How do you think the classroom configuration influences the following:	Positive	Negative	Mean of CCTV	Standard Deviation of CCTV	Mean of VCR	Standard Deviation of VCR
Attendance	1.00	3.00	1.86	0.79	2.11	0.85
Discipline	1.00	3.00	1.96	0.82	2.26	0.87
Desire to Learn	1.00	3.00	1.81	0.78	1.85	0.79

Overall more CCTV users said their classroom configuration had a positive influence on attendance, discipline, and desire to learn compared to VCR users. More than half of VCR users said it had a negative influence on discipline. More CCTV and VCR users responded negatively to discipline than attendance or desire to learn.

Question 12.2 explored how the classroom configurations influence female students' behavior. Participants were asked if they have experienced the following factors which were the drawn from the qualitative study: students talk in class, students skip class, students do not follow faculty members' instructions, and students are careless and do not pay attention. The data was broken down by classroom configurations CCTV and VCR (Figure 19) after eliminating responses for videoconferencing, double-decker, and partitions due to their

relatively small number of responses. Then the survey items were broken down by male professor and female student responses (Figure 20). The following section presents the data.

Influence on behavior by classroom configuration

Figure 19 presents the percentage of respondents' choices in CCTV and VCR classrooms.

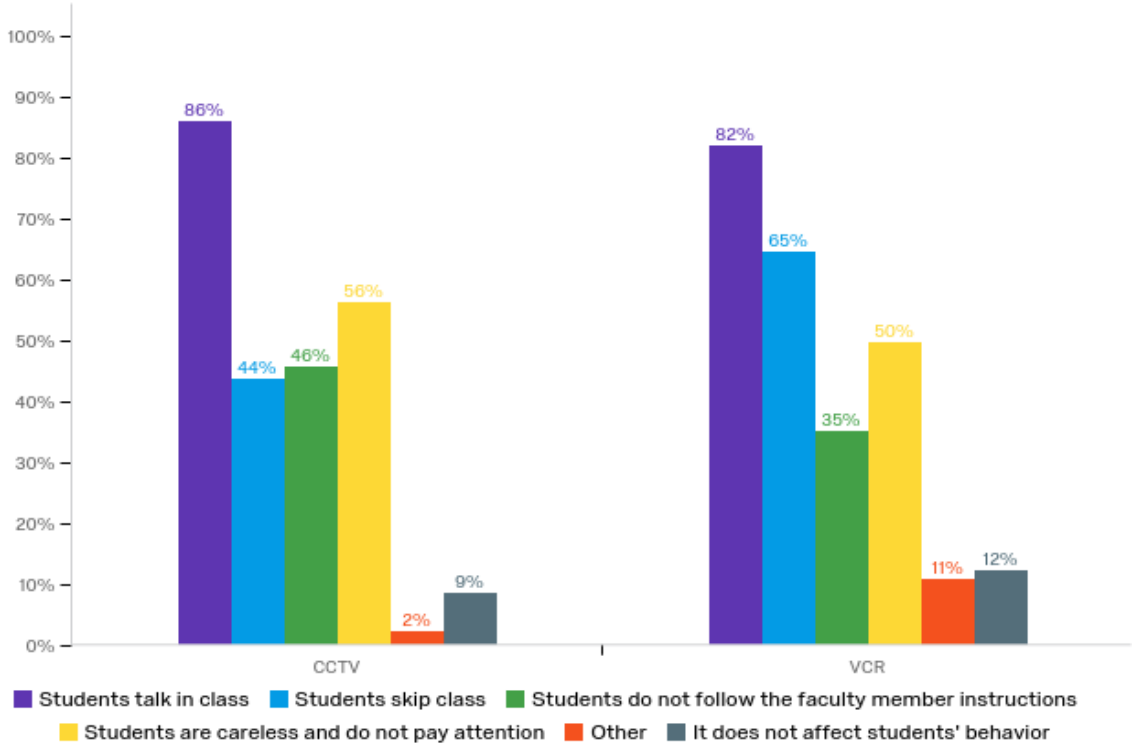


Figure 19. Influence on Behavior by Classroom Configuration

As shown in Figure 19, over 80% of respondents in both CCTV and VCR classrooms have experienced students talking in class. More respondents who use VCR reported that students skip class compared to those who use CCTV. However, more respondents who use CCTV said that 'students are careless and do not pay attention' and that 'students do not follow faculty members' instructions compared to those who use VCR. Only 9% of respondents who

use CCTV and 12% who use VCR said that their classroom configuration does not influence female students' behavior.

Influence on behavior by female students and male Faculty

Figure 20 presents the percentage of respondents' choices broken down by female students and male faculty.

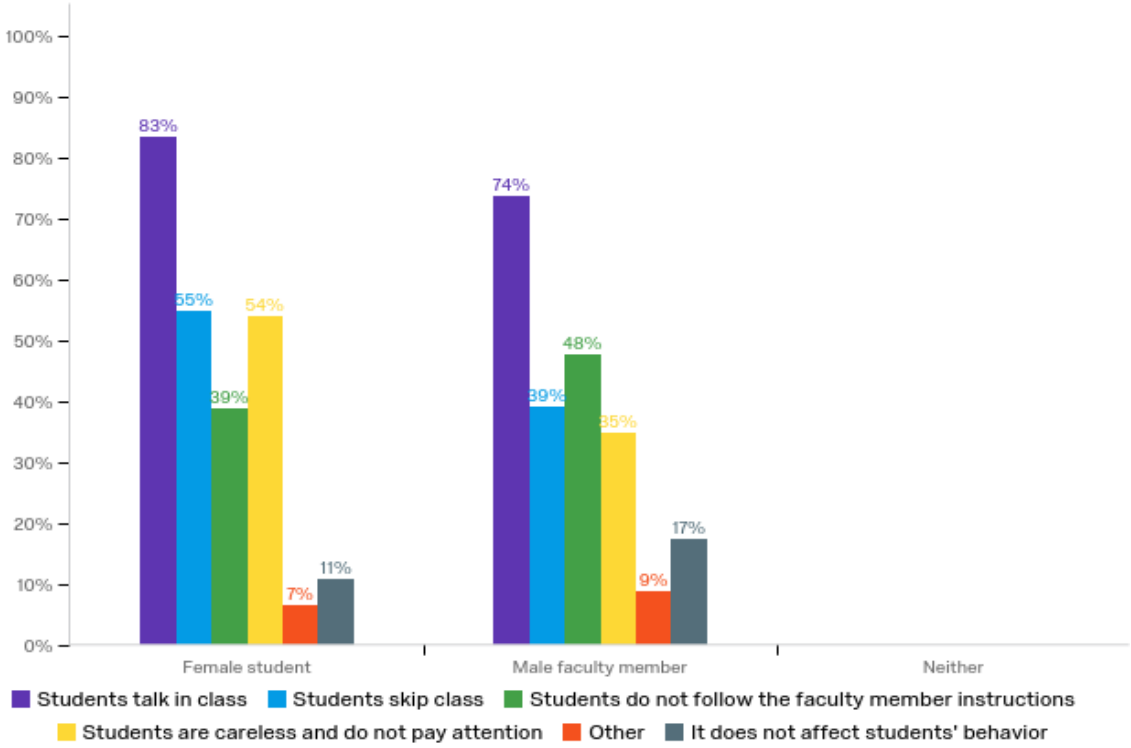


Figure 20. Influence on Behavior by Female Students and Male Faculty

As shown in Figure 20 more female students expressed that 'students talk in class, 'skip class,' and are 'careless and do not pay attention in class' than did male professors. Yet, a higher percentage of male faculty members said that 'students do not follow the faculty members' instructions. Moreover, 17% of male faculty members said that the classroom configuration 'does not affect students' behavior' compared to only 11% of female students.

This suggests that some male faculty members are unaware of the influence that the classroom configurations have on female students' behavior and discipline.

Participants' input

The question also had an input text box so respondents could share their experiences. Four participants provided their input. The first participant said that the classroom configuration does not influence students' discipline when there is a supervisor in the classroom. The second participant said that discipline and behavior relies on the student as some students are there to learn and some are careless. The third participant said that most students do not pay attention due to frustration because they are not able to grasp information or concentrate in the classroom. The fourth participant said that usually there is no supervisor so there is a lot of chaos and disturbance and most students record their attendance and leave the classroom because the instructor cannot see them.

Subjective norm

The survey included two questions about participants' personal preference towards alternative teaching arrangements and their acceptance in Saudi society. Question 13.1 asked participants whether they agree with the following statements:

1) I believe female students should be taught in a co-educational setting.
2) Learning in a co-educational setting is acceptable in Saudi society.
3) Using Partitions in a co-educational setting is acceptable in Saudi society.
4) Using the double-decked bench system is acceptable to separate genders in Saudi society.

The question included a picture of the double deck system for clarification purposes. The data was broken down to present responses for female students and male faculty members. Table 21

presents the percentage of female students and male faculty members who agreed, disagreed or were neutral regarding the previously mentioned statements.

Table 21. Female Students' and Male Faculty's Perspectives of Subjective Norm

	Female students			Male faculty		
Do you agree with the following statements:	Agree	Neither agree nor disagree	Disagree	Agree	Neither agree nor disagree	Disagree
I believe female students should be taught in a coeducational setting	17%	17%	67%	9%	22%	70%
Learning in a coeducational setting is acceptable in Saudi society	7%	15%	78%	4%	26%	70%
Using partitions in a coeducational setting is acceptable in Saudi society	17%	30%	52%	26%	43%	30%
Using the double decked bench system to separate genders is acceptable in Saudi society	15%	26%	59%	22%	39%	39%

As shown in Table 21, only 9% of male faculty members and 17% of female students agreed to the statement that 'female students should be taught in a co-educational setting,' while approximately 70% of male faculty and 67% of female students disagreed. Meanwhile only 4% of male faculty and 7% of female students agreed to the statement 'learning in a co-educational setting is acceptable in Saudi society.' In general, the double deck and partitions arrangements seemed more acceptable by both female students and male faculty members. However, a comparatively larger percentage of faculty members seemed to think that double deck and partition systems are acceptable in society than did the percentage of female students.

Respondents' personal preference of classroom configurations

For the final question (13.2) participants were asked to rank the classroom configurations in order of their personal preference. Table 22 displays the mean responses for female students and male faculty members.

Table 22. Classroom Configurations' Ranking Mean and Standard Deviation

Classroom Configuration	Mean of Female Students' Responses	Standard Deviation of Female Students	Mean of Male Faculty Responses	Standard Deviation of Male Faculty
CCTV	2.94	1.80	3.62	1.89
VCR	2.98	1.75	3.67	1.89
VC	3.59	1.71	3.76	1.48
Partition	4.07	1.38	3.19	1.53
Double deck	4.34	1.51	3.62	1.62

Female students and male faculty ranked the classroom configurations according to the following order (See Table 23). The order was derived based on female students' and male faculty members' mean responses from lowest to highest as shown in Table 22.

Table 23. Classroom Configurations' Ranking by Female Students and Male Faculty

	Female students	**Male faculty members**
1	CCTV	Partition
2	VCR	CCTV - Double deck
3	VC	
4	Partition	VCR
5	Double deck	VC

Summary

This chapter reported the perspectives of Qassim University's male professors and female students of the five classroom configurations used to mediate instruction to female students. A synthesis of the demographic and background information was provided of the study sample. Then female students' and male professors' perspectives of effectiveness was

reported based on seven categories: interaction and participation, open communication, Student understanding, teaching presence, technical issues, classroom management, and subjective norm.

In general, faculty members had more positive perspectives regarding their classroom configurations compared to female students, however they were also more willing to try alternative methods. Overall, VCR seemed to be the least favorable classroom configuration by female students and faculty members while partitions seemed to be a more favorable approach for male faculty.

Chapter Six - Discussion

Introduction

The purpose of this study was to explore the classroom configurations used to mediate instruction to female students in gender-separated classrooms at Qassim and Alfaisal Universities in Saudi Arabia. This exploratory project was designed to collect information in two phases. The first phase included observations and interviews at three classroom sites at Qassim University and two classroom sites at Alfaisal University. Chapter 4 described the classroom configurations used, explored the effectiveness of the approaches, and described the issues and challenges that female students and male faculty members face in gender-separated classrooms. This analysis was used to design a survey for distribution to female students and male faculty members at Qassim University. The survey results were presented in Chapter 5.

This chapter provides a synthesis of the qualitative and quantitative results and summarizes the results of the study in light of the research questions. Recommendations for gender-separated universities are also provided. Finally, this chapter provides a reflection on the researcher's journey throughout the duration of this project and discusses the limitations of this study in addition to recommendations to expand this research in the future.

Synthesis of Results

As described in Chapter 4, all of the cases observed at Qassim University involved strict gender-separation practices involving separate campuses for men and women. Classes relied entirely on communication technology to mediate instruction between female students and male professors. Nearly 85% of the female students who completed the survey said they had used Closed Circuit Television (CCTV), Ethernet Based Videoconferencing (VCR), or Internet Based Videoconferencing (VC) technology to establish communication in the

classroom. The students at Alfaisal University used Double Deck or Partitions that revealed more relaxed gender-separation practices. Faculty offices were in 'mixed' areas and all students had equal access to faculty members. Classes were equipped with technology to support instruction but did not rely on technology for communication.

The strict gender-separation policy at Qassim University's female campuses allowed women to take off their head coverings and Abayas indoors. Generally, female students in all of the cases at Qassim University appeared to be relaxed and interacted with each other openly. The female students knew each other well. They spoke during class regarding course related and non-related issues. The class was usually well managed when an active teaching assistant was present. However, upon the absence of a teaching assistant, students often reported chaos in the classrooms. Students were also effective in using Whatsapp messenger and email to communicate with each other and with their male professors. In most classes at least one female student had access to the professor's personal phone number to coordinate with him on behalf of the rest of the class.

At Alfaisal University students who were covered relaxed their head covers in exclusive areas and adjusted them in 'mixed' areas. Students had less privacy in the classroom because most classes are located in 'mixed' areas. In general, the female students at Alfaisal appeared to be reserved, particularly in 'mixed' areas. In both cases, Double deck and Partitions, students were mostly silent during class and did not appear to interact with each other either before or after class. Interactions with the professors usually happened in the classroom, via email or in the professor's office during office hours.

Technical issues

Generally, all cases at Qassim University revealed issues with technology. In the case of VCR and VC, network connection issues often disturbed the educational experience.

Classes were often delayed and sometimes cancelled due to network connectivity problems. There were also problems with audio and video quality. Because it is a closed network, CCTV did not display any connectivity issues and there were fewer problems with audio and video. Classes often started on time and without disruption. CCTV contained the fewest technical issues and problems, however VC provided an overall better learning experience because it enabled the instructor to use additional methods, such as PowerPoint slides to support instruction.

At Alfaisal University, technical issues were fixed very quickly. It was also possible for classes to function without the technology because students and professor were in physical proximity to each other. All of the female students and male professors liked the partitioned classroom. Female students reported feeling left out and disconnected in the Double deck system.

Preference for classroom arrangements

There was some disparity in participants' opinions regarding their preference for classroom arrangements. Overall, female students at Alfaisal University expressed their approval for the university's current arrangements and did not wish to change anything. However, some of the faculty members disapproved and called for adopting co-education. Students and professors at Qassim had mixed opinions. Some female participants supported face-to-face instruction and others disapproved, stating that it would inhibit their interaction in class rather than improve it.

Factors that influence perspectives

Based upon the interviews and observations conducted across the sites and cases, two factors appeared to influence professors' and students' perspectives. This section summarizes these points.

Professor seniority and experience. During their interviews with the researcher, senior professors seemed to be more diplomatic, culturally sensitive and mindful of social customs. They appeared to be hesitant towards change, focusing the conversation on the method of change rather than the need for change. Professors with less experience seemed to be more vigorous in demanding change. They called for the eradication of gender-separated education and expressed their preference for adopting co-education. Citizenship, background and religion did not seem to have a major influence on professors' perspectives on the need to change, in contrast to professors' level of experience and number of years worked in Saudi Arabia. At Alfaisal University a non-Muslim American professor with an impressive resume who had been working in Saudi Arabia (on and off) for 30 years seemed very comfortable teaching in gender-separated classrooms. Professors with Arab backgrounds who have been working at the same university for less than five years seemed irritated and frustrated with the current arrangements. Meanwhile at Qassim University a senior Arab professor, regarded by female students as one of their best professors, shared a neutral perspective and was somewhat hesitant toward change, often reflecting on the means and repercussions of social change. The professor also had an impressive resume and a great deal of experience working and teaching in different countries.

Student ambition. Based on the focus groups conducted with female students, there was certainly a clear variation in female students' attitudes about the current classroom configurations across the cases of this study. The disparity was especially striking amongst the different colleges at Qassim University. Economics students at the College of Business were very outspoken, demanding and frustrated with their classroom settings. Meanwhile students at the College of Education in Almontazah had a more passive and indifferent attitude. In a separate interview the professor reported that his female students do not expect to get a job

after college so they feel discouraged. They do not have any ambition and are careless about their education. He expressed that despite his efforts to encourage them and spark their ambition for the sake of learning, the female students are careless because they feel they do not have a future and that their education in this college will not provide them with a career.

On the other hand while touring Alfaisal University's premises in 2016, a senior professor at the university expressed that Alfaisal University's female students are more demanding and outspoken than female students in public universities, due to their privileged backgrounds. However, in addition to being very difficult to recruit due to their unwillingness to participate in the study, most of Alfaisal's female students displayed an indifferent and reserved attitude throughout the interview, contrary to what was expected.

The reason for such a disparity between female students across the sites and cases seems to be due to students' ambition as well as an encouraging educational environment. Economics students at Almleyda seem to feel a gap between their ambition and their reality, which explains their frustration, outspokenness and demanding attitudes regarding their educational system. Education students at Almontazah, according to their professor, are less ambitious and discouraged about developing a career or finding a job after college, which may explain their dispassionate careless attitude. Business students at Alfaisal University displayed an indifferent attitude despite being seemingly ambitious and having a supportive environment. This may be due to their privileged backgrounds and having overall a better educational experience compared to students at Qassim University.

Discussion of Results

The exploratory mixed methods design executed in this study involved a qualitative and quantitative component. The two components occurred in two distinct phases and used qualitative data to construct an instrument for quantitative data collection. The purpose of the

qualitative phase was to apply an in depth understanding of the experiences of female students and male professors in gender separated classrooms. The purpose of the quantitative phase was to provide generalizability and report findings reflective of a larger sample of female students and male professors at Qassim University. However, while reflecting on the findings of both the qualitative and quantitative data, the data seems, to some extent, contradictory. Noticeably the survey data does not capture the struggle, frustration, and despair evident in the qualitative data. The quantitative data, mostly, revealed neutral perspectives while many female students and male professors responded favorably to CCTV and VCR, which are classroom configurations that appeared to cause a great deal of frustration in the qualitative data. First, it is noteworthy that the quantitative study was executed during the summer vacation, whereas the qualitative study was executed during the spring semester in between mid-term and final exams. Furthermore, the qualitative study captured participants' experiences in gender separated classrooms whereas the quantitative study captured participants' perspectives. The reason for inconsistencies between participants' experiences and perspectives may be due to subjective norm. Upon reviewing the theoretical framework, Kang and Shin's (2015) research concerning undergraduate students' perspectives of online learning at a Korean University revealed that subjective norm significantly influences perceived usefulness and perceived ease of use. The quantitative data gathered in this study suggests that subjective norm also influences students' and faculty members' perspectives on social, cognitive, and teaching presences in addition to perceived usefulness and perceived ease of use. Further research is required to test this hypothesis.

The following section discusses the qualitative and quantitative findings in light of the research questions.

Q1. What classroom configurations and technologies are used by male professors to teach female students?

Five classroom configurations and technologies were identified and described in this study. Three classroom configurations were observed at Qassim University and two at Alfaisal University. At Qassim University, the main classroom configurations used by male professors to teach female students were: VCR, CCTV, and VC technologies. At Alfaisal University, Double deck systems and Partitions were investigated as the only configurations used in gender-separated classrooms.

VCR. Ethernet based videoconferencing, commonly known as VCR in Saudi discourse, was the most commonly used method at Qassim University. Nearly 45% of female students and 41% of male faculty members who responded to the survey used this method to mediate instruction in the classroom. The technology involves connecting classrooms via an Ethernet network. The network consists of a router in each classroom and an IP address is generated for each router and is used to connect any two routers (classrooms) together for a videoconferencing session. A remote control is provided with each router to input the IP address for the specified room. In addition to the network equipment the VCR classrooms contain a camera, speakers, a microphone, a projector, and a computer workstation for professors in the male classroom.

CCTV. Closed Circuit Television technology is the second most commonly used method to mediate instruction to female students at Qassim University. Nearly 34% of female students and 32% of male faculty members who responded to the study use this method to mediate instruction in the classroom. The technology is operated via a closed circuit network and involves the use of a video camera to transmit a signal to a specific location on a limited set of monitors. Commonly used for security and surveillance purposes, this network

configuration transmits a lecture delivered by a faculty member from a CCTV equipped studio at the female campus. There is a camera, a microphone, and a computer workstation in the studio and a TV monitor, speakers and a microphone in the female classroom.

VCR. Internet based videoconferencing was the least common approach to mediate instruction at Qassim University. Approximately 6% of female student respondents and 11% of male faculty respondents said they used this approach to mediate instruction in their classrooms. This technology involves the use of an Internet based videoconferencing software to deliver a lecture to the female classroom. Female classrooms are often equipped with a display screen, microphone, speakers, a desktop computer and a high-speed Internet connection.

Double deck. Double deck lecture halls are the most frequently used classroom configuration to mediate instruction while maintaining gender separation at Alfaisal University. This approach involves accommodating both genders in the same campus with separate sections for men and women within the same classroom. Double Deck lecture halls are designed in the form of two floors (decks) with bench seating for male students on the lower floor and bench seating for female students in a separate section on the top floor. The female students' section overlooks the male section on the first floor and is often shaded with tinted glass or some sort of partition for privacy. There is a platform on the lower floor that faculty members use to deliver their lectures which offers minimal visibility. A short flight of stairs connects the two decks and is only used for handing out documents and exam papers. Male students and faculty members enter the classroom through an entrance on the bottom floor while female students have a separate entrance on the top floor.

Partitions. Partitioned classrooms are another approach to mediate instruction while maintaining gender-separation at Alfaisal University. This approach accommodates male and

female students in an average sized classroom fully furnished with chairs, desks, a projector and a portable whiteboard. The students sit in separate sections with a short wooden partition between them. Some classroom arrangements involve seating male students on one side and female students on the other, while other classroom arrangements involve seating male students in the front and female students in the back with a tall wooden partition on the side to provide privacy as the female students walk to the back of the classroom.

Q2. To what extent are the classroom configurations and technologies seen to be effective from the perspective of the users?

In Chapter 1 effectiveness was defined in terms of users' acceptance and satisfaction with the classroom configurations for two purposes: (1) to facilitate communication between female students and male professors; and (2) to support the educational experience. The first definition was evaluated using the Technology Acceptance Model (Davis, 1989; Kang & Shin, 2015), which measures users' satisfaction and perception of technology. Support of the educational experience was evaluated in terms of the Community of Inquiry framework (Garrison et al., 1999), which is concerned with the interactions between the social, cognitive, and teaching aspects of learning.

A) Effective in facilitating instruction.

Based on the Technology Acceptance Model, the cases described in this study are discussed in light of the following criteria: perceived usefulness, perceived ease of use, computer self-efficacy, and subjective norm.

Perceived Usefulness. The technologies at Qassim University were considered useful by the majority of faculty members, while the majority of female students were neutral. Despite being considered useful by 47.83% of male faculty members and 26.45% of female students, VCR was very inefficient at establishing and maintaining classroom connections.

There were many technical problems that significantly limited the educational experience. CCTV displayed fewer technical problems but also limited the educational experience. Students reported that professors read to them instead of explaining or demonstrating the material. VC displayed some technical problems but provided an overall improved educational experience. The technology's capacity to mediate instruction to female students while maintaining social norms is what rendered them useful to some participants. Double deck classrooms appeared useful in mediating instruction to female students while adhering to the local customs. Partitions were the most useful and least expensive classroom configuration observed.

Perceived Ease of Use. CCTV and VC were both considered easy to use by the majority of respondents. Most respondents considered VCR neither easy nor difficult. Based on observations, students and most faculty members did not know how to operate VCR technology. CCTV and VC were fairly straightforward and faculty members and students seemed to operate them easily.

Technology Self-Efficacy. The majority of respondents said they were confident in using a personal computer and a personal smartphone but fewer respondents said they were confident operating classroom technology such as CCTV, VCR, and VC.

Subjective Norm. Generally all of the cases described in this study maintain gender separation thereby conserving the social norm. Partitions were less conservative methods since male and female students were in the same classroom. The classrooms also had one entrance for all students as opposed to having separate entrances in the case of the Double deck classrooms. Students at Qassim University were asked to rank the classroom configurations according to their personal preference. The classroom configurations were ranked as follows: 1) CCTV, 2) VCR, 3) VC, 4) Partitions, 5) Double deck. The results suggest that students'

personal preference is largely influenced by the social norm since the order of the results reflects the order of what is socially acceptable.

B) Effective in supporting the educational experience.

The cases described in this study are discussed in light of the following categories provided by the Community of Inquiry framework: teaching presence, social presence, and cognitive presence.

Table 24 shows the overall rating of each classroom configuration according to its educational experience with one star representing the lowest rating and five stars the highest, based on a synthesis of the data collected from classroom observations, focus groups with female students, interviews with male professors and survey results.

Table 24. Classroom Configurations' Rating Based on Educational Experience

	Social Presence	**Cognitive Presence**	**Teaching Presence**
VCR	****	*	*
CCTV	****	*	*
VC	****	***	**
Double deck	***	***	**
Partitions	***	*****	*****

*** - lowest ***** - highest**

Teaching presence. Teaching presence was limited in all of the cases except Partitions. VCR and CCTV classrooms particularly restricted teaching presence in the classroom. VC, due to enhanced instructional capabilities in the technology, and Double deck provided better teaching presence. The VC software included technical tools that enabled the professor to use supportive material with his instruction. Dr. VC used a PowerPoint presentation and his female students were able to use Google drive to share their documents with their professor. Double deck classrooms displayed similar technical capabilities.

However both VC and Double deck had shortcomings. All of the classroom configurations except Partition classrooms constrained the female students' ability to intervene and the male professors' ability to sense students' understanding. Moreover, professors were unable to manage the classrooms, which often resulted in chaos particularly when there was no female supervisor. Due to face-to-face contact, Partition classrooms enabled interaction, intervention and enhanced the teaching presence in the classroom. Partition classrooms have the best potential for teaching presence out of all of the five cases.

Social presence. In VCR, CCTV, and VC classrooms, the atmosphere was very relaxed. The students knew each other and interacted with each other openly. For example, in Dr. VC's class, female students said their communication and collaboration with each other is 99-100%. By contrast, female students required extra mediums in order to communicate with their professor in all three cases. Students in Dr. VCR's class used email and the Whatsapp messenger to communicate with him. Students in Dr. VC's class also used email and Whatsapp messenger to communicate with their professors. Three students in Dr. CCTV's class had his phone number and coordinated with him on behalf of the rest of the class. By contrast, in the Double deck and Partition classrooms the atmosphere was somewhat stiff and the female students seemed reserved, despite the fact that they had better access to their professors and often communicated via email or visited their offices during office hours.

Cognitive presence. Both VCR and CCTV displayed deficiencies in cognitive presence but not VC. In VCR and CCTV classrooms students reported having trouble understanding the material. During observations in VCR and CCTV classrooms students seemed distracted and showed no evidence of connecting ideas, exchanging information, having a sense of puzzlement or applying new information. Both Double deck and VC female students seemed more engaged. VC students exchanged information with each other during

class. Some students preferred face-to-face instruction and considered it more engaging, yet all of the students said they did not have any problems understanding content in Dr. VC and Dr. Double deck's classes. However, students mentioned that the level of understanding often depended on the course and the professor. Overall Partition classrooms displayed the best results for cognitive presence and students expressed feeling more engaged and included.

Q3. What issues and challenges do female students and male professors report in gender-separated classrooms?

This study identified many issues and challenges that female students and male professors experience in the classroom. The issues and challenges were consistent with the Community of Inquiry framework (Garrison et al., 1999). While the data gathered for this question was not done with the Community of Inquiry in mind, however there are parallels with the Community of Inquiry framework suggesting that students and professors are concerned about the interactions of the social, cognitive, and teaching presences in the classroom. This section summarizes the most common issues across the sites.

Technical Problems. The most common and frustrating issue for female students and male professors across the cases were problems with the technology used to facilitate the instruction. Respondents to the survey ranked *Technical Problems* as the number one factor that most restricted communication between male faculty and female students. Technical problems experienced in classrooms with VCR, CCTV, and VC technologies often obstructed the learning experience far more than technical problems in Double deck or Partition classrooms, in part because technology was only used to support instruction rather than deliver it. In addition the technical support at Alfaisal University is very effective at quickly fixing technical issues in contrast to the ineffective technical support at Qassim University. Many

classrooms, particularly VCR classrooms, had to be cancelled or delayed due to technical problems. The most common technical problems across the cases were:

- Inability to establish a network connection.
- Loss of network connection during a classroom session.
- Problems with audio quality such as static, background noise, and audio breaking up or unclear.
- Problems with video quality such as blurry images, very small or far away images.
- Difficulty operating the camera while instructing the lesson.
- Absence or loss of equipment.
- Lack of knowledge on how to use the software.
- Incompetence of technical support.

Classroom management. Another issue that was prevalent across the cases and at both sites was the instructors' inability to manage the classroom. The only exception was in Partition classrooms. Most courses at both sites had female supervisors assigned to manage the classroom. Yet, students and professors reported behavioral problems and chaos in the absence of a supervisor. Participants often reported a better experience in the presence of an active supervisor.

Time management. Another common issue that professors struggled with, especially in VCR and VC classrooms, was managing time. Technical problems often delayed or obstructed the classroom session.

Instructional limitations. Dr. VCR reported that the VCR classrooms largely limit opportunities to experiment with instructional methods. By contrast, most professors said that the classroom configuration did not matter and did not affect their instructional methods. Dr.

CCTV, on the other hand, said that the female classroom was better equipped with technology than his male classroom; and he had more opportunities to experiment with instructional methods in his female classroom. The male faculty members' responses largely depended on the subject being taught and the professor's teaching experience and teaching philosophy.

Communication and participation. The underlying philosophy behind gender-separation naturally aims to limit unsolicited communication and interaction between men and women. In the cases that were investigated in this study, it also largely limited interaction and participation in the classroom. Many professors and students reasoned that this is due to female students behaving in a shy and reserved manner in the presence of male professors or students. Some suggested that it is also due to the difficulty and inconvenience of using technology to communicate, as in some cases students need to move around the classroom in order to speak into the microphone. In gender-separated classrooms with male professors, female students always had to make an effort to interact with their professor in contrast to face-to-face classrooms where interaction was often effortless.

Recommendations for Gender-Separated Universities

Teaching assistants

Most public universities in Saudi Arabia employ male and female teaching assistants and finance their education abroad to fill the need for faculty members at the university. In the case of Qassim University, some of the female teaching assistants remained at the university and did not continue their higher education for various personal reasons. In the College of Business, the teaching assistants who had not continued their education were assigned to supervise gender-separated classrooms and respond to other administrative responsibilities. Their role as classroom supervisors is restricted to operating the technology. They have no influence on or the opportunity to contribute to the instructional aspects of the course.

This caused complaints from male professors and female students who maintained that the teaching assistants are frequently absent and do not do the job they are assigned to do. An administrative assistant who works in admissions and registration at the College of Business confirmed that the teaching assistants are unproductive and that administrative staff members are often required to fill in for them. Another administrative assistant said, "they do not do anything and they are always complaining." Meanwhile teaching assistants expressed that they feel marginalized and unappreciated.

The first recommendation is to activate the role of the female teaching assistant. Although minor and costs nothing, this step may lead to significant improvement in the educational experience. Academic administrators could assign female teaching assistants to teach courses in female classrooms, actively involving the teaching assistants in the design, instruction, and assessment of the course. If the college's national and international accreditation is an issue, the male professor could be responsible for designing and instructing the course but engage the teaching assistants in providing a more active supportive role in the female classroom. This would reduce behavioral issues due to lack of supervision, as well as improve the overall learning experience, given the physical presence of an active instructor in the classroom.

Professional development

Many Saudi universities invest a great deal of money in the professional development of their faculty. However, professional development specifically designed for teaching female students in these universities is an area that needs special attention. One of the ways to approach this is through peer led professional development. For example, students reported that some professors at Qassim University were very proficient in using the technologies provided in their classrooms. Also, some professors incorporated effective strategies and

instructional methods that significantly improved the learning experience via CCTV or VCR. The university administration could ask them to provide workshops on successful instructional methods to support their colleagues in implementing these strategies.

Education technology

Due to the heavy reliance on technology to mediate instruction at gender-separated universities, it seems crucial to invest in new educational technologies that better support learning. VCR and CCTV networks are outdated systems that need to be replaced. Systems that could potentially provide a better solution include online videoconferencing software such as Zoom or TE Desktop. Other solutions such as educational simulations, online virtual labs and virtual educational worlds should also be considered. These technologies often present a more interactive learning experience for the users. If implemented correctly, these technologies may improve the learning experiences for many women in higher education in Saudi Arabia.

In addition to updating the technology, university administrations should also monitor the technology and establish a process whereby the technologies are regularly evaluated and maintained. Efforts should be made to keep up with the latest innovations in educational technology to provide female students and male professors with an optimized educational experience.

Limitations of the Research

This study was limited to the type and geographic location of the institutions that participated in the study. The research was limited to two institutions in the central region of Saudi Arabia: Qassim University, a large university in a conservative agricultural region, and Alfaisal University, a small elite university in a metropolitan city. After data collection began other limitations emerged in the quantitative phase of the study. First, the quantitative study was limited to Qassim University due to lack of cooperation and non-response from Alfaisal

University affiliates. Second, respondents who have experienced videoconferencing, partitions, and double deck systems were a very small number of the sample and thereby limited the quantitative analysis. Future studies could study those populations in more detail.

Recommendations for Future Research

Extending this research.

There are several opportunities to extend this research. The most likely next step would be to conduct a quantitative study to test the hypothesis that subjective norm influences perceptions of the social, cognitive, and teaching presences in the classroom and the hypothesis that subjective norm influences perceived usefulness and perceived ease of use of technology thereby confirming Kang and Shin's (2015) findings. Another opportunity would be to include a larger sample of the different classroom configurations examined in this study. This could be achieved by expanding the study to different sites, particularly sites in different geographic locations such as universities in the eastern, western, southern, and northern regions of Saudi Arabia. Working with a larger sample would provide the opportunity to expand the analysis, better evaluating the effectiveness of the different classroom configurations. Another opportunity for future research would be to research the instructional strategies used by male professors who are successful in teaching female students in a gender-separated environment.

Establishing a quality assurance benchmark

Given the prevalence of certain issues and problems across the different cases and sites in this study, there appears to be a need to establish a quality benchmark specifically designed to assure the quality of female education in gender-separated classrooms. There is an opportunity to expand on this work by building upon the information gathered from the different sites and cases and establishing a quality assurance benchmark that tackles all of the issues uncovered in this study. One area of research that may be of help is online learning.

Future research could build upon existing online learning quality assurance frameworks. Establishing a quality assurance benchmark that specifically targets female learning in gender-separated classrooms may improve the overall quality of female education in Saudi Arabia.

Finding technological solutions

After having identified the issues and challenges that female students and male faculty members face in gender-separated classrooms, future research is needed to find culturally acceptable solutions that bypass these issues. For example there are many technological advances in the field of education technology that may offer more effective solutions for the gender-separation problem in Saudi higher education.

Cultural susceptibility for co-education

One of the findings of this study was the diverse opinions and perspectives amongst male faculty members and female students regarding gender-separation in higher education. Further research is needed to understand social acceptance for face-to-face instruction from professors of the opposite gender and social acceptance for co-education (male and female students together in the same class). A survey could be conducted with students, parents, and faculty members to better understand their perspectives and to study their acceptance of face-to-face instruction (with the opposite gender) and co-education.

Ethical considerations

Further research needs to focus on ethical issues and considerations for female students and female faculty such as educational rights and access to resources. For example, At Qassim University, female students and staff have no access to the university's main campus that encompasses the main administration offices and main library. Recently female faculty members were permitted to visit administration offices for work-related matters, however students and other members of staff are expected to handle their transactions over the phone or

by sending a male relative on their behalf. Female students and staff also have no access to sports facilities. Further research is required to investigate these issues.

Reflection

There were challenges in the design and implementation of this study that have contributed to the difficulty of accomplishing this work albeit while providing a remarkable learning experience. Challenges in the design emerged in the early stages of this project. The dissertation was initially intended to establish a quality assurance framework for technology-mediated instruction in gender-separated classrooms. However, due to the lack of descriptive sources concerning gender-separated classrooms in the literature, it became evident that a descriptive study was vital to later being able to consider corrective steps.

The lack of depiction in the literature provided another challenge with regards to the quality of the survey instrument. Therefore, it became crucial to invest time and effort in ensuring the quality of the survey instrument. This particular mixed methods instrument development design used qualitative data to construct an instrument for quantitative data collection. The themes identified from the analysis of the qualitative data were then used to develop the survey instrument. This strategy ensured the quality of the quantitative instrument and the utility of the findings. A case study approach was used for the qualitative phase to provide a contextual understanding of the experiences of female students and their male professors in gender-separated classrooms. The process of combining the qualitative and quantitative approaches complemented each methodology and provided a more in depth analysis of the situation.

Challenges in implementation were due to the lack of time and amount of workload involved with a mixed methods study. Moreover, the lack of cooperation from Alfaisal University affiliates further elongated the process. During the qualitative phase, the study was

rejected by certain members of the university administration for several months for various reasons. The matter was then taken to the President of the university who permitted the research to be conducted. The researcher's persistence on collecting data at Alfaisal University was fruitful but time consuming. During the quantitative phase of the study, the researcher reached out again with no success. By contrast the research was conducted smoothly and on time at Qassim University.

One of the lessons learned from embarking on this study is that research is a process. In this case it has been an iterative process that required a great deal of patience, perseverance and flexibility. Learning to execute a mixed methods study in a limited time frame has been a struggle, however the significance of the topic at hand and the potential effect that it has on the experiences of female students and male professors makes the struggle worthwhile.

Feedback from Participants

The researcher received feedback from the research participants both verbally and in the form of email and text messages. At Qassim University two male faculty members who received the survey reached out with suggestions regarding the content of the survey. Both professors commented on the importance of the subject matter. One of them wrote, "The topic is excellent, vital, and tries to study a pragmatic issue." One of the professors suggested changing the title of the study, while the other suggested omitting some of the demographic questions. Both professors were experts in survey research. During an interview, a senior professor at Alfaisal University stopped in the middle of the interview and said, "I'm glad you are doing this. Great job. This is really important." During a focus group interview with graduate students at Qassim University, one of the students criticized the study, saying that because this is a descriptive study it would not be accepted by Saudi universities. She said that in order for a research to be accepted it must either involve interventions such as in

experimental or quasi-experimental research or use a correlational or causal-comparative approach. If this were to be true, it may explain the lack of research on gender-separated classrooms in Saudi literature.

On the other hand, undergraduate female students at Qassim University expressed their support for the study. After distributing the survey via Whatsapp messenger, an unknown respondent replied stating, "I completed the survey. The topic is heroic." Another student wrote, "This is an issue that we really struggle with in Computer Science." One student in the College of Business and Economics, who was not involved in the qualitative study, reached out via email with the following message:

> Hello, Majd.
> I've recently came [sic] across your survey on configurations in female classrooms at Qassim University and would like to know if we may see the results of your research anytime soon. I'm currently an undergrad at QU studying Economics, and I'm really interested with your research. As a female student at QU, I can certainly confirm that we as students, almost always have little acquaintance with the subject studied by the end of every course, [sic] when using VCR in the classroom. Lack of communication not only put us students down, but the faculty members as well. We never use discussion as a way of learning, and most classes passes [sic] by with no one asking any question, not because students lack interest or ambition, but because we suffer from poor connection and endless technical problems all the time.
> Anyway, I wish you the best of luck with the research, and I'm looking to see the study's results as soon as possible.
> Best regards,

Conclusion

In conclusion, the qualitative phase of this study found five different classroom configurations used in gender-separated classrooms: VCR, CCTV, and VC at Qassim University and Double deck and Partition at Alfaisal University. VCR and CCTV technologies

were the most commonly applied methods at Qassim University. At Alfaisal, Double deck classrooms were often used for first and second year students and for larger class sizes. Partition classrooms were restricted to smaller sized classes for third and fourth year undergraduates and graduate students.

The qualitative and quantitative phases of this study explored the effectiveness of these classroom configurations in mediating instruction to female students from male faculty members and the effectiveness of the educational experience for female students. VCR was found to be the least effective classroom configuration due to the numerous technical problems associated with its use and limited instructional capabilities. CCTV was found to have fewer technical problems but had limited instructional capabilities. Videoconferencing also had fewer technical problems and had advanced instructional capabilities, thereby making it the most effective classroom configuration observed at Qassim University. At Alfaisal University, Partition classrooms appeared to be the most effective due to the enhanced educational experience provided by direct instruction in the small sized classrooms. Double Deck classrooms were found to be less engaging than Partition classes. Students reported feeling isolated and disconnected.

The study also explored the issues and challenges that female students and male professors faced in the classroom. Across the cases, technical problems were the most impeding issue particularly in VCR, CCTV, and VC classrooms. Classroom management was also a challenge for male professors. The classrooms also limited instructional capabilities for professors and challenged communication and interaction in the classroom.

References

Association to Advance Collegiate Schools of Business (AACSB) International. (2013). *2013 eligibility procedures and accreditation standards for business accreditation* (Standard No. 15). Retrieved from https://www.aacsb.edu/-/media/aacsb/docs/accreditation/business/standards-and-tables/2018-business-standards.ashx?la=en.

Abu Ali, S. (1988). *A new vision of the development of education in the Kingdom of Saudi Arabia through 100 years*. United Arab Emirates (UAE): Alsharqea.

Abdel-Raheem. (2014, August 31). Saudi women in education. *The Jerusalem Post* Retrieved from http://goo.gl/O1K9NZ.

Abu Rass, A. (1993). *King Abdulaziz and education*. Jeddah, SA: Matba Alsafer.

Akyol, Z., Garrison, D. R., & Ozden, M. Y. (2009). Online and blended communities of inquiry: Exploring the developmental and perceptional differences. *The International Review of Research in Open and Distributed Learning, 10*(6), 65-83.

Althowaini, M. A. (2015). *Can I see me? A study of pictorial representations in Saudi elementary textbooks and teacher and curriculum developers' perceptions of multiculturalism* (Ph.D.). Available from ProQuest Dissertations & Theses Global. (1710718793).

Alamry, S. (1997). *Education in AlQassim between the past and present*. Riyadh, SA: Matbah Alwatan.

Alaulamie, L. A. (2014). *Teaching presence, social presence, and cognitive presence as predictors of students' satisfaction in an online program at a Saudi university* (Ph.D.). Available from ProQuest Dissertations & Theses Global. (1646485924).

Alesa, A. (2011). *Higher education in Saudi Arabia: The quest for identity*. Beirut: Alsaqi House.

Alfaisal University. (2016). Alfaisal university vision and mission. Retrieved from http://www.alfaisal.edu/vision_mission.

Alfaisal University. (2018). Alfaisal university admissions. Retrieved from https://admissions.alfaisal.edu/ar/whyalfaisal

Alkhweter, A. (2002). *A brief overview of the history of education in the Kingdom of Saudi Arabia*. Riyadh, SA: Wzarah Al-ealam.

Alsalloom, H. I. (1995). *Education in Saudi Arabia*. Washington, D.C.: The Saudi Arabian Cultural Mission to the U.S.

Alsalman, M. A. (1999). *The beginning of cultural development in the kingdom in King Abdulaziz's era*. Riyadh, SA: Dar Almalik Abdulaziz.

Alshamkh, M. A. (1985). *Education in Mecca and Madina in the end of Othmani era*. Riyadh, SA: Dar Alelom letebaa wanashr.

Andrews, T., & Klease, G. (1998). Challenges of multisite video conferencing: The development of an alternative teaching/learning model. *Australian Journal of Educational Technology, 14*, 88-97.

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the community of inquiry framework using a multi-institutional sample. *The Internet and Higher Education, 11*(3), 133-136.

Baki, R. (2004). Gender-segregated education in Saudi Arabia: Its impact on social norms and the Saudi labor market. *Education Policy Analysis Archives, 12*(28) Retrieved from http://files.eric.ed.gov/fulltext/EJ852310.pdf

Bates, T. (2005). *Technology, e-learning and distance education*. Abingdon, UK: Routledge.

Bates, T. (2009). A personal view of e-learning in Saudi Arabia. Retrieved from http://www.tonybates.ca/2009/11/05/a-personal-view-of-e-learning-in-saudi-arabia/.

Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research for education: An introduction to theory and methods*(3rd ed.). Boston: Allyn & Bacon.

Bullock, K. (2002). *Rethinking Muslim women and the veil: Challenging historical & modern stereotypes*. Herndon, VA: IIIT.

Cleveland-Innes, M., Garrison, R., & Kinsel, E. (2007). Role adjustment for learners in an online community of inquiry: Identifying the challenges of incoming online learners. *International Journal of Web-Based Learning and Teaching Technologies (IJWLTT), 2*(1), 1-16.

Conrad, D. (2005). Building and maintaining community in cohort-based online learning. *Journal of Distance Education, 20*(1), 1-20.

Cordesman, A. H. (2003). *Saudi Arabia enters the twenty-first century: The political, foreign policy, economic, and energy dimensions*. Westport, CT: Greenwood Publishing Group.

Crede, E., & Borrego, M. (2013). From ethnography to items: A mixed methods approach to developing a survey to examine graduate engineering student retention. *Journal of Mixed Methods Research, 7*(1), 62-80. doi:10.1177/1558689812451792.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage Publications.

Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks: Sage Publications.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340. Retrieved from http://www.jstor.org/stable/249008.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1003.

Del Castillo, D. (2003). Teaching through an electronic veil. *The Chronicle of Higher Education, 49*(29), 48-48.

Dewey, John. (1938) *Experience and education*, New York, Macmillan.

Dewey, J. (2013). In Flinders D., Thornton S. (Eds.), *My pedagogic creed* (4th ed.). New York, NY: Routledge.

Dillman, D. A., Christian, L. M., & Smyth, J. D. (2009). *Internet, mail, and mixed-mode surveys* (3rd ed.). Hoboken, NJ: Wiley.

Esposito, J. L., & Mogahed, D. (2007). *Who speaks for Islam?: What a billion Muslims really think*. New York, NY: Gallup Press.

Flaherty, D. J. (1974). *The relative effectiveness of closed-circuit television as a communication medium for instruction in accounting* (Ph.D.). Available from ProQuest Dissertations & Theses Global. (302748580).

Freeman, M. (1997). Flexibility in access, interaction and assessment: The case for web-based teaching programs. *Australian Journal of Educational Technology, 13*, 23-39.

Garrison, D. R. (Ed.). (2009). *Communities of inquiry in online learning* (2nd ed.). Hershey, PA: IGI Global.

Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. Hoboken, NJ: John Wiley & Sons.

Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2), 87-105. doi:10.1016/S1096-7516(00)00016-6.

Gay, L. R. (2000). In Airasian P. W. (Ed.), *Educational research : Competencies for analysis and application* (6th ed.). Upper Saddle River, N.J.: Merrill.

General Authority for Statistics. (2016). Population by gender, age groups, and nationality (Saudi/non-Saudi). Retrieved from http://www.stats.gov.sa/en/43.

Giesbers, B., Rienties, B., Tempelaar, D., & Gijselaers, W. (2013). Investigating the relations between motivation, tool use, participation, and performance in an e-learning course using web-videoconferencing. *Computers in Human Behavior, 29*(1), 285-292.

Gile, K. J., & Handcock, M. S. (2010). Respondent-driven sampling: An assessment of current methodology. *Sociological Methodology, 40*(1), 285-327. doi:10.1111/j.1467-9531.2010.01223.x.

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation*. Newbury Park, CA: Sage Publications.

Harker, M., & Koutsantoni, D. (2005). Can it be as effective? Distance versus blended learning in a web-based EAP programme. *ReCALL*, 17(2), 197-216.

Hamdan, A. (2005). Women and education in Saudi Arabia: Challenges and achievements. *International Education Journal, 6*(1), 42-64.

Johnson, R. B., & Christensen, L. B. (2014). *Educational research: Quantitative, qualitative, and mixed approaches* (5th ed.). Thousand Oaks, CA: Sage Publications.

Kang, M., & Shin, W. s. (2015). An empirical investigation of student acceptance of synchronous E-learning in an online university. *Journal of Educational Computing Research, 52*(4), 475-495. doi:10.1177/0735633115571921.

Kanuka, H., & Garrison, D. R. (2004). Cognitive presence in online learning. *Journal of Computing in Higher Education, 15*(2), 21.

Khine, M. S., & Lourdusamy, A. (2003). Blended learning approach in teacher education: Combining face to face instruction, multimedia viewing and online discussion. *British Journal of Educational Technology*, 34(5), 671-675.

Knipe, D., & Lee, M. (2002). The quality of teaching and learning via videoconferencing. *British Journal of Educational Technology, 33*(3), 301.

Koufaris, M. (2002). Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research, 13*(2), 205-223.

Kuntz, J., & Meddeb, A. (2013). *Islam and the challenge of civilization*. New York, NY: Fordham University Press.

Kupczynski, L., Ice, P., Wiesenmayer, R., & McCluskey, F. (2010). Student perceptions of the relationship between indicators of teaching presence and success in online courses. *Journal of Interactive Online Learning, 9*(1), 23-43.

Mernissi. (1987). *Beyond the veil: Male-female dynamics in modern Muslim society* (Rev ed.). Bloomington, IN: Indiana University Press.

Merriam, S. B. (1988). *Case study research in education: A qualitative approach.* San Francisco, CA: Jossey-Bass.

Meyer, K. A. (2004). Evaluating online discussions: Four different frames of analysis. *Journal of Asynchronous Learning Networks, 8*(2), 101-114.

Ministry Development. (2016). Retrieved from http://www.moe.gov.sa/ar/about/Pages/MinistryDevelopment.aspx.

Ministry of Education. (1969). *Education policy in Saudi Arabia*. Riyadh: Ministry of Education.

Mirza, A. (2007). Utilizing distance learning technologies to deliver courses in a segregated educational environment. *World Conference on Educational Multimedia, Hypermedia and Telecommunications 2007,* Vancouver, Canada. 126-129.

Mirza, A. (2008). Students' perceived barriers to in-class participation in a distributed and gender segregated educational environment. *The Electronic Journal of Information Systems in Developing Countries, 35*(8), 1-17.

Naaj, M. A., Nachouki, M., & Ankit, A. (2012). Evaluating student satisfaction with blended learning in a gender-segregated environment. *Journal of Information Technology Education: Research, 11*(1), 185-200.

Nolan, L. E. (2011). *Keeping the kingdom: The politics of higher education reform in Saudi Arabia* (Ph.D.). Available from ProQuest Dissertations & Theses Global. (900448712).

Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Educational Technology & Society, 12*(3), 150-162.

Park, S. Y., Nam, M., & Cha, S. (2012). University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model. *British Journal of Educational Technology, 43*(4), 592-605.

Parkinson, D., Greene, W., Kim, Y., & Marioni, J. (2003). Emerging themes of student satisfaction in a traditional course and a blended distance course. *TechTrends*, 47(4), 22-28.

Patton, M. Q. (2002). *Qualitative research & evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Qassim University (QU) Website. (2016). Vision and mission. Retrieved from http://www.qu.edu.sa/en/About/Pages/Vision-and-Mission.aspx.

Richardson, J., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, 7(1), 68−88.

Said, E. W. (1994). *Orientalism* (25th anniversary ed.). New York, NY: Random House.

Semaan, S., Lauby, J., & Liebman, J. (2002). Street and network sampling in evaluation studies of HIV risk-reduction interventions. *AIDS Reviews, 4*(4), 213. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/12555695.

Smyth, R. (2005). Broadband videoconferencing as a tool for learner-centred distance learning in higher education. *British Journal of Educational Technology, 36*(5), 805-820. doi:10.1111/j.1467-8535.2005.00499.

Smyth, S., Houghton, C., Cooney, A., & Casey, D. (2012). Students' experiences of blended learning across a range of postgraduate programmes. *Nurse Education Today*, 32(4), 464-468.

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage Publications.

Stodel, E. J., Thompson, T. L., & MacDonald, C. J. (2006). Learners' perspectives on what is missing from online learning: Interpretations through the community of inquiry framework. *The International Review of Research in Open and Distributed Learning, 7*(3) Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/325/743.

Swan, K., Garrison, D. R., & Richardson, J. (2009). A constructivist approach to online learning: The community of inquiry framework. In Payne C. R. (Ed.), *Information technology and constructivism in higher education: Progressive learning framework* (pp. 43-57). Hershey, PA: IGI Global.

Tashakkori, A., & Teddlie, C. (2003). *Handbook on mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage Publications.

United Nations International Children's Emergency Fund (UNICEF). (2013). Saudi Arabia statistics. Retrieved from http://www.unicef.org/infobycountry/saudiarabia_statistics.html.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204.

Wang, Y. (2004). Supporting synchronous distance language learning with desktop videoconferencing. *Language Learning & Technology, 8*(3), 90-121.

Washington, B. T. (1896, September). The awakening of the negro. *The Atlantic,* doi://www.theatlantic.com/magazine/archive/1896/09/the-awakening-of-the-negro/305449/?single_page=true.

Weber, A. S. (2010). Web-based learning in Qatar and the GCC states. Doha, Qatar: CIRS. doi: http://ssrn.com/abstract=2825912.

Wejnert, C., & Heckathorn, D. D. (2012). Web-based network sampling: Efficiency and efficacy of respondent-driven sampling for online research. *SAGE internet research methods* (pp. 134). London: SAGE Publications Ltd. doi:10.1177/0049124108318333 Retrieved from http://dx.doi.org/10.1177/0049124108318333.

Appendix A - Classroom Observation Protocol

University:	Date:
College:	Department:
Course:	Time:
Topic:	Classroom configuration:

Description of the Classroom

Overall layout

Technology layout

Community of Inquiry Framework

Social Presence

Affective expression

- Express emotions
- Use humor
- Share personal information (self-disclosure)

Open Communication

- Interaction inside and outside the classroom
- Reflective participation
- Encouragement (professor encourages students, students encourage each other)
- Recognition (professor recognizes students, students recognize each other)
- Students have a sense of group commitment

Group Cohesion

- Students interact around common activities and tasks
- Use of names (professor addresses students by name, students address each other by name)
- Salutations (professor uses salutations, students use salutations (with each other, with professor))

- Use of inclusive language such as we and our (by professor, by students)

Cognitive Presence

- Students have a sense of puzzlement (puzzled expressions, searching through materials)
- Students question issues discussed (whisper with each other about the content, question issues out loud with other students or with professor)
- Students test the validity of information or viability of solutions (on paper, verbally, or using a computer)
- Students Exchange information (exchange notes, answer each other's questions, explain content to other students)
- Students Connect ideas (engage in discussions with each other about the content)
- Students Apply ideas (build, create, apply solutions or solve problems)

Teaching Presence

Instructional management

- Curriculum design (class runs according to syllabus and curriculum design)
- Time management (professor maintains time)
- Utilizing mediums (professor utilizes the mediums i.e. technologies provided in the classroom)

Building understanding

- Professors draws in less active participants
- Professor acknowledges individual contributions from students
- Professor reinforces appropriate contributions
- Professor focuses discussion
- Professor facilitates an educational transaction with students.

Direct instruction

- Professor focuses and directs discussion
- Professor diagnoses students' misconceptions
- Professor questions students' knowledge
- Professor injects knowledge from diverse sources
- Professor proactively summarizes the discussion
- Professor confirms students' understanding through various means of assessment
- Professor provides constructive feedback

Technology Acceptance Model

Usefulness

- Usefulness of technology or partition in this setting
- Enhances communication between students and professor
- Enhances professor's teaching performance
- Enhances students' performance in class

Ease of Use

- Effort required by professor to operate technology
- Effort required by students to operate technology
- Effort required by technology supervisor to operate the technology

Computer self efficacy

- Professor's ability to operate the technology
- Students' ability to operate the technology
- Technology supervisor's ability to operate the technology

System accessibility

- Technical convenience
- Accessibility of operational instructions
- System is easy to learn
- Overall quality of the system

Technology Use

- How technology is used
- Who operates the technology
- Technical issues or failures
- Disruptions caused by technology

Appendix B - Focus Group Protocol

Impact of Technology on Participation

- How much do you participate in class? In what ways do you participate?
- How does the [insert the specific technology] affect your willingness to participate? Give examples.
- How does it affect your ability to participate? Give examples.

Issues, Challenges & experiences

- If I followed you through a typical class with your male professor what experiences would I observe you having?
- What Challenges would I observe you having?
- What issues would I observe you having?

Community of Inquiry Framework

Social Presence

- **Affective expression**
    - Are you comfortable sharing your emotions? Sharing your own thoughts? Making jokes? If not why not?
- **Open communication**
    - Do you work with your female classmates in developing an understanding of the material? In what ways? Give examples.
    - Support each other? Give examples.
    - Reflect on what you have learned? Give examples.

    - Do you work with male classmates? If so, in what ways? Give examples.

- **Group cohesion**
    - Do you know each other's names? Does your professor know your names?
    - Do you feel that you are part of a group?

Cognitive presence

- Are you comfortable communicating with the professor using [insert the specific technology]?
    - Ask questions
    - Exchange information
    - Connect ideas
    - Apply new ideas
    - Share your experiences
    - Test the viability of solutions?

Teaching presence

- Does the [insert the specific technology] allow the professor to actively intervene to draw understanding from female students?
- What is your opinion of the professor's willingness to actively intervene to draw understanding from female students?
    - Draw in less active participants
    - Acknowledge individual contributions
    - Reinforce appropriate contributions
    - Focuses discussion
    - Facilitates an educational discussion

- Does the [insert the specific technology] hinder the professor's ability to understand female students' questions?
- Build an understanding of female students' mastery of the material?
- Do you think the professor knows if you are having difficulty with the material?
- If not then what prevents him from recognizing if you find the material difficult?
- Can you recall an experience where your professor knew you were having difficulty with the material? What did he do about it?

Direct instruction

Does the [technology] enable the professor to direct the discussion

Probes:

- Does it enable the professor to present content?
- Diagnose students' misconceptions
- Provide questions to students
- Inject knowledge from diverse sources
- Summarize the discussion
- Confirm students' understanding through various means of assessment
- Provide instructive explanatory feedback to female students

Technology Acceptance Model

Usefulness

To what extent do you believe the technology is useful?

Probes:

- Enhance ability to communicate
- Overcomes social restrictions
- Enhances performance in a course

Ease of use

Do you believe the technology is easy to use?

Probes:

- Does it require a lot of effort to learn to use the technology?
- Can everyone in the female classroom use the technology?
- Are the professors competent in using the technology?
- Give examples

Computer self efficacy

What do you think of your professor's ability to operate the technology provided in this classroom?

- Is your professor competent in using the technology?

Technical issues

Does the technology break-up often?

Is it common to have technical failures?

How many times does the technology fail to work in a semester? Give examples

What are the most common technical failures?

Social acceptance of partitions

What do you think about learning in a coeducational setting? Would your parents approve of it?

What do you think about using partitions (provide pictures for Qassim participants) in the classroom instead of technology? Would your parents approve of it?

What would you like to see happen?

What would you like to change?

Appendix C - Interview Protocol

Teaching Background

Tell me a little about yourself? How did you come to teach at [insert name of university]?

Learning objectives

What are the educational objectives for this course?

How does the [insert the technology] contribute towards achieving the learning objectives for this course?

Probes:

- How does it help you communicate with female students?
    - How much do your female students participate in class?
    - How does the [insert technology] affect their ability to participate?
- How does it hinder your ability to interact with female students?
- How does it affect the male student classroom?
    - Does it cause interruptions? How? Give examples.

Is there a difference in achieving the learning objectives for male and female students?

Probes:

- Who (males or females) are more successful in achieving the learning objectives?
- What might explain the differences?

Is there a difference in the effort that you spend on preparing and executing lessons for female students compared to males? How is it different? Give examples.

Issues, Challenges & experiences

If I followed you through a typical class with female students what experiences would I observe you having?

Probes:

What Challenges would I observe you having?

What issues would I observe you having?

Community of Inquiry Framework

Affective expression

- Are your female students comfortable sharing their emotions? Sharing their thoughts? Making jokes? If not why not?
- Are you comfortable sharing your thoughts with them? Making jokes? If not why not?

Group cohesion

- Do you know your female students names? Do you know your male students names? If there is a difference, what might explain the difference?
- How do you feel about the female classroom, does it feel like a cohesive group? How do you feel about being the teacher of that group?

Cognitive presence

Are you comfortable communicating with your female students using [insert the specific technology]?

Do your female students seem comfortable communicating with you using [insert the specific technology]?

- Ask questions, exchange information, connect ideas, apply new ideas, share their experiences, and test the viability of solutions?

Teaching presence

Can you actively intervene to draw understanding from female students? Does the [insert specific technology] allow you to do that?

Probes:

- Draw in less active participants
- Acknowledge individual contributions
- Reinforce appropriate contributions
- Focus discussion
- Facilitate an educational discussion

Follow up questions:

- Does the [insert the specific technology] hinder your ability to understand female students' questions? Build an understanding of female students' mastery of the material?
- Can you tell if your female students are having difficulty with the material? If so, can you recall an experience where you knew your students were having difficulty? What did you do about it?
- If not then what prevents you from recognizing that they are having difficulty with the material?

Direct instruction

Does the [insert type of technology] enable you to direct the discussion

Probes:

- Does it enable you to present content?
- Diagnose female students' misconceptions
- Provide questions to female students
- Inject knowledge from diverse sources
- Summarize the discussion
- Confirm female students' understanding through various means of assessment

- Provide instructive explanatory feedback to female students

Technology Acceptance Model

Usefulness

To what extent do you believe the technology is useful?

Probes:

- Enhance ability to communicate
- Overcomes social restrictions
- Enhances performance in a course

Ease of use

Do you believe the technology is easy to use?

Probes:

- Does it require a lot of effort to learn to use the technology?
- Can everyone in the female classroom use the technology?
- Give examples

Computer self efficacy

What do you think of your ability to operate the technology provided in this classroom?

- Are you competent in using this technology?

Technical issues

Does the technology break-up often?

Is it common to have technical failures?

How many times does the technology fail to work in a semester? Give examples

What are the most common technical failures?

Social acceptance of partitions

What do you think about teaching in a coeducational setting?

What do you think about using partitions (provide pictures) in the classroom instead of technology? Would you feel more comfortable to teach that way?

What would you like to see happen?

What would you like to change?

Appendix D - Consent Form

KANSAS STATE UNIVERSITY | College of Education
Department of Curriculum & Instruction

Informed Consent

November 8, 2016

Dear Student,

I am a PhD student in the College of Education at Kansas State University. As a requirement for my doctoral degree in Curriculum and Instruction with a minor in Education Technology, at Kansas State University, I plan to conduct research to study the classroom configurations and technologies used to mediate instruction in gender-separated classrooms in Saudi Universities. The title of the research is '*Technologies and Classroom Configurations in Gender-Separated Education in Saudi Arabia: An Exploratory Mixed Methods Study'*. The purpose of the study is to describe the methods used, evaluate and compare the effectiveness of the approaches, and describe the issues and challenges that female students and their male instructors face in gender-separated classrooms. This study aims to aid university management and board members in the decision making process at Saudi universities. The study will begin November 2017 and end April 2018. It will involve interviews and observations of your use of facilities and technology and your engagement and collaboration in the classroom.

I am soliciting your participation because you are a female student that is using CCTV, videoconferencing, partition, or smart technology to interact with your male instructor or you are a male instructor using CCTV, videoconferencing, partition or smart technology to interact with your female students. Your participation is voluntary. There is no foreseeable risk or harm involved in this participation. You will be contacted by email for a focus group or individual interview. The interviews will be conducted face to face or through Skype, Zoom or a telecommunication service of your choice. The interviews and focus groups will be audio recorded and the audio will be destroyed upon completion of the study. You can withdraw from the study at any time. The results of this study may be published but your name will remain confidential and anonymous.

If you have any questions regarding this study, please contact Majd Alomar at (785) 477-2874 or email malomar@ksu.edu. You can also contact my supervisor Dr. Jacqueline Spears at jdspears@ksu.edu. If you have any concerns regarding your rights as a participant in this study, you can contact the following individuals:

- Rick Scheidt, Chair, Committee on Research Involving Human Subjects,
  203 Fairchild Hall, Kansas State

University, Manhattan, KS 66506, (785) 532-3224.

- Jerry Jaax, Associate Vice Provost for Research Compliance and University Veterinarian, 203 Fairchild Hall,
  Kansas State University, Manhattan, KS 66506, (785) 532-3224.

Thank you very much for your consideration.

Sincerely,

Majd Alomar
Department of Curriculum and Instruction
College of Education
Kansas State University
Phone: (785) 477-2874
malomar@ksu.edu

If you are interested in participating in this study, please sign the form and return it to me by November 2017.

I, _____, have read the informed consent and am interested in participating in Majd Alomar's study entitled, Technologies and Classroom Configurations in Gender-Separated Education in Saudi Arabia: An Exploratory Mixed Methods Study.

_____ _____

Signature Date

Appendix E - Consent to Conduct Research at Qassim University

Kingdom of Saudi Arabia
Ministry of Higher Education
Qassim University
VICE PRESIDENTS OFFICE
For Graduate Studies and Research

المملكة العربية السعودية
وزارة التعليم العالي
جامعة القصيم
مكتب وكيل الجامعة
للدراسات العليا والبحث العلمي
(٠٤٠)

Qassim University جامعة القصيم

الرقم: ١٥٨٩ التاريخ: ١٧ / ٢ / ١٤٣٩ هـ

المرفقات: الموضوع:

لمن يهمه الامر

احيط سعادتكم بأن المبتعثة مجد بنت إبراهيم العمر احد مبتعثي الجامعة لنيل درجة الدكتوراه في تقنيات التعليم حيث ستكون أطروحتها عن " تقنيات وتجهيزات الفصول الدراسية في التعليم غير المختلط في الجامعات السعودية : دراسة استكشافية متعددة المنهجية " حيث سيكون التطبيق على بعض الجامعات السعودية ومنها القصيم .

آمل من سعادتكم تسهيل مهمة الباحثة وتمكينها من حضور محاضرات الطالبات وإجراء المقابلات وجميع البيانات الخاصة لبحثها ، مع الشكر لتعاون الجميع .

وكيل الجامعة للدراسات العليا والبحث العلمي

أ . د . احمد بن ابراهيم التركي

The University is accredited By NCAAA
(National Commission For Academic Accreditation and Assessment)
May 1. 2013 . April 30. 2017

الجامعة معتمده من
الهيئة الوطنية للتقويم والإعتماد الأكاديمي
١ - مايو ٢٠١٣ - ٣٠ - أبريل ٢٠١٧

P.O Box 6555 - Buraidah 51452 - Tel (016) 3801705 - Fax (016) 3801709

ص.ب ٦٥٥٥ - بريدة ٥١٤٥٢ - هاتف ٣٨٠١٧٠٥ (٠١٦) - فاكس ٣٨٠١٧٠٩ (٠١٦)

Appendix F - Survey Instrument

Female Class Configurations at Qassim University

Start of Block: Cover Page

Q1.1 Hello,

Welcome to the survey on configurations in female classrooms at Qassim University. To begin the survey, click next and follow the instructions. This survey should take about 10 minutes to complete. By clicking next you give your consent to participate in this survey. Participation in this survey is voluntary. All responses will remain confidential and will be used only for research purposes. If you have any questions regarding this study, please contact Majd Alomar at +1(785) 477-2874 or email malomar@ksu.edu. You can also contact my supervisor Dr. Jacqueline Spears at jdspears@ksu.edu.
Thank you very much for your consideration. Sincerely, Majd Alomar College of Education Kansas State University Phone: +1 (785) 477-2874 malomar@ksu.edu

السلام عليكم ورحمة الله وبركاته، وبعد:

مرحبا بكم في الاستبانة الالكترونية لتجهيزات وتقنيات تدريس الطالبات في الجامعات السعودية.
للبدء اضغط التالي واتبع التعليمات. هذه الاستبانة ستستغرق ١٠ دقائق تقريبا.

مشاركتكم في هذه الاستبانة تطوعية وستثري البحث، وتضيف له قيمة علمية، كما ستسهم الى حد كبير في الوصول به الى أفضل النتائج. علما أن المعلومات التي ستقدم في هذه الاستبانة ستكون سرية، وستستخدم فقط لأغراض هذا البحث .لأي سؤال أو استفسار الرجاء الاتصال بالباحثة عبر العنوان الموضح في الأسفل.

أشكر سلفا تعاونكم واهتمامكم.

الباحثة/ مجد إبراهيم العمر
كلية التربية/ قسم المناهج وطرق التدريس، تقنيات التعليم

جامعة ولاية كانساس
الولايات المتحدة الامريكية

هاتف: ٠٠١٧٨٥٤٧٧٢٨٧٤
malomar@ksu.edu

End of Block: Cover Page

Start of Block: Demographics

Q2.1 In order to be directed to the right survey questions, please indicate whether you are a female student or a male faculty member.

- Female student (1)
- Male faculty member (2)
- Neither (3)

هل أنت طالبة أم عضو هيئة تدريس؟

- (1) طالبة
- (2) عضو هيئة تدريس
- (3) لا هذا ولا ذاك

Skip To: End of Survey If In order to be directed to the right survey questions, please indicate whether you are a female s... = Neither

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Male faculty member

Q2.2 Are you a:

- ○ Professor (1)
- ○ Associate professor (2)
- ○ Assistant professor (3)
- ○ Lecturer (4)
- ○ Other (5) _____

هل أنت :

- ○ (1) أستاذ دكتور
- ○ (2) أستاذ مشارك
- ○ (3) أستاذ مساعد
- ○ (4) محاضر
- ○ (5) _____ أخرى

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Male faculty member

Q2.3 Specialization:

- ○ Conceptual & Theoretical Studies (Humanities, Religious studies, Languages, Business, Economics, Education etc.) (1)
- ○ Applied Sciences (Science, Math, Computing, Engineering etc.) (2)
- ○ Health Sciences (Medicine, Dental medicine, Pharmacology etc.) (3)

التخصص :

- ○ (1) علوم نظرية و انسانية (الشريعة، اللغات، الإدارة، الإقتصاد، التربية الخ).
- ○ (2) علوم تطبيقية (العلوم، الرياضيات، الحاسب الآلي، الهندسة الخ.)
- ○ (3) علوم صحية (طب بشري، طب أسنان، صيدلية الخ.)

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Female student

Q2.4 Are you a:

- ○ First year undergrad (1)
- ○ Second year undergrad (2)
- ○ Third year undergrad (3)
- ○ Fourth year undergrad (4)
- ○ Graduate student (5)

هل أنتِ طالبة في سنة :

- (1) أولى جامعة
- (2) ثاني جامعة
- (3) ثالث جامعة
- (4) رابع جامعة
- (5) دراسات عليا

Q2.5 How long have you lived in Saudi Arabia?

- Less than 5 years (1)
- 5-10 years (2)
- 11-15 years (3)
- 15+ years (4)

منذ متى تقيم/تقيمين في المملكة العربية السعودية؟

- (1) أقل من ٥ سنوات
- (2) ٥-١٠ سنوات
- (3) ١١ -١٥ سنة
- (4) ١٥ +سنة

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Male faculty member

Q2.6 How long have you been working in Academia?

- Less than 5 years (1)
- 5-10 years (2)
- 11-15 years (3)
- 15+ years (4)

منذ متى تعمل في الأوساط الأكاديمية؟

- (1) أقل من ٥ سنوات
- (2) ٥-١٠ سنوات
- (3) ١١-١٥ سنة
- (4) ١٥ +سنة

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Male faculty member

Q2.7 How long have you been teaching female students at Qassim University?

- Less than 5 years (1)
- 5-10 years (2)
- 11-15 years (3)
- 15+ years (4)
- I have never taught female students at Qassim University (5)

منذ متى تُدرس الطالبات في جامعة القصيم؟

- (1) أقل من ٥ سنوات
- (2) ٥-١٠ سنوات
- (3) ١١-١٥ سنة
- (4) ١٥ +سنة
- (5) لم يسبق لي أن درست طالبات في جامعة القصيم

Skip To: End of Survey If How long have you been teaching female students at Qassim University? = I have never taught female students at Qassim University

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Female student

Q2.8 How many classes have you taken with a male instructor at Qassim University?

- 1-3 (1)
- 4-6 (2)
- 7-9 (3)
- 10+ (4)
- None (5)

كم عدد المقررات التي درستها مع أعضاء هيئة تدريس رجال في جامعة القصيم؟

- ١-٣ (1)
- ٤-٦ (2)
- ٧-٩ (3)
- ١٠+ (4)
- لا شئ على الإطلاق (5)

Skip To: End of Survey If How many classes have you taken with a male instructor at Qassim University? = None

Q2.9 Religion:

- Muslim (1)
- Non-muslim (2)
- Prefer not to say (3)

الديانة:

- (1) مسلم
- (2) غير مسلم
- (3) أفضل عدم الإفصاح

Q2.10 Citizenship:

- Saudi (1)
- Non-Saudi (2)
- Prefer not to say (3)

الجنسية :

- (1) سعودي
- (2) غير سعودي
- (3) أفضل عدم الإفصاح

End of Block: Demographics

Start of Block: Classroom configurations

Q3.1 Which classroom configurations have you used to communicate between female students and male faculty members? (Please choose all that apply)

- ☐ CCTV (The professor gives the lecture via a separate room at the female student campus) (1)
- ☐ VCR (The professor gives the lecture at a room in the male campus such as the main campus Almleyda) (2)
- ☐ Videoconferencing (Voice over IP connection such as Skype, Link, Zoom, TE Desktop) (3)
- ☐ Double Decker Bench System (4)
- ☐ Partition (5)
- ☐ Direct instruction with co-education (6)
- ☐ Direct instruction with separated-education (7)

ما الوسائل الصفية التي سبق استخدمتها للتواصل مع أستاذك/ طالباتك؟ (ارجو اختيار جميع ما تم استخدامه).

- ☐ (1) شبكةCCTVالدائرة التلفزيونية المغلقة
- ☐ (2) شبكة VCR الفي سي آر
- ☐ (3) شبكة الفيديوكونفرنس (لينك، زوم، تي اي ديسكتوب....)
- ☐ (4) نظام المقاعد ذو الطابقين
- ☐ (5) الحواجز الخشبية او الزجاجية او ما شابه
- ☐ (6) تعليم مختلط بين الطلاب والطالبات
- ☐ (7) تعليم مختلط بين الأستاذ والطالبات فقط بدون طلاب

End of Block: Classroom configurations

Start of Block: Classroom configurations

Q4.1 Choose ONLY ONE classroom configuration (most commonly used) to communicate between female students and male faculty members and answer the following questions accordingly.

- ○ CCTV (1)
- ○ VCR (2)
- ○ Videoconferencing (3)
- ○ Double Decker Bench System (4)
- ○ Partition (5)
- ○ Other. Please specify (6) _____

اختر وسيلة واحدة فقط (الأكثر استخداما) للتواصل بين الطالبات وعضو هيئة التدريس ثم أجب على الأسئلة التي تلي اختيارك :

- (1) شبكة (الدائرة التلفزيونية المغلقة)CCTV
- (2) شبكة الفي سي آرVCR
- (3) شبكة الفيديوكونفرنس
- (4) نظام المقاعد ذو الطابقين
- (5) الحواجز
- (6) _____أخرى. أرجو ذكرها

Q4.2 Was this classroom configuration useful?

- Useful (1)
- Moderately useful (2)
- Not at all useful (3)

هل كانت هذه الوسيلة مفيدة؟

- (1) مفيدة
- (2) مفيدة نوعا ما
- (3) غير مفيدة

Q4.3 Was this classroom configuration easy to use?

- ○ Easy (1)
- ○ Neither easy nor difficult (2)
- ○ Difficult (3)

هل كانت هذه الوسيلة سهلة الاستخدام؟

- ○ سهلة (1)
- ○ ليست سهلة ولا صعبة (2)
- ○ صعبة (3)

Q4.4 How did this classroom configuration make you feel?

- ○ Pleased (1)
- ○ Neither pleased nor displeased (2)
- ○ Displeased (3)

ما شعورك تجاه استخدام هذه الوسيلة الصفية؟

- (1) راضِ
- (2) لست راضِ ولا مستاء
- (3) مستاء

End of Block: Classroom configurations

Start of Block: Social Presence

Q5.1 Do you agree with the following statements:

The classroom configuration enables the following:

	Agree (1)	Neither agree nor disagree (2)	Disagree (3)
Interaction between faculty member & female students (1)	○	○	○
Female students interaction with each other (2)	○	○	○
Enhances students' ability to ask questions (3)	○	○	○
Enhances students' participation in the classroom (4)	○	○	○

هل توافق على العبارات التالية:

الوسيلة الصفية تتيح ما يلي :

	(3)موافق	(2)محايد	(1)غير موافق

(1) التفاعل بين أعضاء هيئة التدريس الرجال والطالبات	○	○	○
(2) تفاعل الطالبات مع بعضهن البعض	○	○	○
(3) تعزز من قدرة الطالبات على طرح الاسئلة	○	○	○
(4) تعزيز مشاركة الطالبات في الصف	○	○	○

End of Block: Social Presence

Start of Block: Social Presence

Q6.1 Do you use additional non-collegiate communication methods to make up for the lack of communication in the classroom? (Please choose all that apply)

- ☐ Yes, students & faculty member communicate via Whatsapp.
- ☐ Yes, students & faculty member communicate via phone.
- ☐ Yes, students & faculty member communicate via email.
- ☐ Yes, students & faculty member communicate via videoconferencing software (blackboard, zoom, link...)
- ☐ Yes, students & faculty member communicate via social media (twitter, facebook...)
- ☐ Yes, students & faculty member communicate via other methods. Please specify _____
- ☐ No there is no need to use additional communication methods.
- ☐ There is a need but I don't know what to use.

هل تستخدم وسائل تواصل إضافية غير منهجية للتعويض عن محدودية التواصل في الصف؟ (الرجاء اختر كل ما ينطبق)

- ☐ نعم، أستخدم الواتس آب.
- ☐ نعم، أستخدم الهاتف النقال.
- ☐ نعم، أستخدم الايميل.
- ☐ نعم، أستخدم برنامج فيديوكونفرنس (بلاكبورد، زوم، لينك....)
- ☐ نعم، أستخدم مواقع تواصل الكترونيه، (تويتر، فيسبوك...)
- ☐ نعم، أستخدم وسائل أخرى. آمل ذكرها _____
- ☐ لا، ليس هناك حاجة لاستخدام وسائل تواصل إضافية.
- ☐ هناك حاجة لكن لا أعلم ماذا أستخدم.

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Male faculty member

Q6.2 Do you use the same methods with male students?

- ○ Yes (15)
- ○ Sometimes (16)
- ○ No (17)

هل تستخدم هذه الوسائل مع طلابك الذكور؟

- ○ نعم
- ○ أحيانا
- ○ لا

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Male faculty member

Q6.3 Rank the factors in the order that most restrict communication between male faculty members and female students during the lecture.

Drag and place the items in the order of most restricting at the top to least restricting at the bottom.

_____ Technical problems (1)

_____ Female students' lack of ambition (2)

_____ Female students' lack of interest (indifference) (3)

_____ Female students are too shy to speak in front of a male faculty member (4)

_____ Female students are too shy to speak in front of male classmates (5)

_____ Other cultural factors. Please specify (6)

_____ Other religious factors. Please specify (7)

رتب من وجهة نظرك العوامل التي تعمل على الحد من تواصل الطالبات معك خلال المحاضرة .

قم بسحب العوامل التالية وضعها بالترتيب ابتداءً بالأكثر تقييدا لتواصلك مع الطالبات .

(1) مشاكل تقنية_____

(2) قلة الطموح لدى الطالبات_____

(3) قلة الاهتمام لدى الطالبات_____

(4) استحياء الطالبات من التحدث أمام الدكتور_____

(5) استحياء الطالبات من التحدث أمام الطلاب_____

(6) عوامل ثقافية أخرى. آمل ذكرها_____

(7) عوامل دينية أخرى. آمل ذكرها_____

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Female student

Q6.4 Rank the factors in the order that most restrict communication between male faculty members and female students during the lecture.

Drag and place the items in the order of most restricting at the top to least restricting at the bottom.

_____ Technical problems (1)

_____ Female students' lack of ambition (2)

_____ Female students' lack of interest (indifference) (3)

_____ Female students are too shy to speak in front of a male faculty member (4)

_____ Female students are too shy to speak in front of male classmates (5)

_____ Other cultural factors. Please specify (6)

_____ Other religious factors. Please specify (7)

رتبي من وجهة نظرك العوامل التي تعمل على الحد من تواصل الطالبات مع عضو هيئة التدريس خلال المحاضرة .
اسحبي العناصر التالية وضعيها بالترتيب ابتداءً بالأكثر تقييدا للتواصل .

(1) مشاكل تقنية_____

(2) قلة الطموح لدى الطالبات_____

(3) قلة الاهتمام لدى الطالبات_____

(4) استحياء الطالبات من التحدث أمام الدكتور_____

(5) استحياء الطالبات من التحدث أمام الطلاب_____

(6) عوامل ثقافية أخرى. آمل ذكرها_____

(7) عوامل دينية أخرى. آمل ذكرها_____

End of Block: Social Presence

Start of Block: Cognitive Presence

Q7.1 Do you agree with the following statements:

The classroom configuration allows students to understand the material through the following actions:

	Agree (1)	Neither agree nor disagree (2)	Disagree (3)
Reflection (1)	○	○	○
Engaging in discussion with the faculty member (2)	○	○	○
Engaging in group discussion (3)	○	○	○
Following the lecture (4)	○	○	○

هل توافق على العبارات التالية:

الوسائل الصفية تتيح للطالبات فعل التالي :

	(1) موافق	(2) محايد	(3) غير موافق
(1) التفكير في المادة العلمية	○	○	○
(2) المشاركة في النقاش مع عضو هيئة التدريس	○	○	○
(3) المشاركة في النقاش الجماعي	○	○	○
(4) تتبع المحاضرة	○	○	○

End of Block: Cognitive Presence

Start of Block: Teaching Presence

Q8.1 Do you agree with the following statements:

The classroom configuration enables the faculty member to do the following:

	Agree (1)	Neither agree nor disagree (2)	Disagree (3)
Utilize a variety of instructional methods (1)	○	○	○
Be efficient in my use of time in the classroom (2)	○	○	○
Effectively facilitate discussion (3)	○	○	○
Sense whether students understand the material (4)	○	○	○
Demonstrate lecture content (5)	○	○	○
Utilize a variety of assessment methods (6)	○	○	○
Provide explanatory feedback (7)	○	○	○

هل توافق على العبارات التالية:

الوسائل الصفية تتيح لعضو هيئة التدريس فعل التالي :

(1) موافق	(2) محايد	(3) غير موافق

(1) استخدام وسائل تعليمية مختلفة	○	○	○
(2) استخدام وقت المحاضرة بفعالية	○	○	○
(3) إدارة النقاش بفعالية	○	○	○
(4) استشعار مدى فهم الطالبات للمحتوى	○	○	○
(5) شرح محتوى المحاضرة	○	○	○
(6) استخدام وسائل تقييم متعددة	○	○	○
(7) تزويد الطالبات بملاحظات توضيحية	○	○	○

End of Block: Teaching Presence

Start of Block: Technology Self Efficacy

Q9.1 Please indicate how confident you feel about your ability to do the following:

	Confident (1)	Neither confident nor unconfident (2)	Not confident (3)
Use a computer. (1)	○	○	○
Use a smart phone. (2)	○	○	○
Operate the technology in your classroom. (3)	○	○	○

ارجو الإشارة الى مدى ثقتك بقدرتك على التالي :

	(1) واثق	(2) واثق نوعا ما	(3) لست واثق
(1) استخدام جهاز الحاسب الآلي	○	○	○
(2) استخدام الهاتف الذكي	○	○	○
(3) استخدام التقنية المتوفرة في الصف الدراسي	○	○	○

End of Block: Technology Self Efficacy

Start of Block: Technical issues

Q10.1 During the semester, how often did you experience the following due to technical difficulties:

	Never (1)	Sometimes (2)	About half the time (3)	Most of the time (4)	Always (5)
Class gets cancelled (1)	○	○	○	○	○
Class gets delayed (2)	○	○	○	○	○
Class is moved to another room (3)	○	○	○	○	○
Tech support is requested (4)	○	○	○	○	○

كم مرة واجهت المشاكل التالية خلال الفصل الدراسي بسبب مشاكل تقنية :

(5) دائما	(4) غالبا	(3) نصف الوقت تقريبا	(2) أحيانا	(1) مطلقا	
○	○	○	○	○	(1) الغاء المحاضرة
○	○	○	○	○	(2) تأخير المحاضرة
○	○	○	○	○	(3) نقل المحاضرة الى مكان آخر
○	○	○	○	○	(4) استدعاء الدعم الفني

Q10.2 How often do the following difficulties disrupt establishing a connection with your female students?

	Never (1)	Sometimes (2)	About half the time (3)	Most of the time (4)	Always (5)	Not applicable (6)
Absence of remote control (1)	○	○	○	○	○	○
Remote control doesn't work (2)	○	○	○	○	○	○
Poor network connection (3)	○	○	○	○	○	○
Network failure (network disconnects during class) (4)	○	○	○	○	○	○
Software crashes (5)	○	○	○	○	○	○
I don't know how to operate the software (6)	○	○	○	○	○	○
Don't know the IP address or room number of the other classroom (7)	○	○	○	○	○	○
Too many classes going on at the same time (8)	○	○	○	○	○	○

كم مرة يتعطل الاتصال بين الطالبات و عضو هيئة التدريس بسبب كلا من العوامل التالية؟

	(1) مطلقا	(2) أحيانا	(3) نصف الوقت تقريبا	(4) غالبا	(5) دائما	(6) لا ينطبق
(1) عدم توفر الريموت لإجراء الاتصال	○	○	○	○	○	○
(2) الريموت لا يعمل	○	○	○	○	○	○
(3) ضعف اتصال الشبكة	○	○	○	○	○	○
(4) فشل الاتصال (انقطاع الاتصال أثناء المحاضرة)	○	○	○	○	○	○
(5) تعطل البرنامج	○	○	○	○	○	○
(6) لا أعرف كيفية تشغيل البرنامج	○	○	○	○	○	○
(7) لا نعرف رقم القاعة او عنوان IP في القاعة الأخرى	○	○	○	○	○	○
(8) محاضرات كثيرة تعمل في نفس الوقت	○	○	○	○	○	○

End of Block: Technical issues

Start of Block: Technical issues

Q11.1 During the semester, how often did you experience the following difficulties with the video and audio system:

	Never (1)	Sometimes (2)	About half the time (3)	Most of the time (4)	Always (5)
Sound breaks up (1)	○	○	○	○	○
Sound has an echo (2)	○	○	○	○	○
Sound has static (3)	○	○	○	○	○
Microphone does not work (4)	○	○	○	○	○
Microphone breaks up (5)	○	○	○	○	○
Video on screen is not clear (6)	○	○	○	○	○
Video breaks up (7)	○	○	○	○	○
Video does 't work (8)	○	○	○	○	○

خلال الفصل الدراسي الماضي، كم مرة واجهت المشاكل التالية في نظام الصوت والفيديو :

	(1) مطلقا	(2) أحيانا	(3) نصف الوقت تقريبا	(4) غالبا	(5) دائما

(1) انقطاع الصوت	○	○	○	○	○
(2) صدى في الصوت	○	○	○	○	○
(3) تذبذب في الصوت	○	○	○	○	○
(4) المايكرفون لا يعمل	○	○	○	○	○
(5) انقطاع صوت المايكرفون	○	○	○	○	○
(6) الصورة على الشاشة غير واضحة	○	○	○	○	○
(7) الصورة تنقطع	○	○	○	○	○
(8) الصورة لا تعمل	○	○	○	○	○

End of Block: Technical issues

Start of Block: Students' behavior and discipline

Q12.1 How do you think the classroom configuration currently provided in your college influences the following with regards to female students:

	Positively (1)	No influence (2)	Negatively (3)
Attendance (1)	○	○	○
Discipline in class (2)	○	○	○
Desire to learn (3)	○	○	○

ما مدى تأثير الوسيلة الصفية على سلوك الطالبات وفق ما يلي :

	(1) إيجابي	(2) لا يوجد تأثير	(3) سلبي
(1) الحضور و المواظبة	○	○	○
(2) الانضباط في الصف	○	○	○
(3) الرغبة في طلب العلم	○	○	○

Q12.2 In what ways does the classroom configuration currently provided in your college affect female students behavior in class? (Please choose all that apply)

- ☐ Students talk in class (1)
- ☐ Students skip class (2)
- ☐ Students do not follow the faculty member instructions (3)
- ☐ Students are careless and do not pay attention (4)
- ☐ Other. Please specify (5)

_____

- ☐ It does not affect students' behavior (6)

كيف تؤثر الوسيلة الصفية على سلوك الطالبات في الصف؟ (الرجاء اختيار كل ما ينطبق)

- ☐ (1) الطالبات يتحدثن مع بعضهن البعض
- ☐ (2) الطالبات يخرجن خارج القاعة
- ☐ (3) الطالبات لا يتبعن تعليمات عضو هيئة التدريس
- ☐ (4) الطالبات مهملات ولا يلقين بالا للشرح
- ☐ (5) _____أخرى. أرجو ذكرها
- ☐ (6) لا يؤثر على سلوك الطالبات

End of Block: Students' behavior and discipline

Start of Block: Subjective Norm

Q13.1 Do you agree with the following statements:

	Agree (1)	Neither agree nor disagree (2)	Disagree (3)
I believe female students should be taught in a coeducational setting. (1)	○	○	○
Learning in a coeducational setting is acceptable in Saudi society. (2)	○	○	○
Using partitions in a coeducational setting is acceptable in Saudi society. (3)	○	○	○
Using the double decked bench system to separate genders is acceptable in Saudi society. (4)	○	○	○

هل توافق على العبارات التالية :

	(1) موافق	(2) محايد	(3) غير موافق
(1) أعتقد أن الطالبات يجب أن يتم تدريسهن في بيئة مختلطة.	○	○	○
(2) التعليم في بيئة مختلطة أمر مقبول في المجتمع السعودي.	○	○	○
(3) استخدام الحواجز الخشبية أو الزجاجية للفصل بين الجنسين في التعليم المختلط مقبول في المجتمع السعودي.	○	○	○
(4) استخدام نظام المقاعد ذو الطابقين للفصل بين الجنسين في التعليم المختلط مقبول في المجتمع السعودي	○	○	○

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Male faculty member

Q13.2 Rank the following classroom configurations in order of your personal preference. Drag and place the items in the order of most preferred at the top to least preferred at the bottom.

_____ CCTV (1)

_____ VCR (2)

_____ Videoconferencing (3)

_____ Partition (4)

_____ Double Decker Bench System (5)

_____ Direct instruction with co-education (6)

_____ Direct instruction with separated-education (7)

رتب من وجهة نظرك أي الوسائل تعتبر أكثر فاعلية في تواصلك مع الطالبات خلال المحاضرة.

اسحب وضع العناصر بالترتيب حسب الأفضل في الأعلى .

(1) الدوائر التلفزيونية المغلقة_____

(2) شبكة الفي سي آر_____

(3) شبكة الفيديوكونفرنس_____

(4) نظام الحواجز الخشبية أو الزجاجية_____

(5) نظام المقاعد ذو الطابقين_____

(6) تعليم مباشر مختلط بين الطلاب والطالبات_____

(7) تعليم مباشر من قبل عضو هيئة التدريس للطالبات بدون طلاب_____

Display This Question:

If In order to be directed to the right survey questions, please indicate whether you are a female s... = Female student

Q13.3 Rank the following classroom configurations in order of your personal preference. Drag and place the items in the order of most preferred at the top to least preferred at the bottom.

_____ CCTV (1)

_____ VCR (2)

_____ Videoconferencing (3)

_____ Partition (4)

_____ Double Decker Bench System (5)

_____ Direct instruction with co-education (6)

_____ Direct instruction with separated-education (7)

رتبي من وجهة نظرك أي الوسائل تعتبر أكثر فاعلية في تواصلك مع عضو هيئة التدريس خلال المحاضرة.
اسحبي وضعي العناصر بالترتيب حسب الأفضل في الأعلى .

(1) الدوائر التلفزيونية المغلقة_____

(2) شبكة الفي سي آر_____

(3) شبكة الفيديوكونفرنس_____

(4) نظام الحواجز الخشبية أو الزجاجية_____

(5) نظام المقاعد ذو الطابقين_____

(6) تعليم مختلط_____

(7) تعليم مباشر من قبل عضو هيئة التدريس للطالبات بدون طلاب_____

End of Block: Subjective Norm

Appendix G - Factors Restricting Communication

Table 25. Factors Restricting Communication

Factors	Mean Responses for Female Students	SD Standard Deviation for Female Students	Mean Responses for Male Faculty	SD Standard Deviation for Male Faculty
Technical problems	2.41	1.62	2.57	2.08
Female students' lack of ambition	4.21	1.51	3.43	1.47
Female students' lack of interest (indifference)	3.59	1.65	3.30	1.68
Female students are too shy to speak in front of a male faculty member	2.73	1.49	3.22	1.41
Female students are too shy to speak in front of male classmates	3.24	1.48	3.70	1.73
Other cultural factors	5.62	1.28	5.74	0.94
Other religious factors	6.21	1.37	6.04	1.43

Appendix H - Cognitive Presence in CCTV and VCR Classrooms

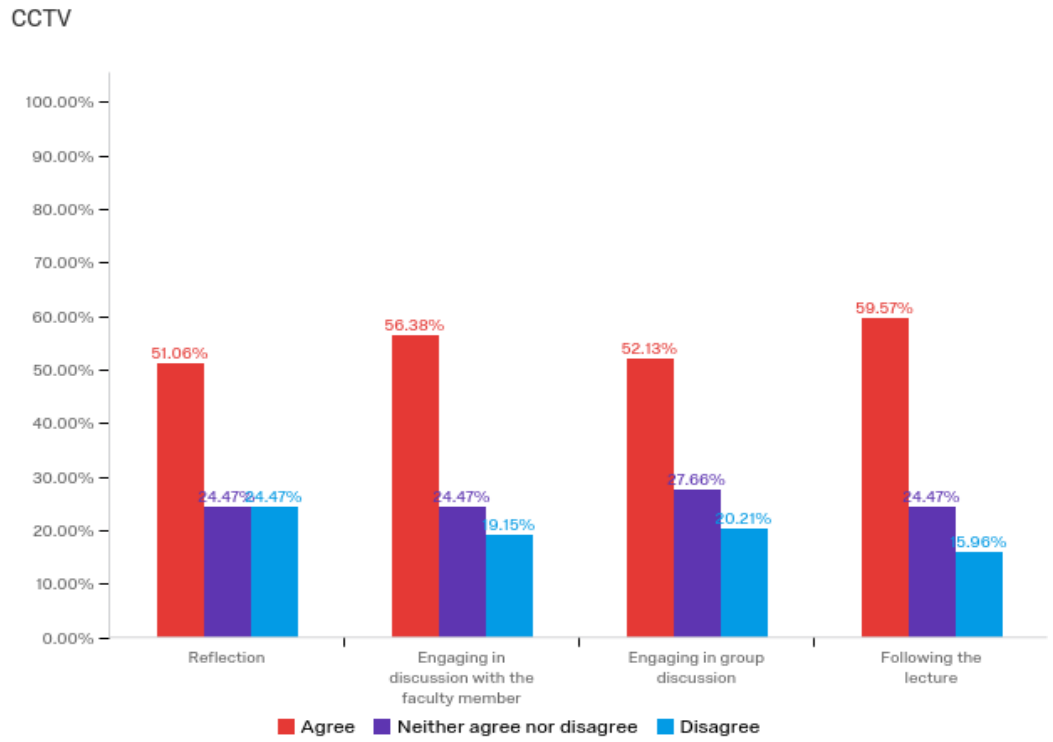


Figure 21. Cognitive Presence in CCTV Classrooms

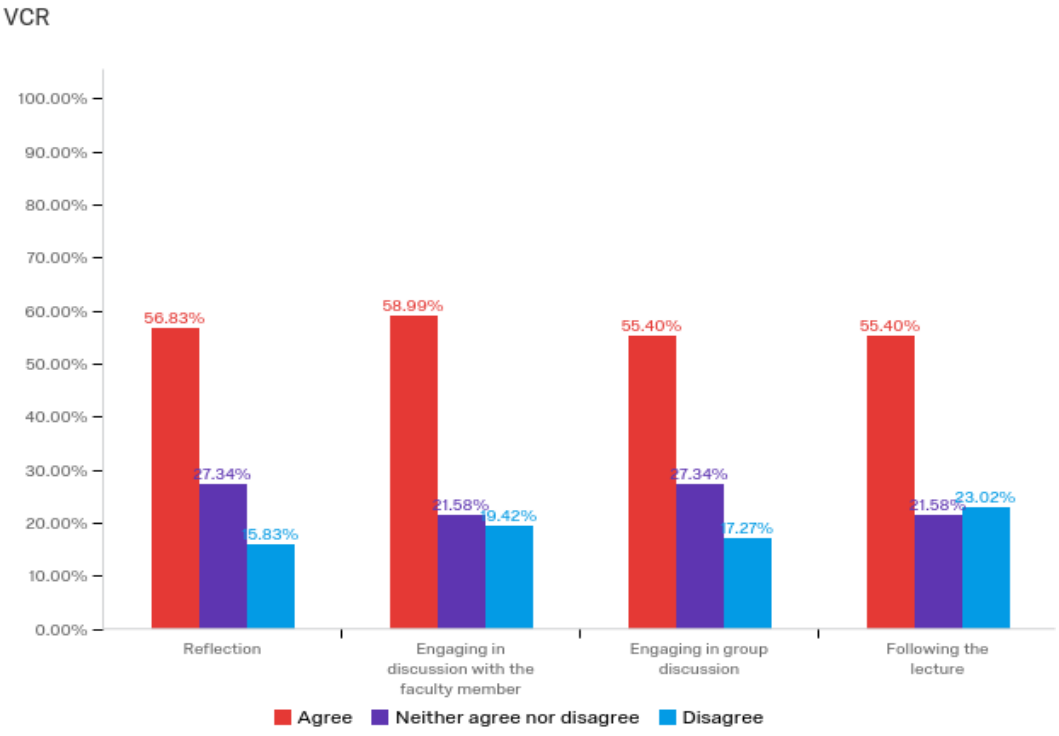


Figure 22. Cognitive Presence in VCR Classrooms

Appendix I - Female Student and Male Faculty Perspectives on Cognitive Presence

Table 26. Female Students' Perspectives of Cognitive Presence

#	The classroom configuration allows students to understand the material through the following actions:	Agree		Neither agree nor disagree		Disagree		Total
1	Reflection	55.37%	134	26.45%	64	18.18%	44	242
2	Engaging in discussion with the faculty member	56.61%	137	25.21%	61	18.18%	44	242
3	Engaging in group discussion	56.20%	136	27.27%	66	16.53%	40	242
4	Following the lecture	57.02%	138	23.97%	58	19.01%	46	242

Table 27. Male Faculty's Perspectives of Cognitive Presence

#	The classroom configuration allows students to understand the material through the following actions:	Agree		Neither agree nor disagree		Disagree		Total
1	Reflection	69.57%	16	17.39%	4	13.04%	3	23
2	Engaging in discussion with the faculty member	78.26%	18	8.70%	2	13.04%	3	23
3	Engaging in group discussion	60.87%	14	17.39%	4	21.74%	5	23
4	Following the lecture	78.26%	18	8.70%	2	13.04%	3	23

Appendix J - Teaching Presence in CCTV and VCR Classrooms

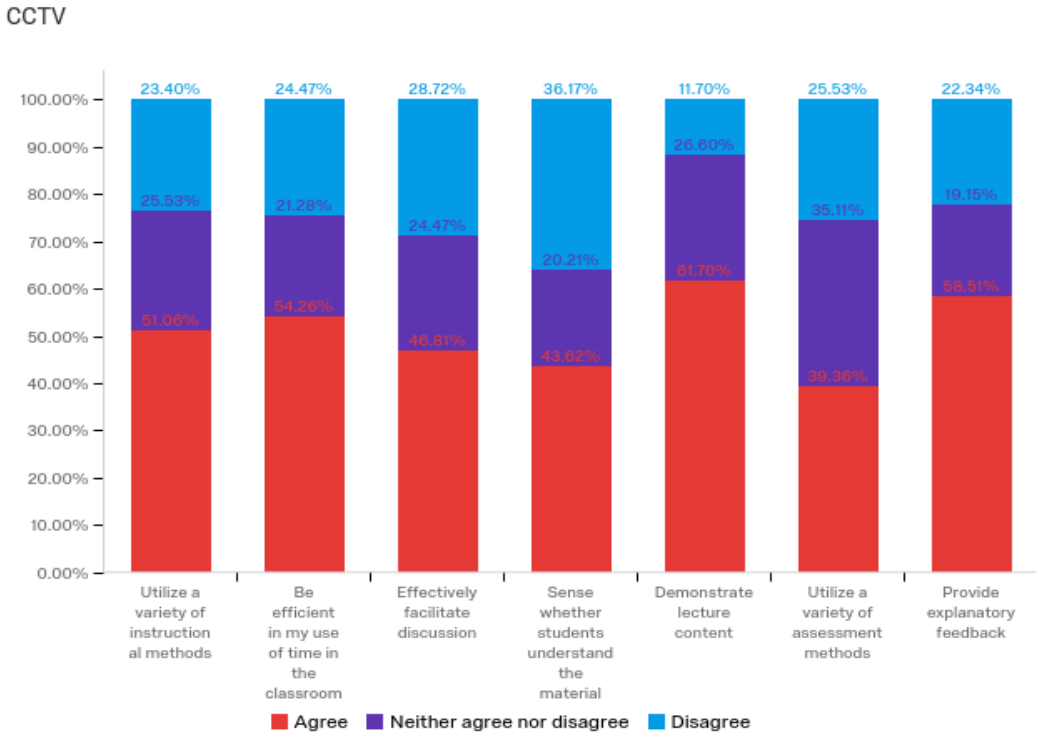


Figure 23. Teaching Presence in CCTV Classrooms

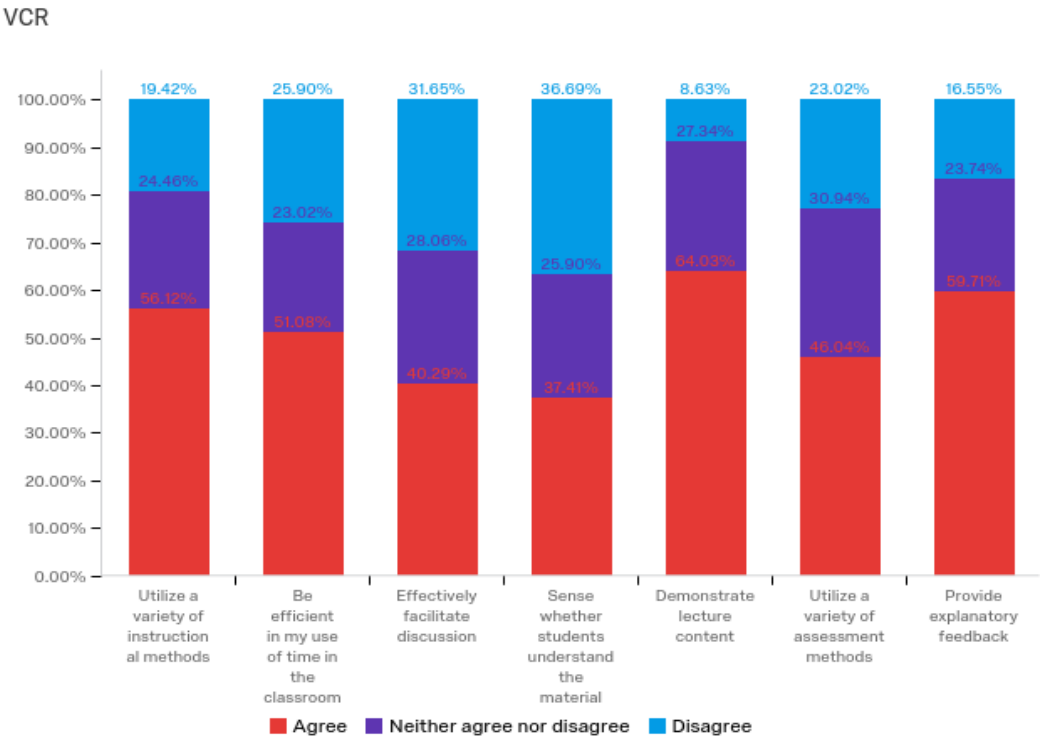


Figure 24. Teaching Presence in VCR Classrooms

Appendix K - Female Student and Male Faculty Perspectives on Teaching Presence

Table 28. Female Students' Perspectives of Teaching Presence

Q8.1	Does the classroom configuration enable male instructors to do the following:	Agree		Neither agree nor disagree		Disagree		Total
1	Utilize a variety of instructional methods	53.72%	130	25.21%	61	21.07%	51	242
2	Be efficient in my use of time in the classroom	53.72%	130	23.97%	58	22.31%	54	242
3	Effectively facilitate discussion	45.45%	110	27.69%	67	26.86%	65	242
4	Sense whether students understand the material	43.39%	105	22.73%	55	33.88%	82	242
5	Demonstrate lecture content	62.40%	151	28.10%	68	9.50%	23	242
6	Utilize a variety of assessment methods	45.04%	109	31.82%	77	23.14%	56	242
7	Provide explanatory feedback	60.33%	146	22.73%	55	16.94%	41	242

Table 29. Male Faculty's Perspectives of Teaching Presence

Q8.1	Does the classroom configuration enable male instructors to do the following:	Agree		Neither agree nor disagree		Disagree		Total
1	Utilize a variety of instructional methods	86.96%	20	8.70%	2	4.35%	1	23
2	Be efficient in my use of time in the classroom	65.22%	15	13.04%	3	21.74%	5	23
3	Effectively facilitate discussion	60.87%	14	13.04%	3	26.09%	6	23
4	Sense whether students understand the material	60.87%	14	13.04%	3	26.09%	6	23
5	Demonstrate lecture content	86.96%	20	8.70%	2	4.35%	1	23
6	Utilize a variety of assessment methods	73.91%	17	17.39%	4	8.70%	2	23
7	Provide explanatory feedback	73.91%	17	4.35%	1	21.74%	5	23

Appendix L - Female Students' and Male Faculty's Self-Efficacy

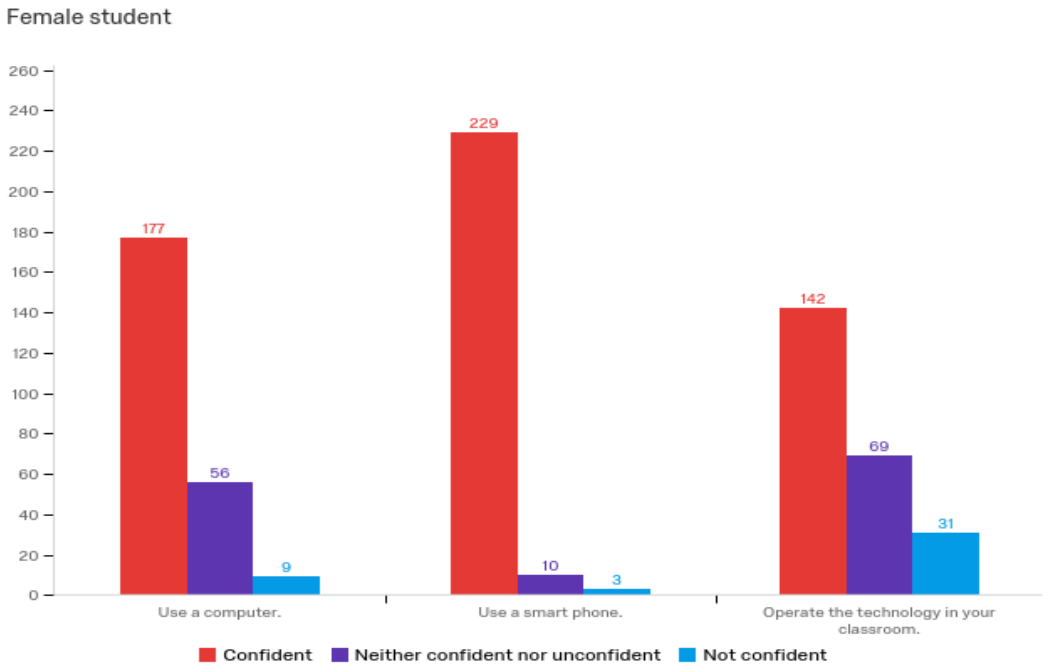


Figure 25. Female Students' Self-Efficacy

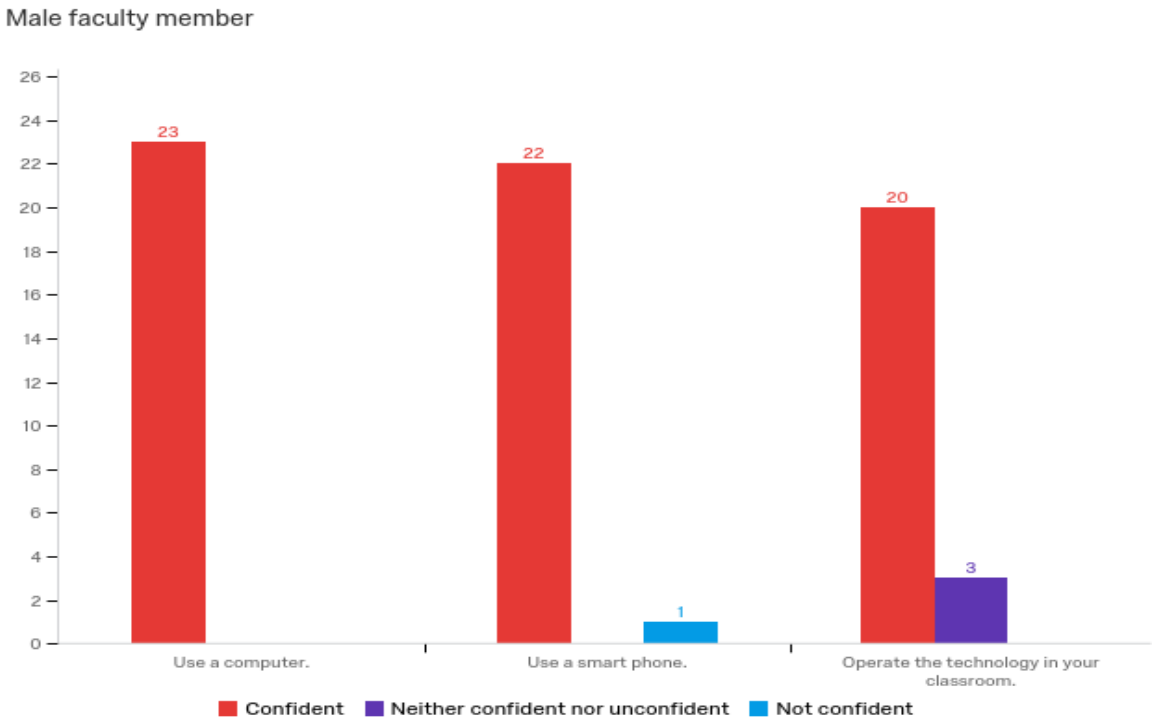


Figure 26. Male Faculty's Self-Efficacy

Appendix M - Technical Difficulties with CCTV and VCR

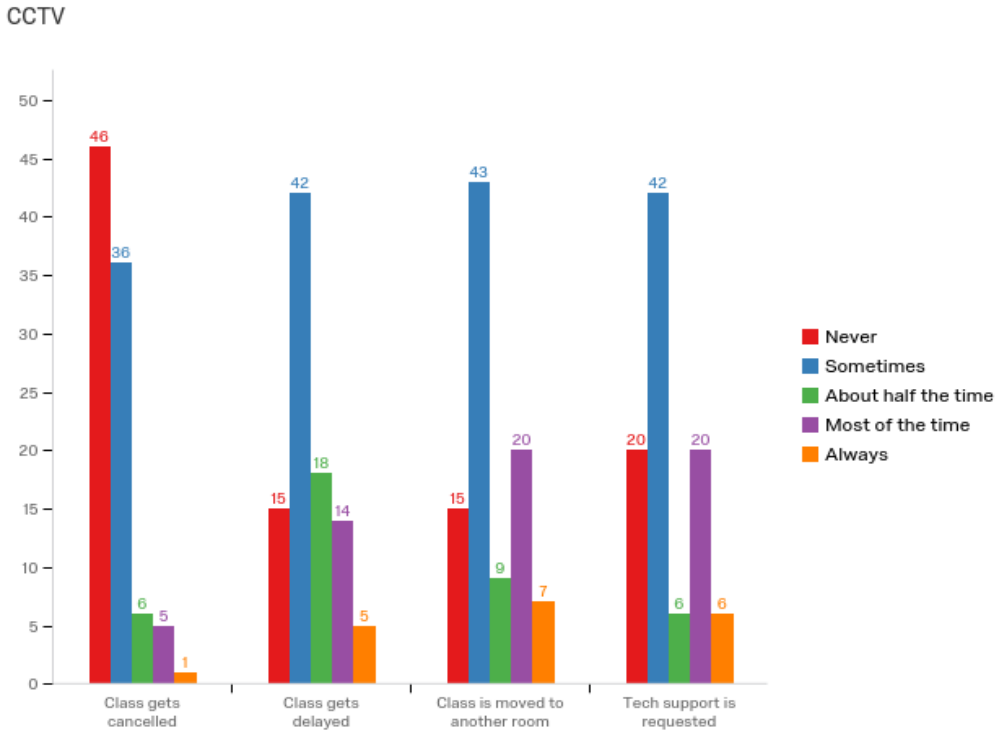


Figure 27. Technical Difficulties with CCTV

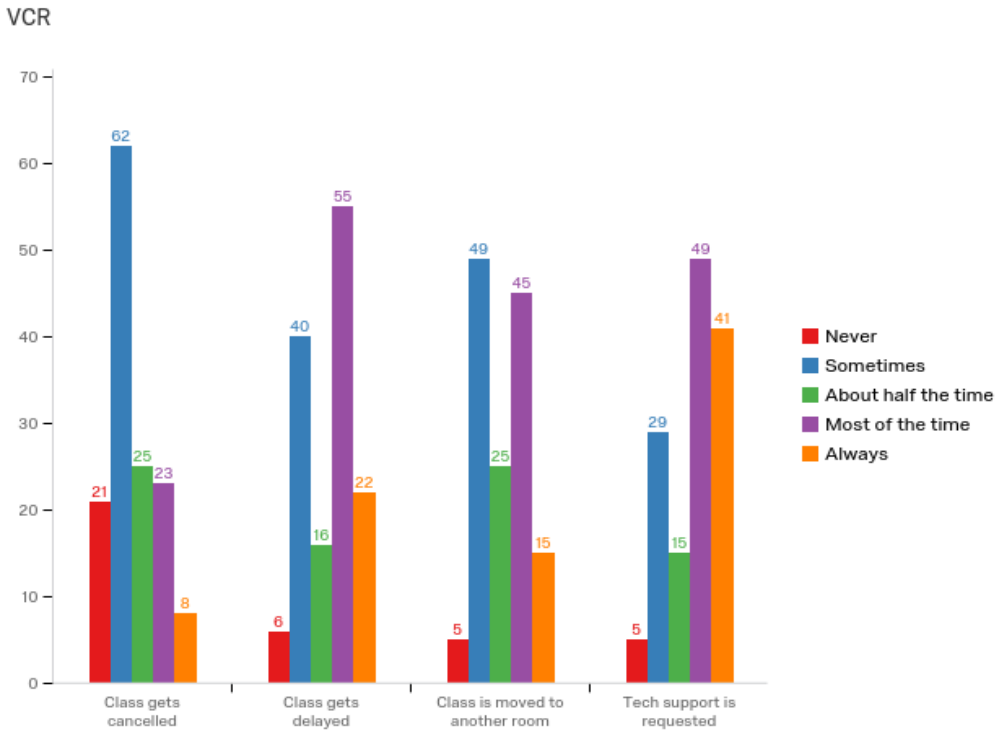


Figure 28. Technical Difficulties with VCR

Appendix N - Causes of Network Disruptions in CCTV and VCR Classrooms

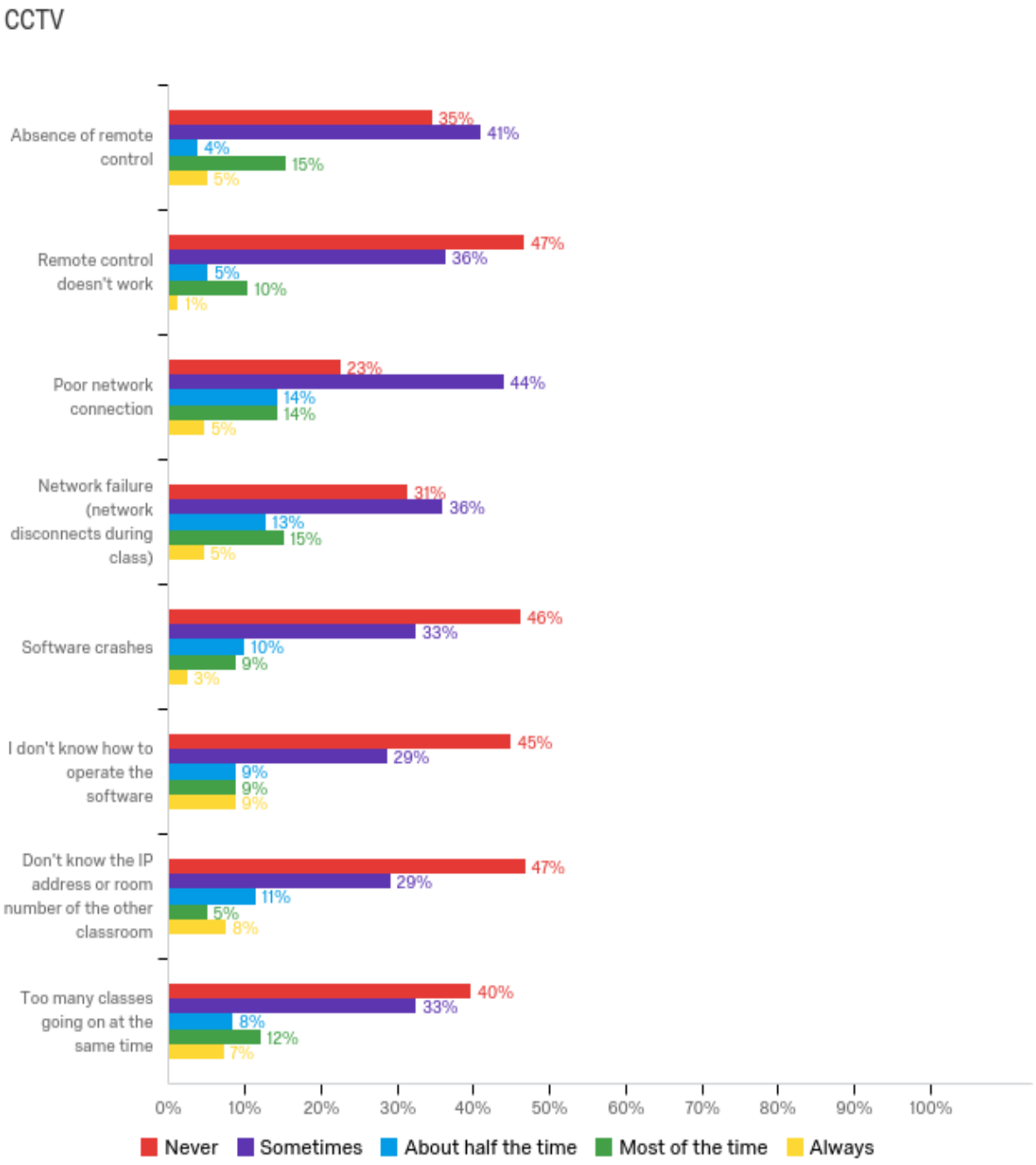


Figure 29. Causes of Network Disruption in CCTV Classrooms

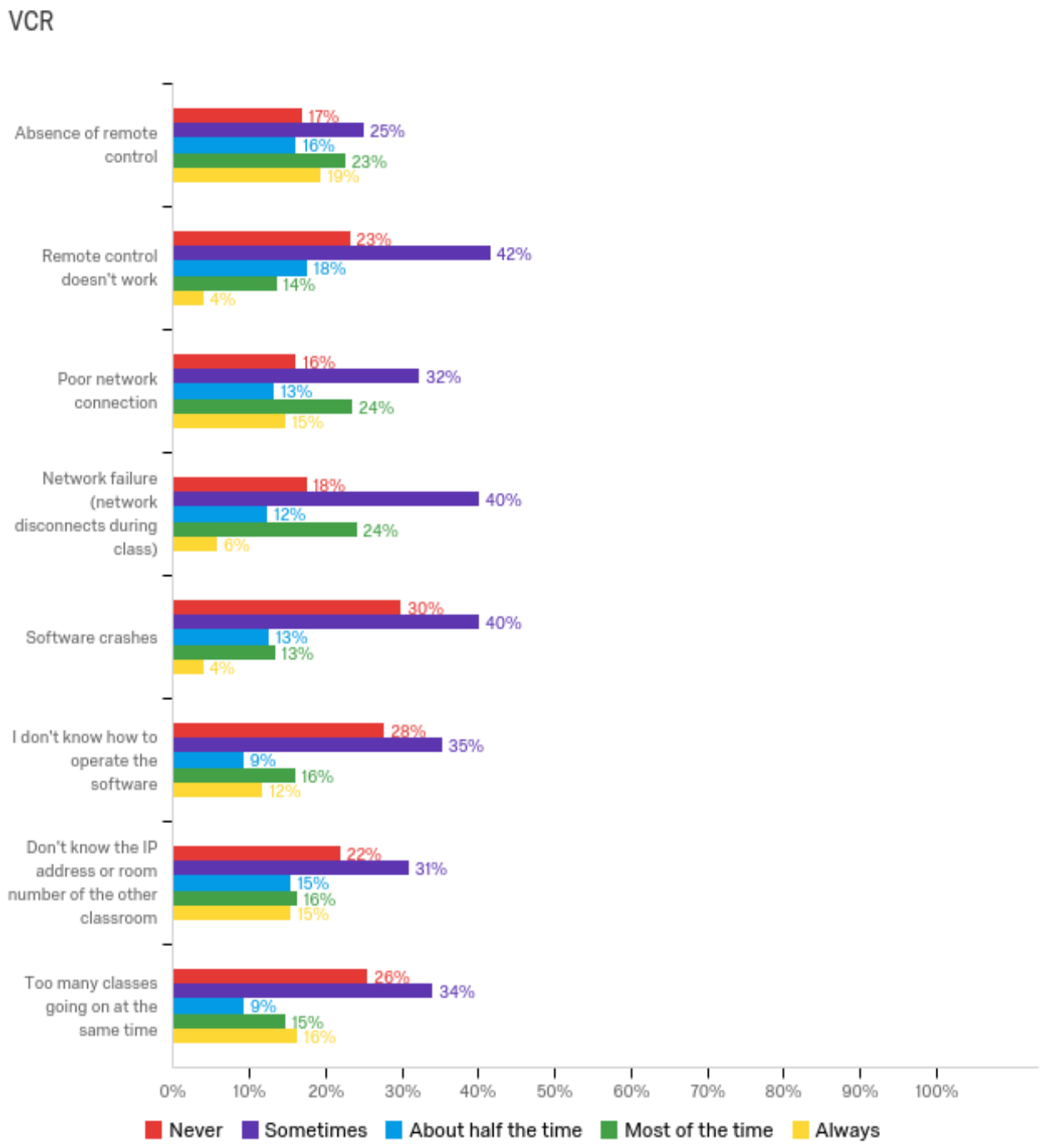


Figure 30. Causes of Network Disruptions in VCR Classrooms

Appendix O - Frequency of Audio and Video Difficulties in CCTV and VCR Classrooms

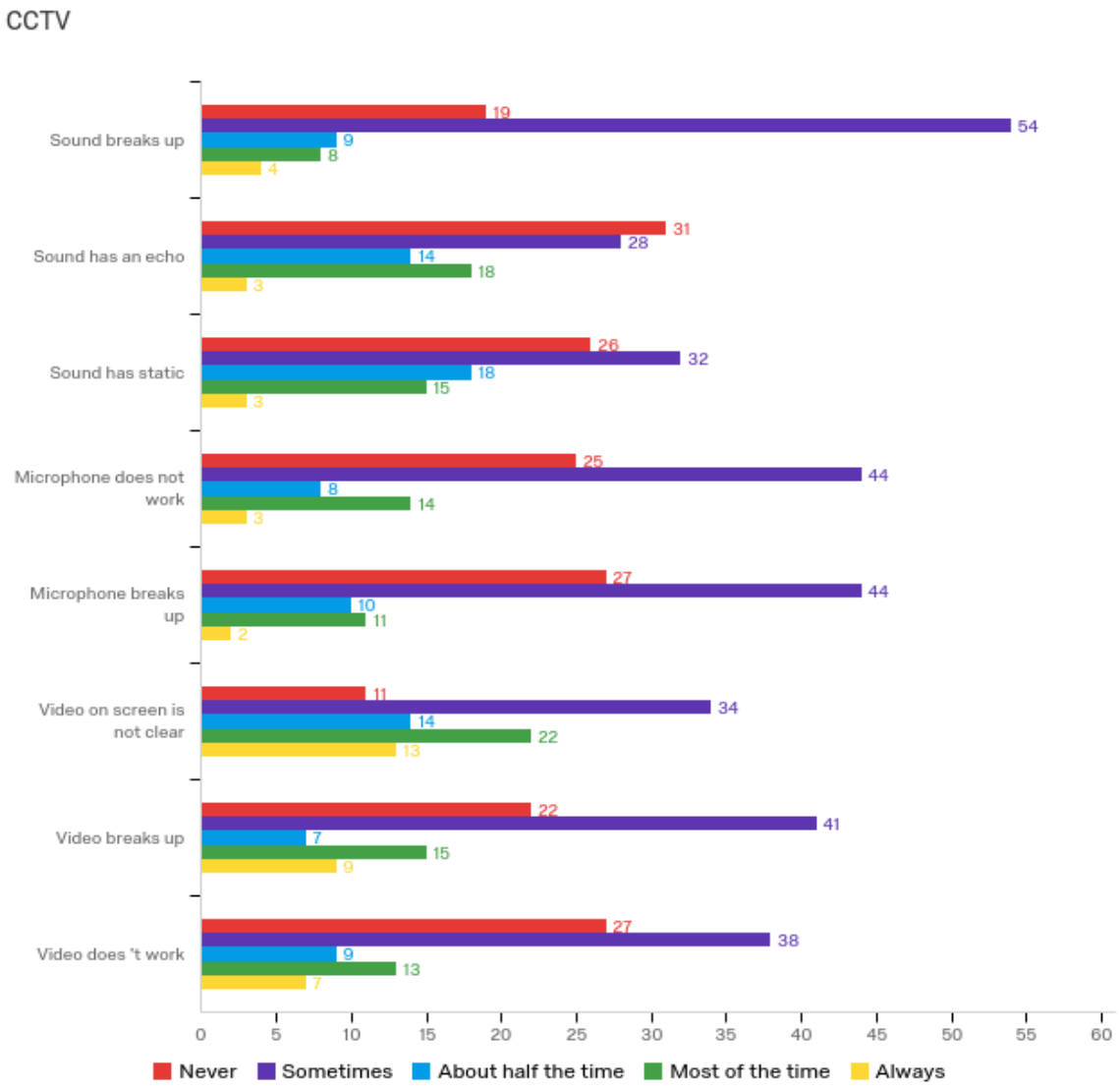


Figure 31. Audio and Video Difficulties in CCTV Classrooms

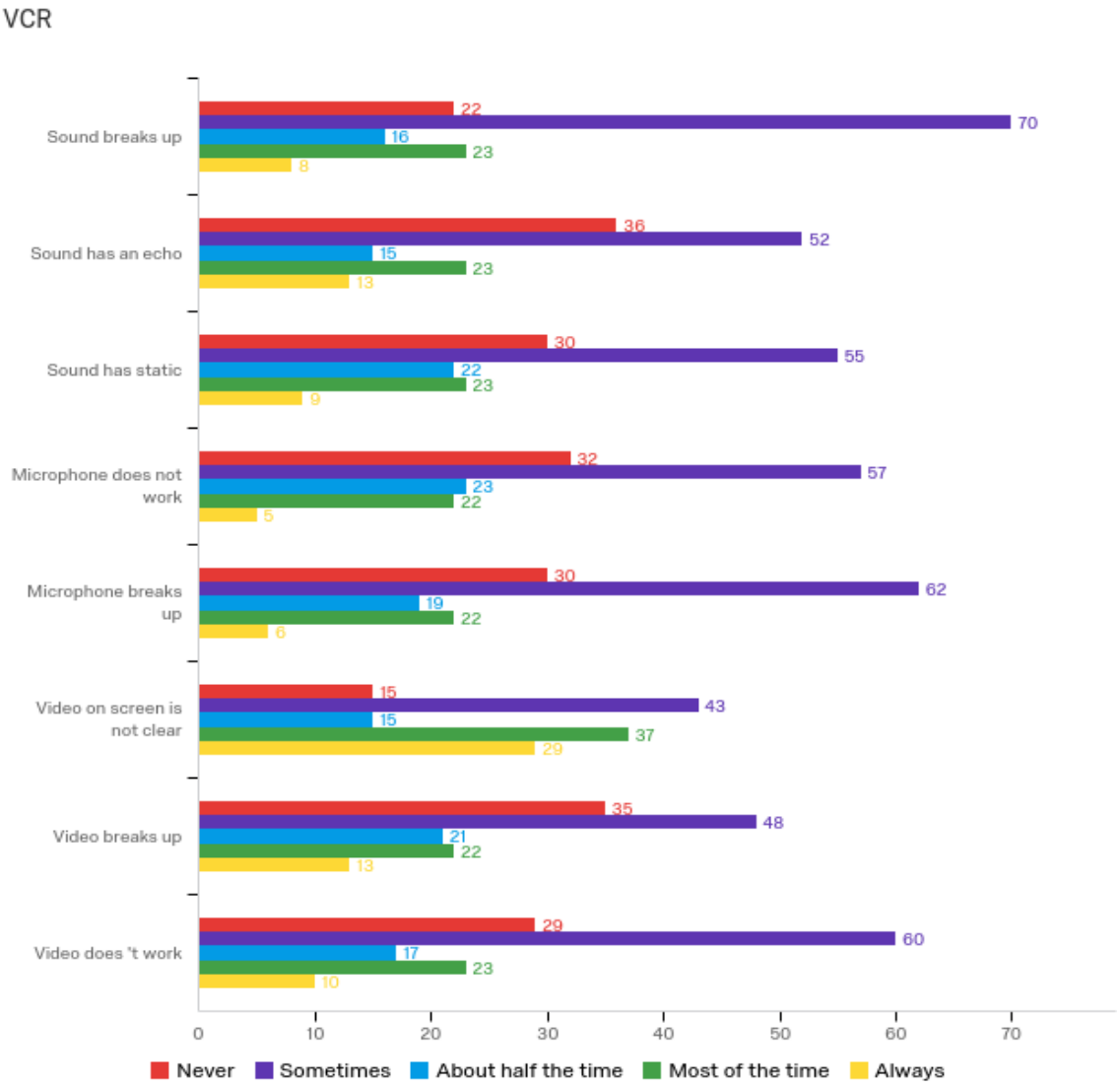


Figure 32. Audio and Video Difficulties in VCR Classrooms